

### 1.1.9 EE in public buildings - Piaseczno (PL)

Piaseczno is a semi-urban municipality located in the central part of Poland, in the Warsaw Metropolitan Area (WMA). It covers an area of 12.823 ha and has more than 70.000 inhabitants, which makes it the most populated municipality in Poland.

Piaseczno's location in the vicinity of the Capital City of Warsaw significantly contributed to its dynamic economic development, but also to the degradation of the local natural environment. Therefore, the local authorities are undertaking many actions aiming at improving this situation, including actions focused on climate protection, reduction of GHG emissions, increasing energy efficiency, improving air quality and increasing local energy security. On the 21<sup>st</sup> of September 2011 Piaseczno joined the Covenant of Mayors, thus committing to reduce its CO<sub>2</sub> emissions by at least 20% by 2020 in comparison with the baseline year which is 2008. In order to fulfill this commitment Piaseczno developed a *Sustainable Energy Action Plan (SEAP)*, which describes the long-term vision of the sustainable development of the municipality:

*„Piaseczno will create good conditions for the development of low-carbon economy and will ensure good quality of life of the citizens by reducing emissions of pollutants and by increasing energy efficiency”.*

The SEAP also includes a set of actions that will be carried out by the municipality to make this vision come true. The plan was officially adopted by the Municipal Council on the 23<sup>rd</sup> of October 2013. It is planned that its implementation will contribute to the increase in energy efficiency and RES use resulting in CO<sub>2</sub> reduction reaching 24% in 2020 (compared to 2008).

#### **Baseline situation**

In 2008 total CO<sub>2</sub> emission from the territory of the municipality came to 659 687 Mg CO<sub>2</sub>. It slightly decreased in the next years reaching 635 196 Mg CO<sub>2</sub> in 2011. Results of the emission inventory conducted for 2011 showed, however, that the CO<sub>2</sub> emission increased in the transport sector (increase by 11,11%) and residential buildings sector (increase by 3,97%). Taking into account the results of the baseline and monitoring emission inventory, as well as the prognosis conducted for 2020, it was estimated that the municipality of Piaseczno has to reduce its energy consumption by **632.499 MWh/year**, reduce its CO<sub>2</sub> emission by **24.355 Mg CO<sub>2</sub>/year** and increase RES production by **440 MWh/year** to reach Covenant of Mayors targets set for 2020.

It was also estimated that large CO<sub>2</sub> reduction potential is connected with implementation of energy saving measures in buildings, including public utility buildings. The latter are very important due to the relative easiness of implementation of sustainable energy actions, as well as due to the motivating effect that these actions may have on the citizens and local stakeholders (municipality acting as a model for the others, giving them good example). Moreover, European directives on EE highlight the important model role of the public sector in

this area. It is expected that thermal retrofitting of selected municipal buildings will result in **decreasing energy consumption of the municipality by 2.800 MWh/year** and in decreasing its **CO<sub>2</sub> emissions by 562 Mg/year**.

Complex thermal retrofitting of municipal buildings will be implemented in the period of 2013-2020 and started with the retrofitting of two buildings, which are the topic of this study - railway station in Piaseczno and fire station in Chojnów (village within the boundaries of the Piaseczno municipality). The aim of the action is to reduce energy consumption of the buildings and thus reduce accompanying CO<sub>2</sub> emissions and improve the quality of air. The body responsible for the implementation of the action is the Investment Department of the Municipality of Piaseczno. Persons involved in the task are high-qualified and experienced. Thermal retrofitting of analysed buildings will also bring social and economical benefits and will help the municipality to reach its targets resulting from signing the Covenant of Mayors.

#### **Thermal retrofitting of the building of the railway station in Piaseczno**

Thermal retrofitting of the railway station in Piaseczno is a part of the complex revitalization of this building, which was constructed in the 30-ties of the XX century. Implementation of the project started in 2013 and will be finished in 2014. The works will include: (1) hydro and thermal insulation of the foundation wall, (2) replacement of windows and doors, (3) construction of the central heating system with the boiler house fired with natural gas, (4) modernization of the electrical system and (5) elaboration of the energy certificate in accordance with the construction law. The thermal retrofitting will be accompanied by other renovation works, including: replacement of the wooden roof framing, demolition of some partition walls, rebuilding the roof over the higher part of the building and revitalization of the area around the building (pavements, green places, etc.)

Originally, the railway station building was heated with heating oil and electricity. After the thermal retrofitting it will have a separate boiler house with two gas-fired boilers with the capacity of 50 kW each. However, this will be a temporary solution as it is planned that - as soon as it will be possible - the building will be connected to the municipal district heating network.

It was estimated that the total cost of the thermal retrofitting of the railway station building will come to 1.988.330,29 PLN (**approximately 497.000 €**). It will be covered partly from the **municipal budget** and partly from the loan granted within the **JESSICA initiative** (the funds are distributed via Regional Operational Programme for Mazowieckie Voivodeship for the years 2007-2013). The annual costs savings resulting from improved energy efficiency will amount to 110.550 PLN (approximately 27.640 €), while annual CO<sub>2</sub> emissions reduction will amount to 276 Mg CO<sub>2</sub>.

The body responsible for the thermal retrofitting of the railway station building is the Investment Department of the Municipality of Piaseczno. Until now the technical documentation of the project was completed, construction permit was arranged, call for

tenders was announced (on the 28<sup>th</sup> of January 2014; the best offer was not selected yet) and the application for the loan from the JESSICA initiative was submitted.



**Figure 9 Present state of the railway station in Piaseczno**



**Figure 10 Visualisation of the new railway station**

### **Thermal retrofitting of the building of the fire station in Chojnów (municipality of Piaseczno)**

Thermal retrofitting of the fire station in Chojnów is already finalized and was conducted in the period 24.10.2013 - 20.01.2014. The project included *inter alia*: (1) thermal insulation of external walls, (2) thermal insulation of ventilated flat roof and (3) repair of the chimneys. The flat roof was insulated with the layer of 18 cm thick mineral wool laid down on a steam insulation film (after removing previous leca insulation). Thermal retrofitting of the building was connected with other modernization works, including replacement of the metal components (gutters, sanitary pipes, window sills, chimney caps, etc.) and replacement of the lightning installation.

The contractor, who conducted the thermomodernisation works, was selected in a tendering procedure. The total cost of the action came to 126.353,17 PLN (**approximately 31.600 €**). It was financed entirely from the municipal budget.

Thermal retrofitting of the fire station in Chojnów resulted in the reduction of energy consumption amounting to approximately 40 kWh/m<sup>2</sup>/year (so for the whole building amounting to approximately 21.355,20 kWh/year) and CO<sub>2</sub> emissions reduction amounting to 4,29 Mg CO<sub>2</sub>/year. The thermomodernisation works ended in January 2014 and the as-built documentation was submitted to the investor, i.e. the municipality of Piaseczno. Currently the contractor is removing the faults found during the user acceptance procedure.

### **Environmental and social benefits of the action**

Below are listed main environmental benefits associated with the thermal retrofitting of the building of the railway station in Piaseczno and the building of the fire station in Chojnów:

- Reduction of the demand for the fossil fuels (heating oil, hard coal, etc.);
- Reduction of the CO<sub>2</sub> and other GHG emissions;

- Reduction of particulate emissions;
- Improving air quality at the area of the municipality.

Main social benefits associated with the action are following:

- Improvement of the thermal comfort in the buildings, connected with reduction of humidity and mould;
- Improvement of the health of the citizens resulting from improved air quality due to reduction of pollutant emissions;
- Economical benefits resulting from the reduction of the costs of heating buildings and the development of local companies involved in the investment;
- Improvement of the external appearance of the buildings.

Additional support for the municipality of Piaseczno was an opportunity to exchange experience and best practices with the municipality of Guadix - Spanish twinning partner. During the study visit organized in July 2013 both municipalities signed the Memorandum of Cooperation committing to undertake common actions for environmental and climate protection. Moreover, representatives of Piaseczno municipality had an opportunity to get familiar with the energy projects implemented not only in Guadix, but also in other municipalities of the Province of Granada. They learned about the technical parameters of the installations, legal procedures, financing schemes, economic aspects, etc.

To sum up, thermal retrofitting of the building of the railway station in Piaseczno and the building of the fire station in Chojnów will directly contribute to the reduction of energy consumption, reduction of energy costs and reduction of CO<sub>2</sub> emissions by at least 280,29 Mg CO<sub>2</sub>/year. The project will also help the municipality of Piaseczno to fulfill its commitments resulting from the signing of the Covenant of Mayors.

Table 9 below summarises the results of the technical, financial, socio-economical and organisational analysis of the action entitled “Thermal retrofitting of two municipal buildings (railway station and fire station) in the municipality of Piaseczno”.

**Table 8 Summary of the findings of the assessment study of the action “Thermal retrofitting of two municipal buildings (railway station and fire station) in the municipality of Piaseczno”**

Technical/ Environmental Assessment	Title	“Thermal retrofitting of two municipal buildings (railway station and fire station) in the municipality of Piaseczno”
	Baseline scenario data concerning municipal buildings sector (kWh, tCO <sub>2</sub> )	44.199 MWh, 10.326 tCO <sub>2</sub>
	Technical specifications	<ul style="list-style-type: none"> <li>• <b>Thermal retrofitting of the building of the railway station in Piaseczno:</b> Hydro and thermal insulation of the foundation wall, replacement of windows and</li> </ul>

		<p>doors, construction of the central heating system with the boiler house fired with natural gas<sup>3</sup> and modernization of the electrical system.</p> <ul style="list-style-type: none"> <li>• <b>Thermal retrofitting of the building of the fire station in Chojnów (municipality of Piaseczno):</b> Thermal insulation of external walls, thermal insulation of the ventilated flat roof and other measures</li> </ul>
	Energy savings	<ul style="list-style-type: none"> <li>• Building of the railway station in Piaseczno – 154.888 kWh/year</li> <li>• Building of the fire station in Chojnów – 21.355,20 kWh/year</li> </ul>
	CO <sub>2</sub> savings	<ul style="list-style-type: none"> <li>• Building of the railway station in Piaseczno - 276 Mg CO<sub>2</sub></li> <li>• Building of the fire station in Chojnów - 4,29 Mg CO<sub>2</sub></li> </ul>
Financial assessment	Financing scheme	Municipality's own funds & Loan granted within the JESSICA initiative (distributed via Regional Operational Programme for Mazowieckie Voivodeship for the years 2007-2013)
	Project cost	<ul style="list-style-type: none"> <li>• Building of the railway station in Piaseczno - 1.988.330,29 PLN (approximately 497.000 €)</li> <li>• Building of the fire station in Chojnów - 126.353,17 PLN (approximately 31.600 €)</li> </ul>
	Payback period (in years)	<ul style="list-style-type: none"> <li>• Building of the railway station in Piaseczno - 18 years</li> <li>• Building of the fire station in Chojnów - 8,5 year</li> </ul>
Organisational assessment	Time schedule	2013-2014
	Body responsible for the implementation of the action	Investment Department of the Municipality of Piaseczno

<sup>3</sup> This is a temporary solution. As soon as it will be possible, the building will be connected to the municipal district heating system.