

# Sustainable Energy Action Plan for the City of Bielsko-Biała - *a summary for decision-makers*

---

## **Table of contents**

1. Purpose and scope of the analysis .....	2
2. Results of the greenhouse gas emission inventory for Bielsko-Biała.....	2
3. Potential for reducing greenhouse gas emissions in Bielsko-Biała .....	3
4. General strategy for reducing greenhouse gas emissions in the city .....	4
5. Proposed actions for sustainable energy management and reduction of greenhouse gas emissions in the city .....	6
6. Schedule of the implementation, costs and sources of financing for the proposed actions.....	10
7. Summary.....	15

## 1. Purpose and scope of the analysis

The purpose of this analysis is to present the action plan and related considerations, aimed to reduce final energy in Bielsko-Biała, and as a result reduce the greenhouse gas emissions (CO<sub>2</sub>). The requirement to prepare the Plan is a result of commitments made by the City of Bielsko-Biała by joining the Covenant of Mayors, whose members must adopt the „3x20” - EU’s climate and energy policy. Therefore, the City of Bielsko-Biała is obligated to limit its greenhouse gas emissions in the city area by a minimum of 20% before 2020, in comparison to the base year - 1990.

A greenhouse gas emission inventory for the City was prepared as part of developing the plan, as well as an analysis of the considerations and possibilities of reducing energy consumption, and an analysis of the possible action plans with an assessment of their ecological and economic effectiveness. A general implementation schedule with the indication of parties responsible for implementation of each task has been prepared for the selected version of the plan. The principles of monitoring and reporting the results of implementing actions anticipated in the plan have been established. Also, potential sources of external financing (subsidies) for the planned actions have been indicated.

**The Sustainable Energy Action Plan is a key document explaining how the City of Bielsko-Biała, a signatory of the Covenant of Mayors, plans to accomplish the objectives planned for the years 2010-2020.**

The Action Plan was created along the guidelines of, and in compliance with the Covenant of Mayors. All key issues addressed in the Plan are a result of the commitments of the City of Bielsko-Biała under the Covenant of Mayors.

## 2. Results of the greenhouse gas emission inventory for Bielsko-Biała

The Covenant of Mayors requires the signatories to reduce the emissions in the city by at least 20% in comparison to the base year (1990 or its closest). The year 1990 is the base year used in the analysis for which the greenhouse gas emission inventory was prepared. In order to define a reference point, in accordance with the requirements of the Covenant, greenhouse gas emissions for 2008 were also inventoried. In order to estimate the reductions in absolute values, a prognosis of greenhouse gas emissions in 2020 has been prepared (on the basis of the inventory for 2008).

The inventory includes all carbon dioxide emissions in the city and methane emissions expressed as carbon dioxide equivalent. Emission values were determined on the basis of energy consumed in the city. Calculations of the emission were completed according to the guidelines specified in the Covenant of Mayors, taking into consideration the consumption of final energy in the indicated years.

The results of the inventory allow for the identification of the main anthropogenic sources of greenhouse gas emissions (CO<sub>2</sub>, CH<sub>4</sub>) and prioritization of actions aimed at reducing these emissions. The inventory includes the following emissions resulting from energy consumption:

- direct emissions resulting from fuel combustion - buildings, equipment and accessories, transportation,
- emissions (indirect) resulting from the process of generating electric energy, heat and cold,
- Other direct emissions resulting from selecting sectors for the base year inventory report

Inventory results are presented in the following table

**Table 1 Synthesis of the emission inventory results for the City of Bielsko-Biala (emission values in Mg CO<sub>2</sub> equivalent)**

<b>Emission Sector</b>	<b>1990</b>	<b>2008</b>	<b>2020</b>
City Hall – buildings, accessories/equipment	44 550	17 510	18 476
Service – buildings, equipment/stationary	161 567	176 988	203 187
Residential buildings	548 090	398 191	415 446
City street lighting	8 293	9 334	12 911
Industry	574 119	583 193	719 719
Transportation	207 609	342 742	359 314
Other emission sources	59 788	1 984	1 352
<b>TOTAL</b>	<b>1 604 016</b>	<b>1 529 943</b>	<b>1 730 404</b>
Change in comparison to the base year (1990) – in total	-	-4,6%	7,9%
Emissions excluding industry	1 029 897	946 750	1 010 686
Change in comparison to the base year (1990) - excluding industry	-	-8,1%	-1,9%

In order to define a reference level, in accordance with the Covenant, emissions due to industry are excluded.

### **3. Potential for reducing greenhouse gas emissions in Bielsko-Biala**

In summarizing the analysis of the potential for reducing greenhouse gas emissions, to be accomplished with the use of renewable energy sources and actions improving energy effectiveness, the potential is estimated at about 20 000 tons of CO<sub>2</sub> per year. This amount is a result of the analysis of sample actions aimed at using the potential and does not fully define the possible reductions in the city. The analysis only marginally takes into account the potential reduction as a result of changes in the behaviour patterns of residents.

**It should be emphasized that the greatest potential for reducing emissions is in improving the energy efficiency, especially regarding thermal energy. Most important areas for potential reductions include:**

- **Thermal efficiency improvement of buildings**
- **Changing behaviour patterns (energy savings)**
- **Use of energy-efficient equipment and technologies**
- **Use of renewable energy sources**

- **Changing transportation habits**

It should be emphasized that in the comparison to the rest of the country, Bielsko-Biała has an average potential for reducing emissions, because of the results achieved so far in the above potential reduction areas.

Especially significant is the potential hidden in changing the behaviour of residents - it is estimated that if all the residents of Bielsko-Biała were to reduce their energy consumption (electricity, gas, central heating) by 1% per year, greenhouse gas emissions would be reduced by about 6 200 tons. This potential is very simple to utilize yet it requires a great effort and many years of work on changing the attitude of residents. The essence of the Action Plan is to build an appropriate awareness among the residents, so that it is the citizens living in Bielsko-Biała who feel responsible for implementing the goals of emission reduction. That is why the Sustainable Energy Action Plan pays particular attention to actions aimed at changing the behaviour of residents. Only an effective involvement of citizens can make the implementation of this Plan's objectives possible.

#### **4. General strategy for reducing greenhouse gas emissions in the city**

The conclusion of the analyses of the estimated reduction potential is that, taking into account all the considerations (local and national), it is possible to reduce emissions by about 245 000 tons of CO<sub>2</sub> before 2020, which is about 26% in relation to the base year. In theory, it is possible to reduce emissions in the city by more than 30% in relation to the base year; however, this is a highly optimistic and very expensive variant.

Therefore, it is assumed that:

**the goal of reducing emissions in Bielsko-Biała is to accomplish an emission level which is at least 20% smaller than that of 1990, excluding the industry sector. In absolute values, the target reduction of emissions is a minimum of 187 000 tons of CO<sub>2</sub> equivalent.**

In order to prepare an action plan, the strength and weaknesses of Bielsko-Biała have been analysed, as well as the opportunities and threats which will make it easier or harder to accomplish this objective. A SWOT analysis was used (Strengths, Weaknesses, Opportunities, Threats). On the basis of the results of the analysis, we can indicate the following considerations, which are the most significant to the accomplishment of the adopted target reduction:

**Positives – favourable to the achievement of the goal:**

- City Hall’s active attitude, experience and previous achievements in limiting energy consumption
- Well-developed and significantly upgraded heating network,
- National requirements for ensuring certain levels of renewable energy and biofuels in final consumption on a national level

**Negatives – unfavourable to the achievement of the goal:**

- Small renewable energy potential in the city
- A nationwide trend of growing electricity consumption

The action plan should concentrate on taking advantage of the opportunities and strengths and at the same time on minimizing the threats.

In the context of the analysis, we can sketch out the following vision for the city:

**Bielsko-Biała – a city of rational energy consumption, a leader in the use of low-emission technologies and climate protection. Through its actions and its adopted direction, Bielsko-Biała will become a city of sustainable development, giving a good impulse, inspiration and an example to other cities, strengthening the impact of climate protection actions.**

Going beyond the goals for 2020, the policy of the city authorities will have a long term goal (2030 and further) of accomplishing:

- A neutral impact of City Hall actions on greenhouse gas emissions;
- A maximum thermal efficiency improvement in the residential building sector;
- A maximum utilization of the technical potential of renewable energy in the city;
- Providing the highest possible share of low-emission heating network supplies to the highest possible number of customers (with a maximum restriction of individual heating sources based on fossil fuels);
- Ensuring the safety of the heat and electricity supplies.

These objectives will be implemented in the city’s policy by:

- Adopting appropriate local laws;
- Including the Plan’s objectives in strategic and planning documentations;
- Including the Plan’s objectives in City Hall's internal instructions;
- Wide-scale promotional actions and actions which activate the residents, businesses and public entities.

**1. City Hall's organisational units and public service units managed by the city**

This sector has a relatively small share in emission in the city, however, it is particularly important due to the easiness of implementing the tasks and the big role played in promoting the tasks and attitudes among the city’s residents (offices and public service units should set the example for others).

## 2. Housing

The housing sector has the biggest share in the amount of emissions in the city (excluding industrial emissions). At the same time, it is a sector where city authorities have the most impact (especially regarding council housing). Housing also has a high potential for emission reductions.

## 3. Transportation

Transportation is a key sector due to its second biggest share in city emissions (excluding industry). The intense growth of the number of vehicles and traffic, current and projected, requires the city authorities to take decisive actions in order to minimize its impact on the environment and climate. Transportation also has a significant potential for reduction. At the same time, city authorities have a high potential in implementing actions aimed at reducing energy consumption and CO<sub>2</sub> emission in regard to public transportation (urban transport), and the actions taken have a high significance in promoting the concept of sustainable energy.

## 5. Proposed actions for sustainable energy management and reduction of greenhouse gas emissions in the city

Actions are a key element of this document. In order to accomplish the emission reduction planned for 2020, that is a minimum 20% reduction in greenhouse gas emission, it is necessary to design actions which, when implemented, will help reduce energy consumption based on fossil fuels, at the same reducing greenhouse gas emissions.

The document concentrates on presenting potential specific tasks which the city authorities may undertake as part of individual sectors identified in the inventory (municipal objects, services, housing, transportation, street lighting). The individual specific tasks have been grouped into broader actions, which will finally be analysed in regard to their costs and the benefits obtained from their implementation. On the basis of the results of the analysis, actions were selected and presented in the form of an implementation plan.

These actions have a character of investment projects or support actions (non-investments)

<b>Id</b>	1	
<b>Category</b>	Main	
<b>Type of action</b>	investment	
<b>Area of action:</b>	Buildings belonging to the city's public service units	
<b>Name of action:</b>	Thermal Efficiency Improvement of Municipal Buildings	
<b>Estimated reduction effect</b>	<b>CO<sub>2</sub></b>	4 349 Mg
	<b>Energy</b>	13 141 MWh
<b>Estimated cost:</b>	63 000 000 PLN	

<b>Id</b>	2
<b>Category</b>	Support action

<b>Type of action</b>		Education/promotion
<b>Area of action:</b>		Buildings belonging to the city's public service units
<b>Name of action:</b>		Promotion of saving energy in municipal buildings
<b>Estimated reduction effect</b>	<b>CO<sub>2</sub></b>	<i>Estimated 0,25% annually</i>
	<b>Energy</b>	<i>Estimated 0,25% annually</i>
<b>Estimated cost:</b>		30 000 PLN

<b>Id</b>		3
<b>Category</b>		Main
<b>Type of action</b>		Investment
<b>Area of action:</b>		Buildings belonging to the city's public service units
<b>Name of action:</b>		Indoor lighting in buildings belonging to the city's public service units
<b>Estimated reduction effect</b>	<b>CO<sub>2</sub></b>	26 - 47 Mg
	<b>Energy</b>	37 - 48 MWh
<b>Estimated cost:</b>		<i>4 400 – 27 000 PLN</i>

<b>Id</b>		4
<b>Category</b>		Main
<b>Type of action</b>		Investment / continuous action
<b>Area of action:</b>		Buildings belonging to the city's public service units
<b>Name of action:</b>		Monitoring of energy consumption in buildings belonging to the city's public service units
<b>Estimated reduction effect</b>	<b>CO<sub>2</sub></b>	4 713 – 6 636 Mg
	<b>Energy</b>	9 921 – 13 891 MWh
<b>Estimated cost:</b>		200 000 – 950 000 PLN

<b>Id</b>		5
<b>Category</b>		Main / support action
<b>Type of action</b>		Investment / promotion / education
<b>Area of action:</b>		Other Buildings - Private Residential Buildings
<b>Name of action:</b>		Restrictions on emissions in private buildings (Restrictions on Low Emissions Programme /PONE/ and thermal efficiency improvement)
<b>Estimated reduction effect</b>	<b>CO<sub>2</sub></b>	18 050 Mg
	<b>Energy</b>	45 334 MWh
<b>Estimated cost:</b>		<i>47 850 000 PLN</i>

<b>Id</b>	6	
<b>Category</b>	Main	
<b>Type of action</b>	Investment / project	
<b>Area of action:</b>	Other Buildings - Council Housing	
<b>Name of action:</b>	Thermal efficiency improvement of council housing	
<b>Estimated reduction effect</b>	<b>CO<sub>2</sub></b>	3 660 Mg
	<b>Energy</b>	11 055 MWh
<b>Estimated cost:</b>	50 600 000 PLN	

<b>Id</b>	7	
<b>Category</b>	Main	
<b>Type of action</b>	Investment	
<b>Area of action:</b>	City Street Lighting	
<b>Name of action:</b>	Upgrading of City Street Lighting	
<b>Estimated reduction effect</b>	<b>CO<sub>2</sub></b>	1182 - 1970 Mg
	<b>Energy</b>	1203 - 2005 MWh
<b>Estimated cost:</b>	3 367 000 – 14 500 000 PLN	

<b>Id</b>	8	
<b>Category</b>	Main	
<b>Type of action</b>	Investment / project	
<b>Area of action:</b>	Mass transportation	
<b>Name of action:</b>	Upgrading of Municipal Public Transportation vehicles	
<b>Estimated reduction effect</b>	<b>CO<sub>2</sub></b>	1 916 – 4 212 Mg
	<b>Energy</b>	308 – 7 387 MWh
<b>Estimated cost:</b>	15 000 000 – 82 250 000 PLN	

<b>Id</b>	9	
<b>Category</b>	Main / support action	
<b>Type of action</b>	Investment / project / education / promotion	
<b>Area of action:</b>	Mass transportation	
<b>Name of action:</b>	Alternative means of transportation	
<b>Estimated reduction effect</b>	<b>CO<sub>2</sub></b>	1 003 – 2 751 Mg
	<b>Energy</b>	3 986 – 10 963 MWh
<b>Estimated cost:</b>	4 515 000 – 62 360 000 PLN	

<b>Id</b>	10	
<b>Category</b>	Main	
<b>Type of action</b>	Investment	
<b>Area of action:</b>	Local generation of energy / Renewable energy sources	
<b>Name of action:</b>	Local generation of thermal and electric energy	
<b>Estimated reduction effect</b>	<b>CO<sub>2</sub></b>	19 585 – 68 791 Mg
	<b>Energy</b>	-
<b>Estimated cost:</b>	5 350 000 – 416 750 000 PLN	

<b>Id</b>	11	
<b>Category</b>	Main	
<b>Type of action</b>	Investment	
<b>Area of action:</b>	Generation and distribution of thermal energy	
<b>Name of action:</b>	Increasing the effectiveness of thermal energy distribution	
<b>Estimated reduction effect</b>	<b>CO<sub>2</sub></b>	57 186 – 58 253 Mg
	<b>Energy</b>	175 842 MWh
<b>Estimated cost:</b>	62 000 000 PLN	

<b>Id</b>	12	
<b>Category</b>	Support action	
<b>Type of action</b>	Continuous action	
<b>Area of action:</b>	Strategic spatial planning	
<b>Name of action:</b>	Spatial planning according to sustainable development principles	
<b>Estimated reduction effect</b>	<b>CO<sub>2</sub></b>	indirect
	<b>Energy</b>	indirect
<b>Estimated cost:</b>	insubstantial	

<b>Id</b>	13	
<b>Category</b>	Support action	
<b>Type of action</b>	Continuous action	
<b>Area of action:</b>	Tenders and purchases	
<b>Name of action:</b>	Green purchases for the City Hall	
<b>Estimated reduction effect</b>	<b>CO<sub>2</sub></b>	indirect
	<b>Energy</b>	indirect
<b>Estimated cost:</b>	Potential increase of the cost of purchased goods/services	

<b>Id</b>	14	
<b>Category</b>	Support action	
<b>Type of action</b>	Continuous action / projects	
<b>Area of action:</b>	City residents	
<b>Name of action:</b>	Residents fighting climate change	
<b>Estimated reduction effect</b>	<b>CO<sub>2</sub></b>	8 308 – 11 750 Mg
	<b>Energy</b>	10 660 MWh
<b>Estimated cost:</b>	520 000 PLN	

<b>Id</b>	15	
<b>Category</b>	Support action	
<b>Type of action</b>	Continuous action	
<b>Area of action:</b>	Training and education	
<b>Name of action:</b>	Investment in education	
<b>Estimated reduction effect</b>	<b>CO<sub>2</sub></b>	-
	<b>Energy</b>	-
<b>Estimated cost:</b>	2 000 000 PLN	

<b>Id</b>	16	
<b>Category</b>	External – beyond the control of city authorities	
<b>Type of action</b>	-	
<b>Area of action:</b>	Other	
<b>Name of action:</b>	Emission reduction through market mechanisms and national policy	
<b>Estimated reduction effect</b>	<b>CO<sub>2</sub></b>	59 726 Mg
	<b>Energy</b>	Not applicable
<b>Estimated cost:</b>	-	

## 6. Schedule of the implementation, costs and sources of financing for the proposed actions

The action implementation stage is a key element of fulfilling the strategy of reducing greenhouse gas emissions. Correct planning of the actions will allow for their effective implementation, bringing the desired results. Detailed implementation plans for the tasks using a projects approach should be prepared for all planned actions. Approaching the implementation of tasks using project management will allow for an effective management over the process of implementing the plan.

**The responsibility for the implementation of the entire Plan is upon the Mayor of the City of Bielsko-Biała.**

Individual general actions and specific tasks will be implemented by various organisational units within the City Hall, appropriate for the given tasks. In order to coordinate the entire process of implementing actions, controlling the accomplished effects and fulfilling the adopted strategy, it is necessary to establish a coordinating body. Within the City Hall, the appropriate unit for this task is the Energy Management Office, which possesses the appropriate competences and experience to take on this type of task. The most important tasks of the coordinating body will be:

- Preparation of detailed short-term plans (1-2 years) for action/task fulfilment - in cooperation with the units implementing the individual tasks;
- Preparation of medium-terms plans for action fulfilment (3-6 years);
- Control and correction, if needed, of the Plan in regard to the accomplishment of the objectives until 2020;
- Monitoring of the fulfilment of the entirety of actions resulting from the adopted Plan;
- Preparation of reports on the process of the implementation of the Plan for the Mayor, units involved in the plan and Covenant of Mayors structures;
- Informing the public opinion of the results achieved and building public support for the implemented actions.

The Sustainable Energy Action Plan is a strategic document which indicates the general objectives and defines the methods of their implementation in a general manner, at the same time presenting propositions of specific actions. A general schedule of the implementation of the planned actions is defined as part of the Action Plan. The high level of generality of the schedule is a result of the long-term character of the Plan's implementation (10 years). The long-term perspective makes planning individual actions difficult due to the potential socioeconomic changes. The goal of the coordinating body is to prepare a detailed action plan for each area of activity, which will be used to implement the tasks anticipated in the Plan, as well as the tasks which are not included in the Plan but which fulfil the Plan's objectives.

Action	Range of tasks	Unit responsible for implementation	Implementation period		Estimated cost	Reduction effects	
			From	To		Mg CO2	MWh
1	Improving thermal efficiency in buildings managed by the city, including in particular the implementation of tasks 1.1, 1.2 and 1.3	Investment Department and selected budgetary units	2010	2020	63 076 800 PLN	4349	13141
2	Internal promotional and educational actions in City Hall departments, in particular tasks 2.1-2.3	Energy Management Office	2010	2020		50	160
3	Improving thermal efficiency in buildings managed by the city, including in particular the implementation of tasks 3.1 and 3.2	Investment Department, Department of Organisation and Supervision	2010	2012	104 400 PLN	27	38
4	Monitoring of energy consumption in buildings belonging to the city's public service units, in particular tasks 4.1, 4.2 and 4.3	Energy Management Office	2010	2012		3370	9921
5	Restrictions on emissions in the private sector by implementing the Restrictions on Low Emissions Programme and promoting thermal efficiency improvement (tasks 5.1 and 5.2)	Energy Management Office	2010	2020	47 800 000 PLN	18050	45344
6	Thermal efficiency improvement of council housing	Investment Department	2010	2020	50 452 800 PLN	3480	10511
7	Upgrading of city street lighting	Investment Department  Urban Management Department	2010	2020	3 300 000 PLN	1182	1203

8	Modernization and promotion of public transportation, in particular tasks 8.1, 8.2, 8.3, 8.5, 8.6	Municipal Transportation Company, Transportation Department, Municipal Roads Authority	2010	2020	66 200 000 PLN	3651	5540
9	Promotion of eco-friendly transportation	Transportation Department, Municipal Roads Authority, City Development Office	2010	2020	4 515 000 PLN	611	2140
10	Support of locally generated thermal and electric energy, in particular tasks 10.4, 10.8, 10.9	Investment Department, Energy Management Office	2010	2020	3 400 000 PLN	19585	-
11	Increasing the effectiveness of thermal energy distribution	PK Therma	2010	2020	62 000 000 PLN	58303	176012
12	Adaptation of urban planning to the requirements of energy management, inclusion of tasks 12.1-12.8 in development plans	Department of Economic Strategy and Development, Transportation Department, City Development Office	2010	2012	500 000 PLN	77	309
13	„Green purchasing” - adoption of sustainable development principles in public ordering, in particular implementation of tasks 13.1-13.5	Legal Department, Department of Organization and Supervision, Internal Audit and Control Department	2010	2012		184	480
14	Support and activation of city residents in energy consumption reduction, promotion of renewable energy sources and reduction of CO <sub>2</sub> emissions, tasks 14.1-14.5	Energy Management Office, Environmental Protection Department	2010	2020	90 000 PLN	7440	10660

15	Support for educational actions - entities located in the city (including Tasks 15.1 and 15.2)	Board of Education, Environmental Protection Department	2010	2020	2 000 000 PLN		
16	Tasks on a national level	Not applicable	2010	2020	Not applicable	59726	-
<b>TOTAL</b>					<b>304 019 000 PLN</b>	<b>182 817</b>	<b>277 840</b>

## 7. Summary

The proposed Plan for sustainable energy management makes it possible to meet the requirements of reducing greenhouse gas emissions by 20% in comparison to the year 1990, allowing for the fulfilment of the obligations adopted by the City Council on an European level (Covenant of Mayors).

The estimated cost of implementing the actions is about 300 million zlotys over a period of 10 years. The above estimated cost is an approximate value.

