

„The Energy Efficiency Plan for the Gorlice County”

- the summary of the main thesis

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Introduction

The studies mentioned further were created under the VIS NOVA project. The studies contain the analysis of energy resources of the Gorlice County, the potential for development of Renewable Energy Sources (RES) and the status of energy efficiency. The documents include:

- “A SWOT Analysis for Renewable Energy Sources and Energy Efficiency in the Administrative District of Gorlice” (2012),
- “The development scenarios for renewable energy in the Gorlice County” (2013),
- “The Energy Efficiency Plan for the Gorlice County” (2014).

This study constitutes a summary of “The Energy Efficiency Plan for the Gorlice County” with the reference to the preceding documents.

Please visit www.powiatgorlicki.pl or www.basz.pl to download a full version of *The Energy Efficiency Plan for the Gorlice County*.

The aim of the study

The Energy Efficiency Plan sets targets for energy efficiency and defines specific actions required for efficient use of fuel and energy in key sectors, i.e.:

- households (the housing sector),
- municipal buildings and public institutions,
- business enterprises,
- transportation,
- lighting of public spaces.

The strategic action plan to improve energy efficiency is in line with the objectives of the VIS NOVA project, i.e.:

- an increase of energy efficiency in the region,
- an increase in regional production of energy from renewable sources.

Energy efficiency is at the core of the European energy policy and is one of the main objectives of the "Europe 2020" strategy for smart, sustainable and inclusive growth.

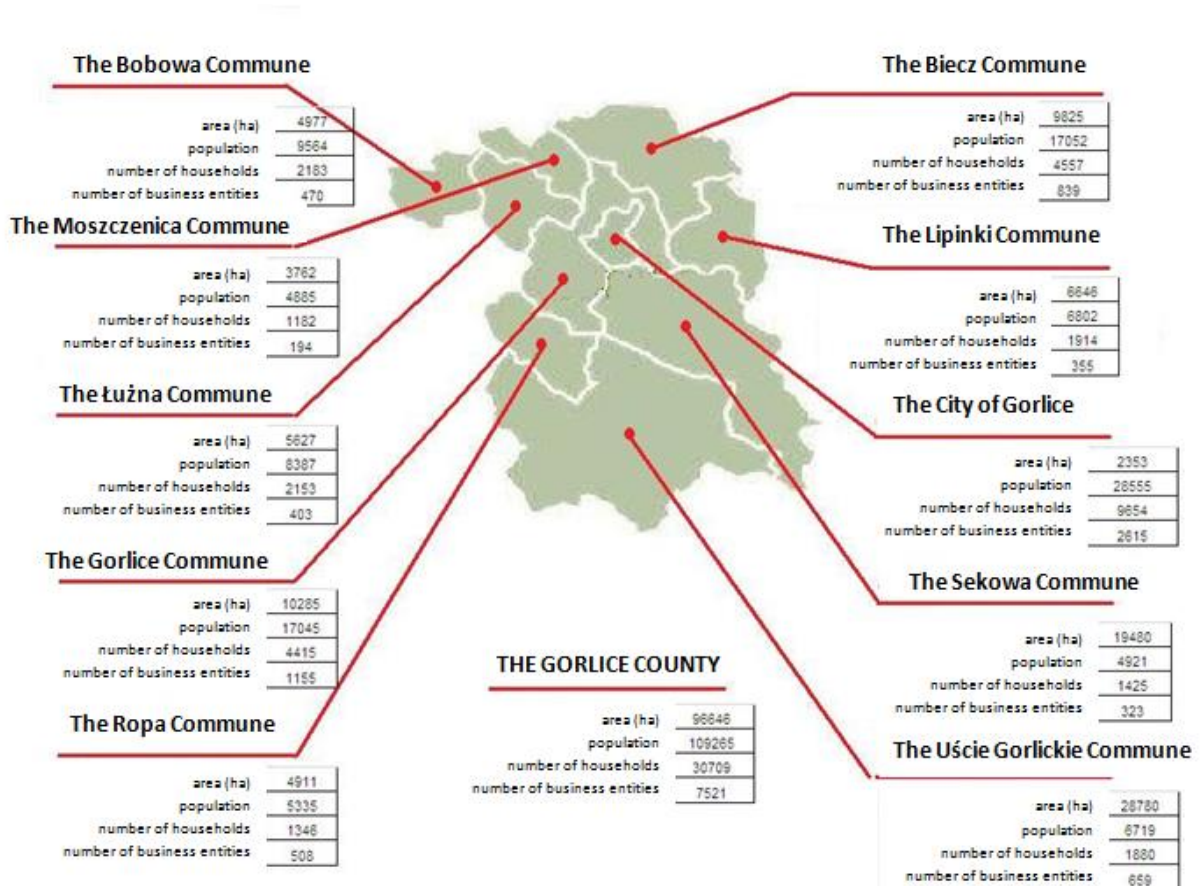
Methodology

The energy demand assessment in the study was based on:

- **actual energy consumption** in recent years (for groups of objects for which such data is available),
- **indicator methods** based on estimates, indicators of the energy intensity, fuel consumption rates, etc. (for groups of objects for which detailed data is not available).

The Gorlice County

The Gorlice County is located in the southeastern part of the Malopolska Region and it comprises: the City of Gorlice, two urban-rural communes: Biecz and Bobowa, seven rural communes: Gorlice, Lipinki, Łużna, Moszczenica, Ropa, Sękowa and Uście Gorlickie.

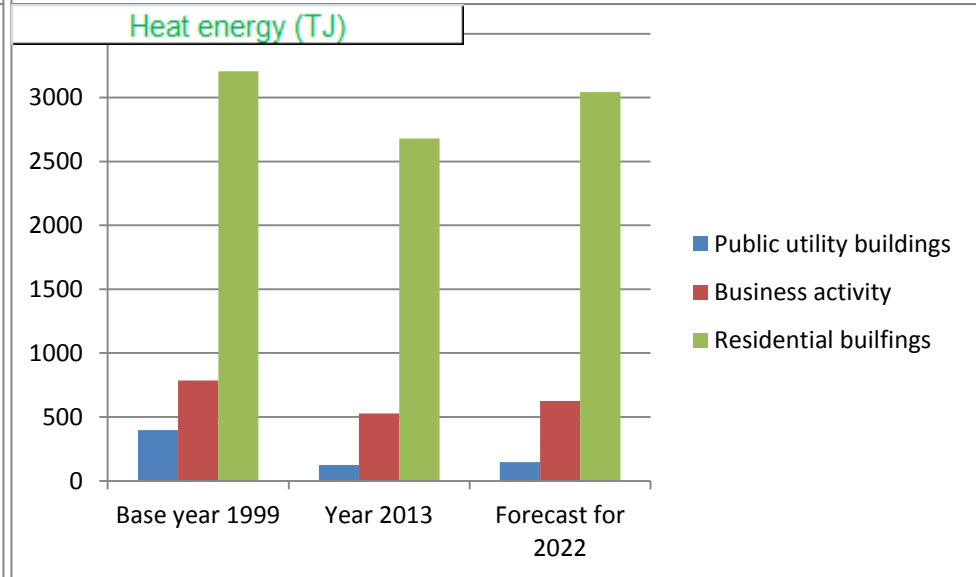
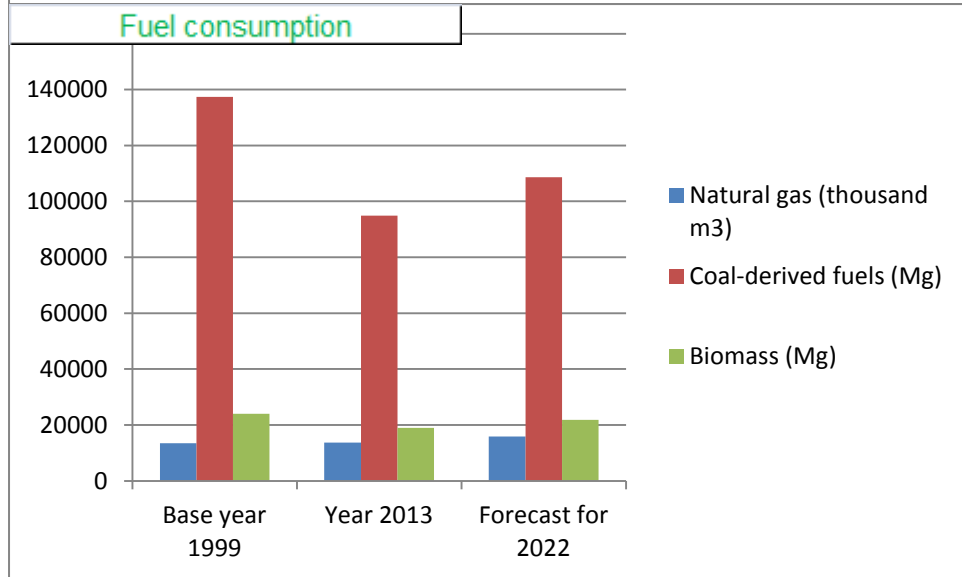
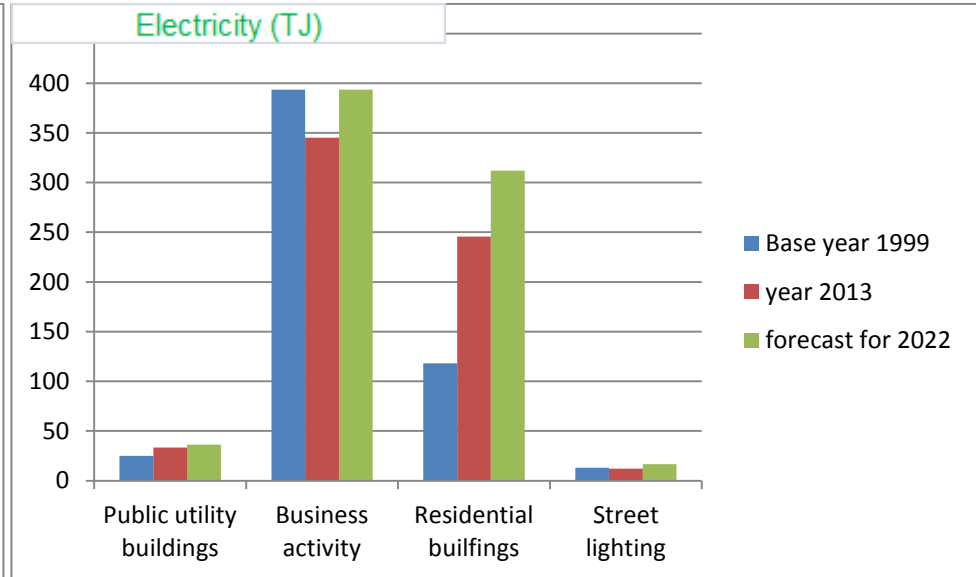
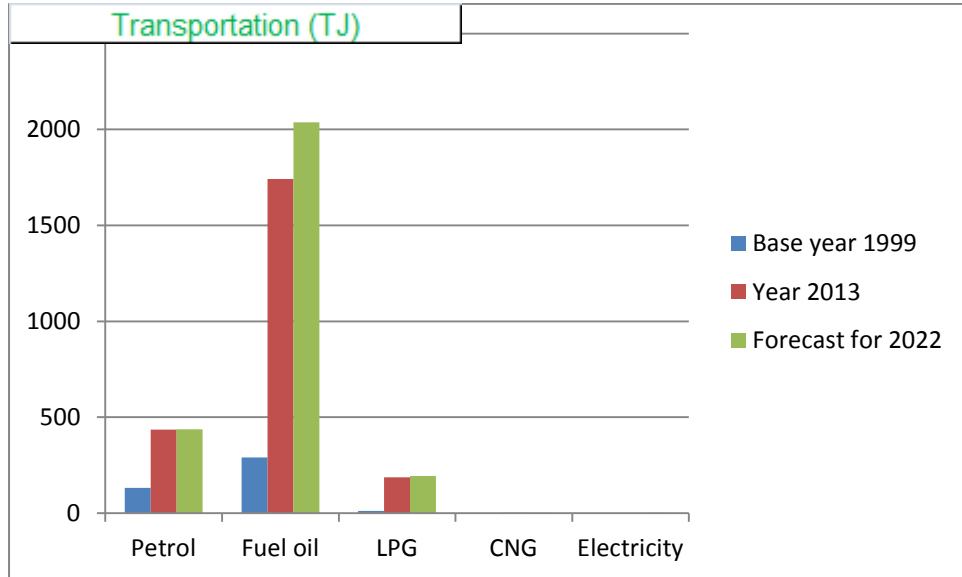


Energy demand

The below-mentioned charts represent energy and heat demand, liquefied fuels consumption in transport and the use of fuels for heating purposes. The data represents the following years:

- base year (1999),
- current state (data from 2012),
- forecast for 2022 (assuming no actions taken, described in the further part of the EEP).

THE ESTIMATED DEMAND FOR ENERGY AND FUELS IN THE GORLICE COUNTY FOR THE YEARS 1999, 2013 AND 2022 (THE FORECAST)



1 TJ = 277,78 MWh = 277777,78 kWh

The opportunities for energy efficiency improvement

The conducted analyses indicate that the residential sector shows the greatest potential for energy savings. There is almost no chance for obtaining external support for carrying out energy efficiency-related investments in this sector. The local governments can use the public utility buildings sector as a means of transferring modern, energy-efficient technologies, as well as promoting good practices related to them.

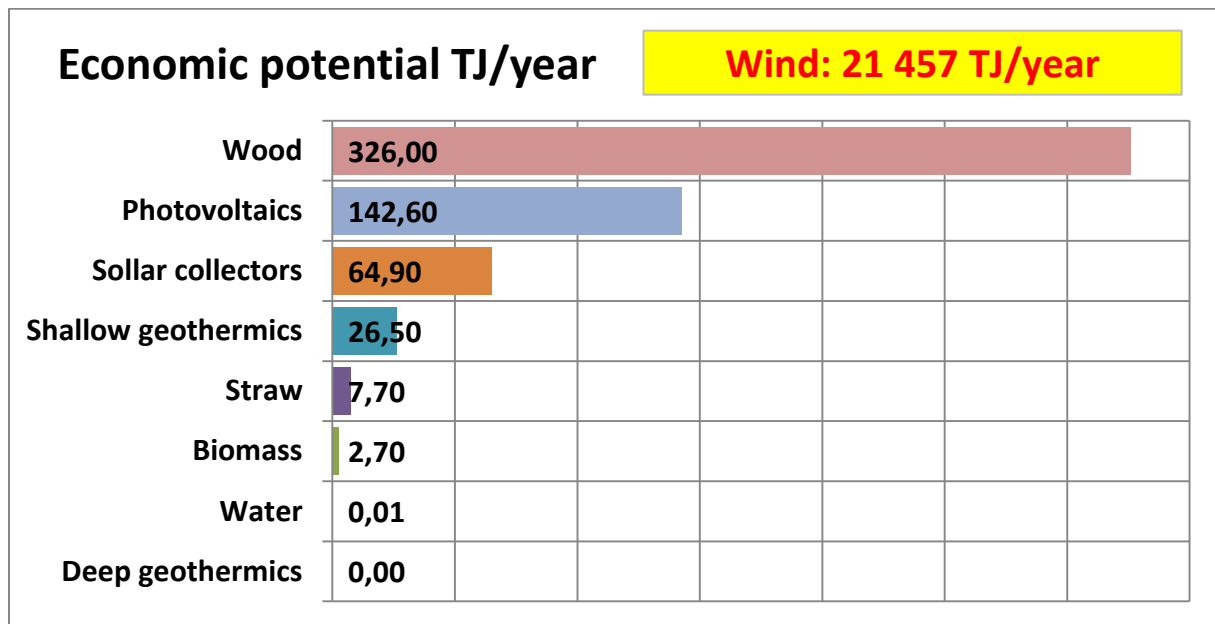
Estimated potential for energy savings in residential and public utility buildings in the Gorlice County

	Thermal retrofitting of a building	Replacement of heat source	Regulation of daily and weekly temperature regimes	Recovery of heat from ventilation air
Residential buildings				
Potential reduction of heat demand	20-60% (depending on the scope of improvements)	10-15%	5%	About 70% of heat losses used for heating of ventilation air
Estimated number of buildings to undergo thermo modernisation	approx. 12.000 buildings	approx. 11.000 buildings	approx. 12.500 buildings	approx. 2.000 buildings
Estimated savings potential (GJ/year)	360000	165000	75000	50000
Public utility buildings				
Potential reduction of heat demand	10-50% (depending on the scope of improvements)	5-15%	5-15%	
Estimated number of buildings to undergo thermo modernisation	142 buildings	35 buildings	approx. 200 buildings	
Estimated savings potential (GJ/year)	28400	1050	4000	

The calculations were made for a model building in accordance with the description of the EEP, Chapter 9

Renewable Energy Sources in the Gorlice County

The document "A SWOT Analysis for Renewable Energy Sources and Energy Efficiency in the Administrative District of Gorlice" from 2012 contains the analysis of resources of particular renewable energy sources of the County and the estimation of the energy potential of RES. The estimation included e.g. the potential which can be realized after considering economic and organisational criteria, as well as a number of limitations i.e. technical, legal and the ones concerning spatial development (the economic potential).



Biomass

The biomass resources are limited and it is difficult to expect an increase in supply.

The status evaluation and recommendations:

There are opportunities for a better utilization of the energy from the wood biomass through, inter alia, burning it in specialized wood furnaces. Informational activities as well as the possibility of co-financing replacement of old type boilers for more modern and efficient ones can increase the effectiveness of the use of wood biomass for energy purposes.

Hydro energy

The Gorlice Region does not have significant potential for energy production based on watercourses.

The status evaluation and recommendations:

Due to limited economic potential (for practical and economically viable use) of hydro energy, a limited promotional activity related to this RES is recommended.

Wind energy

Despite both good wind conditions in the eastern part of the County and many years of planning, no wind farm has been constructed yet. The micro installations using wind energy on farms or residential buildings do not exist too.

The status evaluation and recommendations:

At the moment, wind energy is not utilized in the region. This situation can change if promotional and organizational actions are taken and combined with financial support for the construction of micro-installations based on wind energy. Introduction of anticipated legislative changes facilitating the sale of surplus energy produced to the grid should give impetus to the development of the prosumer energy.

Solar energy

The Gorlice Region has good conditions for the use of solar energy. At the moment, the energy of the Sun is used only for hot water production. It is estimated that in all the communes a few hundreds of solar panels are installed on individual buildings.

The status evaluation and recommendations:

The use of solar energy by using solar panels is gaining momentum, but it requires further organizational and financial support for individual users to become a mass phenomenon. The photovoltaic installation, currently absent in the region, should occur if promotional and organizational activities are combined with financial support for the construction of micro-installations and in the event of favourable legislative changes.

Geothermal energy

At the moment in the region, there are no professional geothermal installations. What is more, the use of heat pumps, which use ground as the lower source, is rare.

The status evaluation and recommendations:

At present, virtually no geothermal energy is used. A significant increase in the number of installations of ground source heat pumps is possible only through the introduction of systems of financial and organizational support. However, it should be taken into account that heat pumps drawing energy from the surrounding air may constitute technological competition.

How to use RES in the Gorlice County?

The analysis of capabilities of RES development in the County was based on the following division:

- commercial, large-scale renewable energy installations – production of electricity to the national power grid,
- small-scale renewable energy systems (RES micro-installations) – energy production for own use and in some cases, with the possibility of selling electricity surplus to the national power grid.

A detailed analysis of the local factors (on the countywide or smaller scale) was conducted. These factors can be influenced by local governments and residents of the Gorlice County.

Professional power generation based on RES

The analyses conducted indicate that commercial power industry of RES in the Gorlice County can rely on wind and solar energy.

Professional wind power generation

The main barrier is the limited availability of areas with sufficient wind conditions (the supply side barrier) and access to the national power grid (the infrastructure barrier). The availability of areas is also limited by the presence of various forms of nature conservation (the environmental barrier). The high risk of conflict occurrence is also a barrier to the development (the awareness and formal administrative barriers).

The things the local government can do to promote the professional wind power generation:

- adjust space development/zoning plans to the needs of potential investors.

Professional photovoltaic power generation

The main barrier is the formal one – the lack of appropriate provisions in the zoning plans which allow the construction of the installation of capacity bigger than 100 kW. Difficult accessibility to the grid is also a barrier to the development of professional photovoltaic power generation.

The things the local government can do to promote the professional photovoltaic power generation:

- adjust space development plans to the needs of potential investors.

RES micro-installations

According to the "SWOT analysis..." the measures to **improve the energy efficiency** should be supplemented by compatible actions involving the production of energy from renewable sources at the place of energy use (i.e. **solar panels, photovoltaic systems, small wind turbines and heat pumps**).

The analysis of factors enabling and hindering the use of RES potential, which was performed for each type of RES source, shows that:

- there is a large social acceptance of RES micro-installations,
- informational efforts and the spreading of good examples must be continued, especially when it comes to the latest technologies,
- there is a need of a thorough inventory of existing and planned RES micro installations,
- high investment costs combined with a relatively long pay-off period require organizational activities and grant support for individual households.

Anticipated directions of RES micro-installations:

- solar thermal collectors - further increase of public interest is anticipated. In most households this type of installation is possible. It is also the case for public utility buildings used year-round. Increasing the number of operating solar collectors in the Gorlice County can be considered the key concern.

- solar photovoltaic panels - further increase of public interest is expected in the case of positive legal regulations (prosumer power generation). The support of the development of photovoltaic technology should be included in the EEP.
- heat pumps – currently, there is little public interest in this type of installation. This measure should be included in the EEP as it is of great importance for the reduction of energy demand from conventional sources.

How to improve energy efficiency?

The public utility sector

The majority of public utility buildings in the County have undergone thermomodernisation in the recent years. Many of them also possess modern, low-emission heat sources. The analysis shows that it is necessary to:

- conduct thermomodernisation and heat source replacement in the remaining buildings (which are used round the year),
- perform feasibility analysis, and in the case of a positive result, undertake investment actions aiming at the implementation of energy management systems in the buildings.

A great majority of public utility buildings are used from several up to ten-odd hours a day, 5 days a week – it provides an opportunity to install manual temperature control systems. The public utility buildings should also serve as an example of RES micro-installations operating.

Residential buildings

The analysis conducted shows that single family buildings have the greatest potential for both energy demand reduction as well as RES use (energy used at the production site – solar collectors, photovoltaic cells and heat pumps). The main barriers hindering energy demand reduction and RES development are:

- the investments costs exceeding a home budget,
- the lack of professional advisory assistance in acquiring external financial support for the investments and knowledge of energy efficient technologies.

The EEP suggests taking the following system measures, which facilitate transfer of modern, energy efficient technologies to the County region:

- creation of **regional funds** which would improve the availability of financial aids,
- creation of a **local entity** supporting the owners of the buildings in technical and organizational activities,
- **simplification of the procedures** concerning obtaining financial aid.

The implementation of these measures will allow for:

- **reduction of energy demand for heating purposes** thanks to thermomodernisation, replacement of heat sources for the energy efficient ones, energy management in buildings (e.g. daily temperature control) and recovery of ventilation air,

- **use of RES in production of energy for household purposes** thanks to mounting solar collectors, photovoltaic systems and heat pumps.

The business sector

The potential for energy demand reduction in the business sector lies mainly in thermomodernisation of manufacturing facilities and administrative buildings, as well as energy use rationalization in technological processes. The identified barriers for the improvement of the energy efficiency in this sector are caused by:

- the lack of investment funds;
- the lack of professional advisory assistance in acquiring external financial support for the investments and knowledge of energy efficient technologies.

Measures which would help to enhance energy efficiency include:

- thermal retrofitting of office buildings;
- thermal retrofitting of production facilities;
- replacement of heat sources in office buildings;
- replacement of heat source in production facilities;
- regulation of daily and weekly temperature regimes;
- decreasing demand in technological processes;
- using RES for space heating and hot water production.

In order to increase the chance of improving energy efficiency in the business sector, the EEP assumes:

- creation of a **local entity** supporting the participants and beneficiaries of the EEP
- improvement of **flow of information** concerning available external funding opportunities
- funding a **local entity** supporting business entities in the area of technological counselling and obtaining aid resources;
- improvement of **flow of information** concerning available support programmes.

Transportation

The local governments have a small impact on the increase of energy efficiency use in the transportation sector. It requires the cooperation of all managers of the County roads. Measures aimed at reducing energy consumption in the sector include:

- improving the organization of transport and improvement of traffic flow,
- improving the use of existing means of transport,
- increasing the energy efficiency of vehicles.

The Energy Efficiency Plan (the EEP)

As a result of consultation meetings and discussions we propose the adoption of such a shape of the mission, vision and strategic objectives of the Gorlice County in terms of energy efficiency:

Mission:

The Gorlice Region – a region of energy used efficiently.

Vision:

In 2022 the Gorlice County is a regional leader in energy efficiency and prosumer power generation.

Strategic objectives:

1. Increasing environmental and energy awareness of the County residents

Improving the energy efficiency of the County requires the cooperation of all energy users. The development of a system providing information about local needs and possible solutions is crucial for achieving this objective.

2. Efficient energy management in public utility buildings

The public utility buildings should be a local demonstration sites and visualization of best practices in the area of energy efficiency, efficient heating, energy management and use of RES.

3. Improving lighting effectiveness of public spaces

Local public space lighting systems are in the process of modernization. Both continuation of this process and use of available modern technologies will reduce energy consumption and improve safety.

4. Reducing the energy demand in residential buildings

The analyses show that the residential buildings in the County have the greatest potential for energy efficiency improvement, mainly through thermal retrofitting, modernisation and upgrading space heating, as well as hot water production systems. To exploit this potential, a local support system organization should be developed.

5. Rationalisation of energy use in the business sector

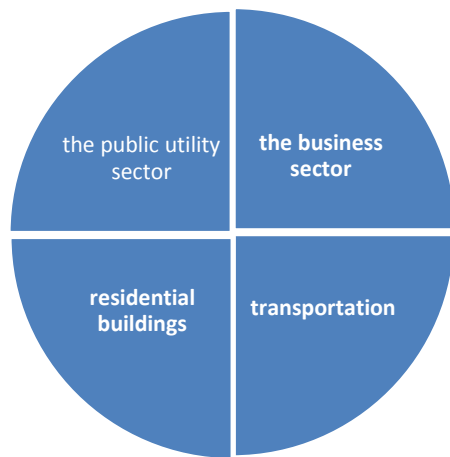
The business sector represents a significant reserve for the reduction of energy demand for heating, technological processes and transport. The aim of the EEP is to support this sector in order to improve energy efficiency.

As a consequence of achieving the strategic objectives, the low emission will be reduced in the area of the Gorlice County.

The Action Plan

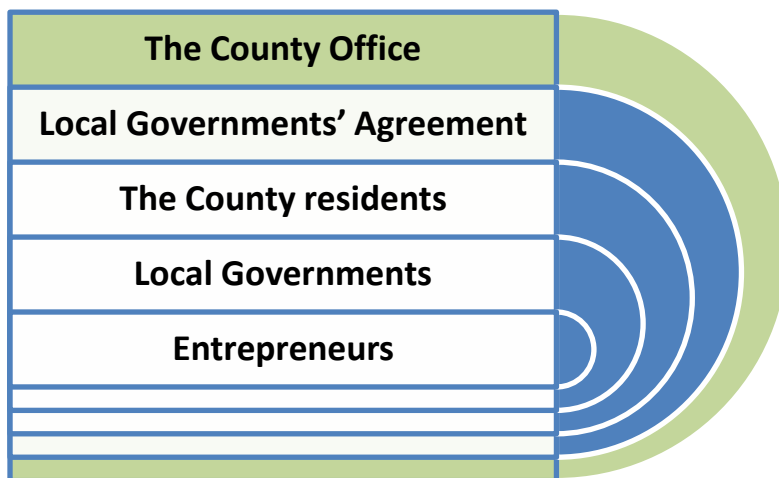
The action plan includes the previously-analysed sectors:

- the public utility sector,
- the business sector,
- residential buildings,
- transportation.



The stakeholders of the Energy Efficiency Plan are:

- The County Office which ensures the sustainability of the VIS NOVA project,
- Local Governments' Agreement,
- Local Governments' Agreement and the County residents,
- Local Governments,
- Entrepreneurs.



The most profound effect of the EEP's implementation is expected in the case of individual buildings. In order to achieve the goal, it is essential to set up a coordinating institution as well as appointing regional funds facilitating obtaining financial funds by household members.

Więcej szczegółów w dokumencie *Plan Efektywności Energetycznej* (www.powiatgorlicki.pl; www.basz.pl)

Implementation of the Energy Efficiency Plan

At present, in the Gorlice County there are no institutions or structures that could take on the management of this plan. As local governments, the business sector and local communities are included in the Energy Efficiency Plan, the management structure must be approved and supported by all stakeholders. It seems that the cooperation of all the governments of the Gorlice Region is the key to the effective implementation of the plan. Taking this into account, the proposed management system should fully exploit synergies, at the same time ensuring the efficiency of operations.

For more details of the Energy Efficiency Plan please visit (www.powiatgorlicki.pl; www.basz.pl).

The estimated low-emission reduction

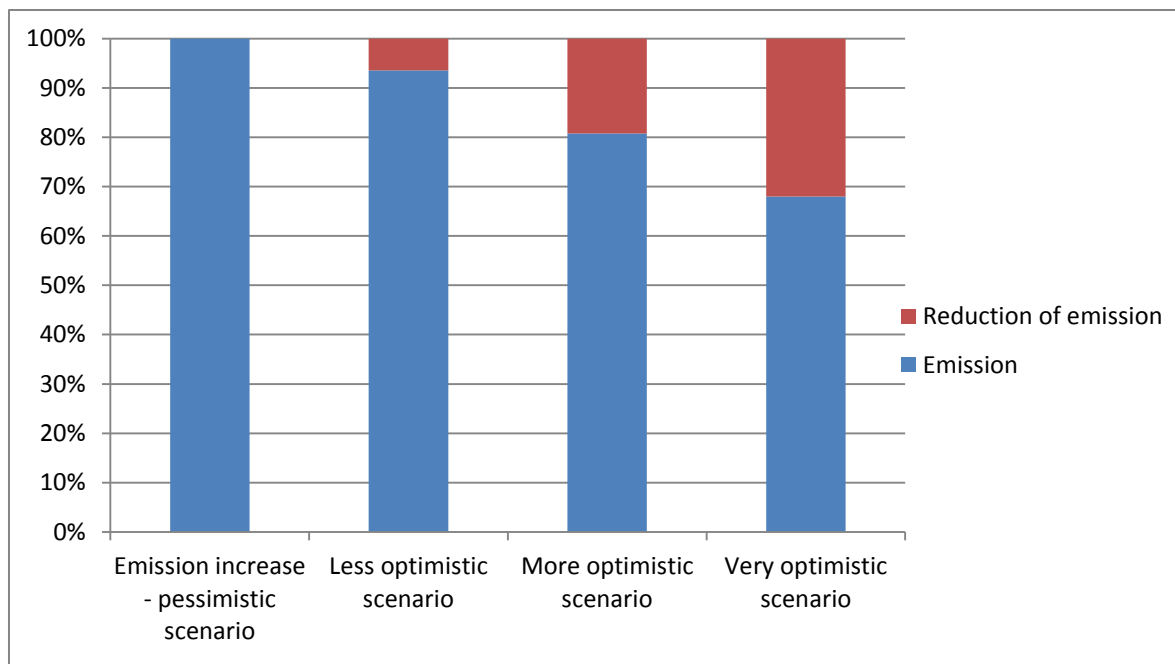
It is expected that coal will remain the predominant type of fuel in individual heating systems. This tendency, along with housing development and the increase of transportation emissions, resulting from a growing number of vehicles, will lead to the increase of greenhouse gases emission. The implementation of the actions suggested in the EEP will reduce the pace of low-emission increase. The scope of reduction will be dependent upon the scale of financial support for the implementation of the actions. The following variants of the Energy Efficiency Plan implementation were considered:

- Pessimistic - only organisational tasks will be implemented; these tasks do not have any direct effects on energy consumption and environmental objectives, but they raise public awareness,
- Less optimistic – the external financial resources will be acquired in the amount sufficient to carry out approximately 100 investments per year (of which: thermal retrofitting 50, replacement of heat source 25 and the installation of RES 25),
- More optimistic - the external financial resources will be acquired in the amount sufficient to carry out approximately 300 investments per year (of which: thermal retrofitting 150, replacement of heat source 75 and the installation of RES 75),
- Very optimistic - the external financial resources will be acquired in the amount sufficient to carry out approximately 500 investments per year (of which: thermal retrofitting 250, replacement of heat source 125 and the installation of RES 125).

The "less optimistic", "more optimistic" and "very optimistic" are the investment scenarios for which the expected size of the CO₂ reduction was evaluated. The assumptions used in the calculations are as follows:

- investments consisting of thermal retrofitting and the replacement of heat sources in residential buildings in which the heat was previously produced by the combustion of carbonaceous fuels
- investments consisting of the installation of RES concern residential buildings, in which the heat was previously produced by the combustion of carbon-free fuels.

The chart below shows the effects resulting from the implementation of particular scenarios in comparison with the predicted emission growth in the "pessimistic" scenario.



Recommendations

Cooperation of Local Governments of the Gorlice Region

Cooperation between local governments in the Gorlice Region is a basic factor conditioning the positive effect of the implementation of the EEP. The joint action at the regional level increases the chance for external support and minimizes the costs of the project management. It also integrates the local communities.

Sector strategies on power industry and low emission economy

In accordance with "Commune Self-government Act", communes should satisfy the collective needs of the community in the area of electricity, heat and gas supply. These tasks require interaction with the instruments involved in the production and distribution of fuels and energy. The scope of cooperation should be specified in the "Guidelines for Heat, Electricity and Gas Fuels Supply Plan" – a document required by The Energy Law. Only a few municipalities in the County complied with this obligation – hence, there is a lack of a certain output data for energy management planning. Therefore, it is considered that the development of such "Guidelines ..." by all communes should be the first step to rationalize energy management in the County. The next step should be the development and implementation of programmes aimed at the energy consumption reduction (and therefore low emission reduction), such as SEAP or the low emission programme. Such planning schemes are crucial when applying for external funds which can be spent on the realization of particular stages of an investment. It is the case as the range of the investment's needs significantly exceeds the financial capacity of both local authorities and inhabitants of the Gorlice Region.

Database

When preparing an application for external support, it is essential to have broad knowledge on the needs of each user group. Therefore, it is of extreme importance to create and regularly update local databases as well as implement an efficient information flow system among various stakeholders.

Information and promotion

The implementation of the EEP requires raising local inhabitants' awareness in the field of energy efficiency - the development of the system of information and promotion plays a key role in the initial phase of the EEP and is very important in further stages.