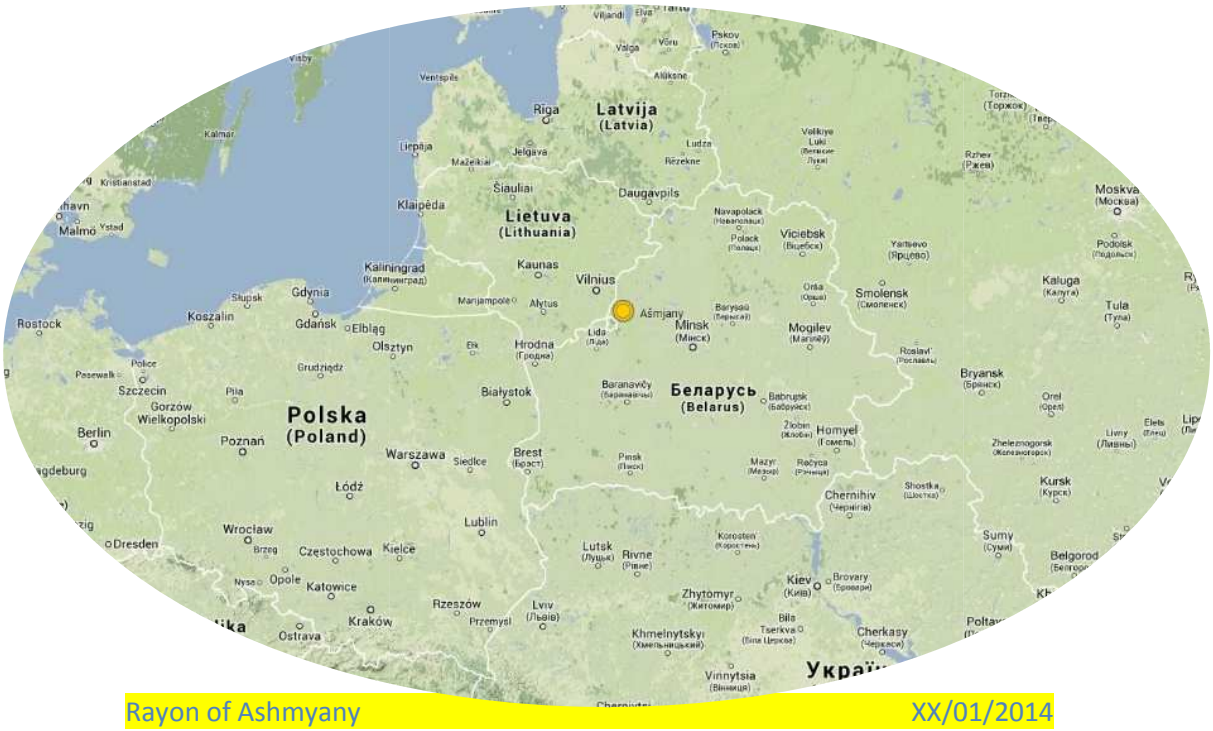
Energy for Eastern Mayors Project – EuropeAid Program

Sustainable Energy Action Plan

Ashmyany - Voblasc of Hrodna Belarus



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Contacts

City of:	Ashmyany
Name and Surname:	Galina S. Liutkovskaya
Role:	Vice President of Executive Committee
Phone:	+375(1593) 4-32-12; +375(29) 6933139
Fax:	
e-mail:	1Lutik@tut.by

City of:	Ashmyany
Name and Surname:	Alexei A. Filipov
Role:	Energy specialist
Phone:	+375(1593) 4-21-70, +375(44)7565258
Fax:	
e-mail:	osch-econ@tut.by

Project E4EM:	Assistance in the definition of SEAPs for Belarus
Name and Surname:	Francesco Tinti
Role:	Energy consultant
Phone:	+39 (051) 2090477
e-mail:	francesco.tinti@unibo.it

Project E4EM:	Assistance in the definition of SEAPs for Belarus
Name and Surname:	Daniel Caratti
Role:	Consultant
Phone:	+39 (051) 228048
e-mail:	caratti@ecuba.it

Covenant of Mayors for Sustainable Local Energy

On 29th January, 2008, European Commission, General Direction TREN, launched an initiative address to Municipalities from EU member states, namely the Covenant of Mayors (CoM).

The Covenant provides a voluntary commitment of mayors directly with European Commission, to act all measures necessary to reach, at 2020, a reduction of greenhouse gas emissions (tons of equivalent CO_2) at least of 20%, in comparison with 1990 level.

One year after the Covenant signature, Municipalities must present a Sustainable Energy Action Plan (SEAP), capable to reach the ambitious goal.

Since its official launch, the Covenant has encountered an incredible success from all over EU, and since 2010 the CoM initiative has come to involve 11 Eastern Partnership and Central Asian countries in the implementation of local sustainable energy policies, among them Republic of Belarus. A specific program has been launched, named Covenant of Mayors going East (CoM-East). The specific situation that characterizes the 11 countries forced to adapt the methodology for the SEAPs preparation, by using a Business as Usual (BaU) scenario and by referring as baseline a recent year (usually 2010 or 2011), in contrast with 1990, requested by the CoM.

The Rayon of Ashmyany, supported by the *Energy for Eastern Mayors* Project, decided to adhere to the Covenant of Mayors on 8th May, 2012 and developed the present Sustainable Energy Action Plan in order to act towards a sustainable development, by cutting CO_2 emissions, by improving energy efficiency objectives and by promoting the use of renewable energy. The objectives of energy efficiency and energy security are a priority for the Republic of Belarus, so that the Action Plan of Ashmyany is perfectly placed in the major framework of central energy policy.

SEAP is basically made by two parts:

1. The Baseline Emission Inventory (BEI), which gives information on CO_2 emissions of the territory of the Rayon, quantifies the CO_2 quota to be cut, and focuses on the critical points and on the opportunities for a sustainable development and for the increase of the quota of renewable energy sources in the local energy mix.
2. The Action Plan, which identifies a set of actions to implement before 2020 in order to reach the targets of CO_2 reductions.

In order to effectively quantify the situation and the target in terms of CO_2, the energy consumptions must be transformed in tons of CO_2 emissions, by using the UE official conversion factors for each type of fuel.

In 2011 (the baseline year adopted), the total CO_2 emissions in Ashmyany Rayon, populated by 31.872 people, were about 70.325 tons. By assuming that in coming years there will not be a significant increase of population (indeed, in Belarus in recent years the tendency is to leave rural places and to move towards Minsk and other big cities), the target of CO_2 reduction is at least of 14.065 tons, which means that in 2020 the expected CO_2 emissions will be no more than 56.260 tons.

The SEAP is the key instrument for the Ashmyany Rayon to reach this goal, by identifying actions in the following sectors:

- Municipal buildings;
- Tertiary buildings;
- Residential buildings;
- Transport;
- Renewable energy sources;
- Municipal lighting

E4EM Project – Energy for Eastern Mayors

The objective of Energy for Eastern Mayors – E4EM Project is to support Municipalities from Belarus, Moldova and Ukraine towards their way to the adoption of energy efficiency criteria and renewable energy sources. The main instrument is the adhesion to the Covenant of Mayors and the realization of the Sustainable Energy Action Plan of the area of territorial competence (Rayon) for each signatory.

Energy for Eastern Mayors Project began on January 2012 and is funded by EuropeAid Program in the framework of Covenant of Mayors going East initiative. Within the Project, up to date many initiative have been realized in three partner countries, such as workshops for CoM promotion, trainings addressed to energy managers and technicians, design and implementation of pilot actions, organization of Energy Days, support to mayors for participation in international events, (among the others: European Union Sustainable Energy Week in Brussels, High Level Covenant of Mayors Forum in Istanbul)

The coordinator of E4EM Project is University of Bologna - Department of Civil, Chemical, Environmental and Materials Engineering, from Italy.

Focusing on the specificity of Belarusian context, the local partners of E4EM are the Rogachev Rayon, in the Gomel Oblast, and the Foundation “Aiutiamoli a Vivere”, an Italian NGO with an official representative in Minsk, named “Planeta Detei”.

Official E4EM website: www.e4em.eu

Figure 1: Home page of E4EM website

Energy issues in the Republic of Belarus

Energy policy

The goal of Belarusian energy policy is to ensure a sustainable energy supply for consumers through improving the energy security of the country, maximizing the efficient use of fuel and energy resources and the potential of the fuel and energy complex and reducing the dependence on energy resources imports in parallel with using the benefits of Belarus' geopolitical position as a transit country for energy trade between Russia and the European Union.

The general goal of entire Belarusian Energy Policy is the reduction of energy intensity of GDP by 2015 of at least 50% from the 2005 level[1]. The main strategic documents that set forth the state policy on energy efficiency and energy saving are as follows:

➢ **The Program of Social and Economic Development of RB for 2011–2015** approved by Decree No. 136 of the President of Republic of Belarus, dated 11 April 2011;

It sets forth the improvement of the energy efficiency of the economy, the introduction of advanced energy efficiency technologies and the promotion of alternative energy with the increasing use of local energy sources. The main indicators of the republic's social and economic development for 2011 – 2015 include a 29%–32% reduction in the energy intensity of GDP by 2015 from the 2010 level and a reduction of at least 50% from the 2005 level.

➢ **The Directive No. 3 of the President of Republic of Belarus** (dated 14 June 2007) Saving and Thrift are the Key Factors of Economic Security of the State

It is of strategic importance for the intensification of efforts in the area of energy efficiency. It provides the basis for new energy saving programs and measures and establishes specific objectives, assignments and responsibilities.

➢ **The Concept of Energy Security of the Republic of Belarus** approved by Decree No. 433 of the President of Republic of Belarus, dated 17 September 2007;

It establishes 12 indicators, including the energy intensity of GDP using Purchasing Power Parity (PPP). The Concept sets forth the followings objectives:

- Reduction in the energy intensity of GDP: 31% in 2010, 50% in 2015 and 60% in 2020, from the 2005 level;
- Provide for an overall increase in fuel and energy saving (under comparable conditions) in 2006 -2010 of at least 7.55 Mtce (Million tons of coal equivalent) and from 2011 - 2015 of at least 7.0 Mtce.

➢ **The Strategy of Energy Potential Development in the Republic of Belarus**, approved by Resolution No. 1180 of the Council of Ministers of Republic of Belarus, dated 9 August 2010.
It is developed for the period of 2011–2015 and until 2020. The Strategy specifies the parameters and mechanisms of the medium-term development in connection with new economic conditions, while keeping the long-term guidelines of the energy policy established in the Concept and Directive No. 3 unchanged. The Strategy is aimed at achieving the following indicators:

- 50% reduction in the energy intensity of GDP (from the 2005 level) by 2015 and 60% by 2020;
- Up to 28–30% increase in the share of domestic energy resources in the boiler and furnace fuel mix in 2015 and up to 32–34% in 2020.

➢ **The National Energy Saving Program for 2011–2015** approved by Resolution No. 1882 of the Council of Ministers of RB, dated 24 December 2010;

It set forth the objective of providing for GDP growth without increasing the fuel and energy consumption; it has a goal of 50% reduction in the energy intensity of GDP from the 2005 level by 2015.

[1] *In-Depth Review of the Energy Efficiency Policy of the Republic of Belarus, Energy Charter Secretariat 2013*

➢ **The National Program of Local and Renewable Energy Sources Development for 2011– 2015** approved by Resolution No. 586 of the Council of Ministers of RB, dated 10 May 2011.

It summarizes and specifies all program documents on local fuels and Renewable Energy Sources (RES) use and set forth areas of activities and indicates the specific measures required to achieve an increase of use of local fuel and energy, including RES, which should reach 2,767 ktce by 2015.

Energy situation

Due to natural and geological conditions, Republic of Belarus cannot cover its demand for energy with domestic resources (small reserves of crude oil, biomass, mainly wood, peat, coal, associated gas and hydro energy). The country has to import fuel and energy mainly from the Russian Federation. The share of the net import of total primary fuel and energy consumption is around 85%. The mineral resources of Belarus for energy use purposes include oil, petroleum gas, peat, lignite and shale.

Oil and gas - Almost all (99%) natural gas is imported. In 2010, natural gas imports were 21.6 billion cubic meters, equal to 63% of the primary energy consumption in the country.

Belarusian oil and associated gas deposits are located in the eastern part of the Pripyat Trough. As of 2010, 75 deposits have been discovered and explored; the largest include Rechitskoye, Ostashkovichskoye and Vishanskoye. Annual oil production amounts to 1,7 - 1,8 Mt.

Peat - Belarus has over 9.000 discovered peat deposits, which contain 4 billion tons of peat, equal to 1.36 billion tons of coal equivalent (tce) The State Program Peat for 2008–2010 and until 2020 determined the economically feasible annual level of peat consumption for fuel purposes and targets for peat fuel use. The related target indicators are as follows: 1,3 Mtce in 2015 and 1,4 Mtce in 2020. In 2010, the actual consumption of peat for fuel purposes was 0,8 Mtce.

Shale - Commercial reserves of shale are concentrated in two deposits Liubanskoye and Turovskoye. 30% of these reserves have been preliminarily explored. The development of shale deposits is only possible through mining. Shale may be used for fuel purposes only after it has been thermally processed using a hard heating agent.

Lignite - The explored reserves of lignite equal 160 Mt. Lignite is used in the form of peat-and-coal briquettes produced from lignite and peat. Currently, the occurrence of Lelchitskoye lignite is being explored and its forecasted reserves are estimated to be 250 Mt.

Wood - Forests, which cover almost 40% of the territory, play a key role in the natural resources of Belarus. Forests cover more than 9,4 million hectares and reserves of standing timber are estimated to be 1,5 bcm; the annual increase in timber exceeds 30,3 million cubic meters (mcm). The potential of wood fuel and industrial wood waste is estimated to be 11,65 mcm (3,1 Mtce) per annum. The production of wood fuel resources by 2015 and 2020 is estimated to reach up to 2,81 Mtce (10,56 mcm) and 3,10 Mtce (11,65 mcm), respectively.

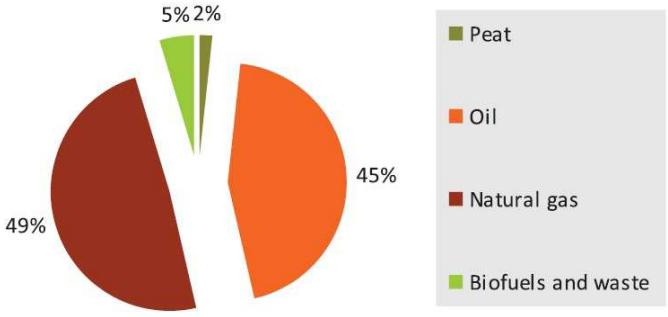

Figure 2: primary energy supply mix in Belarus in 2010[2].

[2] *International Energy Agency Statistics, 2012*

Hydro - The potential of hydro energy in Belarus is estimated to be 2.270 million kWh_e (0,64 Mtce). In 2010, there were 41 operational hydro power plants (HPPs) in the country with a total capacity of 16.1 MW_e (about 3% of the technically feasible potential), which generated 48,6 million kWh_e of electricity annually. The potential capacity of all stream flows in Belarus totals 850 MW_e, including 529 MW_e that are technically feasible and 250 MW_e that are economically feasible

Wind - By 2013, three wind factories are installed with a total power of 3,5 MW_e, responsible for 2.500 MWh_e. a total of 1.840 sites for the location of WPPs have been identified in Belarus, with a theoretical energy potential of 1.600 MW_e and an electricity generation potential of 2,4 billion kWh. According to hydro meteorological surveys, the average annual speed of wind at 10–12 m is 3–4 m/sec. The plan is to construct, by 2015, wind power plant with a total capacity of 440 – 460 MW_e. Furthermore, the plan is to improve the level of wind energy potential use for farms, greenhouses and other agricultural facilities.

Solar - The average annual level of solar radiation in Belarus, taking into account night hours and cloudiness, equals 2.8 $kWh/m^2/d$ and has a conversion efficiency of 12% or 0,3 $kWh_e/m^2/d$. The main areas of solar energy use are solar water heaters in agriculture and in the household sector. In 2010, a domestically manufactured solar water heater with a thermal capacity of 160 kW_t was put into operation in Soligorsk District. Small photovoltaic plants are also in operation, generally stand-alone.

Geothermal - Pripyat Trough and Podlaska-Brest Depression are characterized by the most favorable conditions for the use of thermal waters; the temperature of subsurface waters is 80 °C or higher and their potential in terms of geothermal energy is estimated to be 3 – 6 tce/m^2. Moreover, over 200 geothermal heat pumps with a total capacity of about 16.5 MW_t are being operated for the purposes of supplying heat in various sectors of Belarus' economy.

CO_2 emissions

At 2010 the total emissions of CO_{2eq} in Belarus were about 89.444,38 tons, lower of a 35,7% than 1990 values (139.104,80 tons), but higher of a 7,3% than 2000 values (79.289,73 tons).

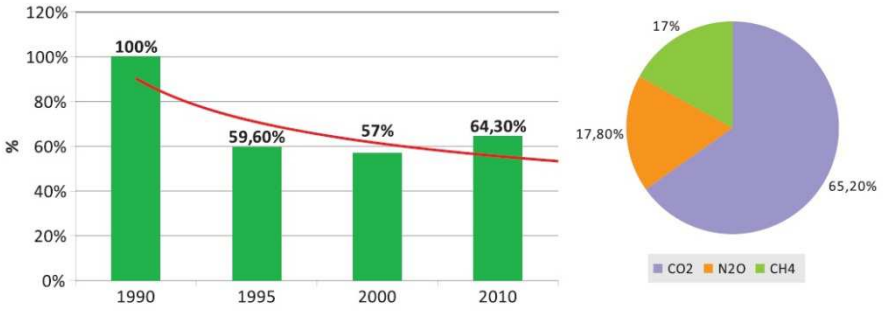

Figure 3: level of CO_{2eq} emissions from 1990 to 2010 and GHG mix[3]

According to official data[4], the actual CO_2 emission factor for electricity production in Belarus is about 0,46 t CO_2 / kWh_e

[3] *Ministry of Natural Resources and Environmental Protection of Republic of Belarus*

[4] *European Bank for Reconstruction and Development, Electricity Emission Factors Review, 2009*

Covenant of Mayors for the city of Ashmyany

General introduction and specifics about the city

The Rayon of Ashmyany was founded on 15th January 1940. Originally, it was a part of Vileysky and Molodechensky provinces; since 20th November 1960 it is included in the Hrodna region. The town of Ashmyany is located in the northeast part on the Ashmyany province. The province borders are:

- in the West: Lithuania;
- in the north: the Ostrovetsky province of the Grodno region;
- in the Southeast respectively the Smorgonsky and Ivyevsky provinces of the Grodno region;
- in the Southeast the Volozhinsky region of the Minsk region.

The territory of the province occupies 1.200 km^2. The soils are generally composed by peat and marsh. The woods occupy 34% of the territory. Agriculture occupies 53% of the territory. In the Ashmyany Rayon, there are 10 villages: Borunsky, Golshansky, Grauzhishkovsky, Grodinsky, Zhupransky, Kamennologsky, Kolchunsky, Kreyvantsevsky, Moore-Oshmyankovsky, Novosyolkovsky, including 364 settlements.

The population (according to population census of 2009) is about 32.300 inhabitants, divided in country people of 14.800, and city people of 17.500.

The Municipal Center of Ashmyany is located on the river Oshmyanka, 120 km from Minsk and 55 km from Vilnius. Through the Ashmyany, area passes the ninth transport corridor, which connects UE countries with CIS countries.

Figure 4: Map of the Ashmyany Rayon

In 2011, the overall electric consumption of Ashmyany Rayon was about 31.839 MWh_e, while the thermal energy consumption was about 167.565 MWh_t. In Ashmyany town, almost all thermal energy is distributed by district heating network, while in the country individual boilers are most used.

The main energy sources used is natural gas, which represents around 50% of the total consumption (fossil fuels + renewable energy, mainly biomass) and almost 54% if considering only fossil fuels

Long-term vision of the city of Ashmyany

The long-term vision of Ashmyany Rayon lies within the national energy policy and basically wants to improve the energy efficiency of the area and to reduce the energy imports, by a major exploitation of local energy sources, fossils (in particular peat and turf) and renewables (biomass – chip and pellet, biogas – zootechnics and waste disposal, wind, solar, geothermal). In particular, the aim for the coming years is to attract massive investments for the realization of big renewable power plants (as wind factories), in order to increase job potential of the area through the adoption of sustainable energy technologies. It will be strictly connected to an improvement of educational and training programs, with the introduction of theoretical and practical lessons on renewable energy and the consequent creation of new works, such as PV designers and installers.

Ashmyany wants also to increase tourist and agritourist attraction of the area. By this purpose, a green way across borders between Lithuania and Belarus has been activated in the year 2012.

Finally, the improvement of living conditions in the country area is also a priority, which is strictly linked to the promotion of use of renewable energy sources in rural context.

Adoption of LED lamps for public lighting and methane for automotive are two actions directly connected to national energy policy.

Coordination and organizational structures created/assigned

The Ashmyany Executive Committee actually is entirely involved in the energy efficiency programs of the Rayon. At the actual moment, two people are directly involved in SEAP realization. The coordination activities should generate the creation of an Energy Point, with people entirely involved in energy topics and charged to coordinate the different Departments.

Involvement of stakeholders and citizens in the area

The involvement of citizens will happen through the organization of the Energy Days, related to the installation of new innovative renewable energy plants on public buildings (such as the planned PV installation on an orphanage). Activation of dedicated school programs about renewable energy programs will serve to increase awareness among young people.

Once passing the beginning communication phase, training courses will be operated for designers and workers and Energy Point will act as referee of energy initiatives.

Regarding stakeholders, the main planned activity is to attract foreign investments, by the aid of international banks and funds.

BEI – Baseline Emission Inventory

Methodology

Collection of energy data in order to create the baseline emission inventory can be made by using a 3 kind of approaches: Top-Down, Bottom-Up or a mix.

Top-Down approach is generally used when there are not specific data from the Municipal archives (in particular over private consumptions) and so national, or better, regional statistical data are used in order to transfer values according to population and surface.

Bottom-Up approach is used in case of availability at Municipal level (e.g. archives), after all, these data are compared with upper level data in order to validate and fully understand the real situation.

Belarus is a country with a peculiar political and social context, and public data are almost all managed at Rayon level. Oblast level data are protected by national security, so that there is no direct access to these data. Otherwise, at national level many generalist statistics about energy data are public because used as referee for the energy vision and policy of the Republic.

Due the peculiar context, data which are generally unknown for European Municipalities, as managed by private companies (residential buildings, tertiary, private transport, etc..), in Belarus are collected by each Rayon and so available for consultation.

Therefore, Rayon of Ashmyany is in possession of all useful data and put them available for the SEAP implementation. Data are then compared to global Belarusian and EU statistics.

The approach used for this Baseline Emission Inventory is a Bottom-Up approach.

In order to transform energy data in emissions data, conversion factors listed in SEAP guidelines are used. Regarding electricity conversion factor, the value has been obtained by official EBRD paper, dated 2009. Regarding biomass conversion factor, at the present the wood sector in Belarus does not meet the environmental sustainability standards of EU, so that the worst value was assigned. One of the main priorities of SEAP, related to objectives at national level, is an improvement of sustainability standards in biomass use, so that a natural decrease of emissions is expected, without changing heat generation systems and by gradually improving the use of biomass.

Regarding data for heating of buildings, it is important to notice that in the Ashmyany Rayon, as well as in all Belarus, there is a massive use of district heating networks. Individual boilers are used only outside of the city, in the rural part of the Rayon. Emission factors for district heating network are derived by a weighted average of all fuels used in the municipal boilers.

At the present, in the Ashmyany Rayon there is not local electricity production, as well as there is no acquisition of electricity from certified alternative energy sources.

Year 2011 has been chosen as baseline year and it is not expected an increase of population at 2020, respect to actual level (31.872 inhabitants)

BEI – Data report

The official COM tables (BEI and SEAP) are listed in the Annex I.

In the following two tables are summarized the results deriving from tables regarding Baseline Emission Inventory, that is energy consumptions, CO_2 emissions and renewable energy produced for the baseline year in 2011, as well as the objectives of reduction.

Baseline divided by sector – Year 2011

Municipal buildings		
Energy consumption [MWh]	CO_2 [t]	Renewable Energy [MWh]
32.339,3	9.934,4	2.547,5
Tertiary buildings		
Energy consumption [MWh]	CO_2 [t]	Renewable Energy [MWh]
23.188,2	7.557,7	4.183,0
Residential buildings		
Energy consumption [MWh]	CO_2 [t]	Renewable Energy [MWh]
143.551,1	40.949,6	6.183,3
Transport		
Energy consumption [MWh]	CO_2 [t]	Renewable Energy [MWh]
46.156,2	11.733,3	5.697,4
Municipal lighting		
Energy consumption [MWh]	CO_2 [t]	Renewable Energy [MWh]
325,7	149,5	0,0

Table 1: baseline divided by sectors of interventions

Baseline 2011 and objectives 2020 to reach

Baseline 2011		
Energy consumption [MWh]	CO_2 [t]	Renewable Energy [MWh]
245.560,5	70.324,5	18611,1
Expected population increase at 2020	0,0%	
Coefficient	1,0	
Scenario in 2020 without actions		
Energy consumption [MWh]	CO_2 [t]	Renewable Energy [MWh]
245.560,5	70.324,5	18.611,1
Objectives for 2020		
Energy savings -20% [MWh]	CO_2 cut -20% [t]	Renewable Energy Increase +20% [MWh]
-49.112,1	-14.064,9	3.722,2
Scenario in 2020 with actions		
Energyc [MWh]	CO_2 [t]	Renewable Energy [MWh]
196.448,4	56.259,6	22.333,4

Table 2: Complete baseline 2011 and scenarios for 2020 divided by sectors of interventions

The objective for the year 2020 is therefore represented in the following graph:

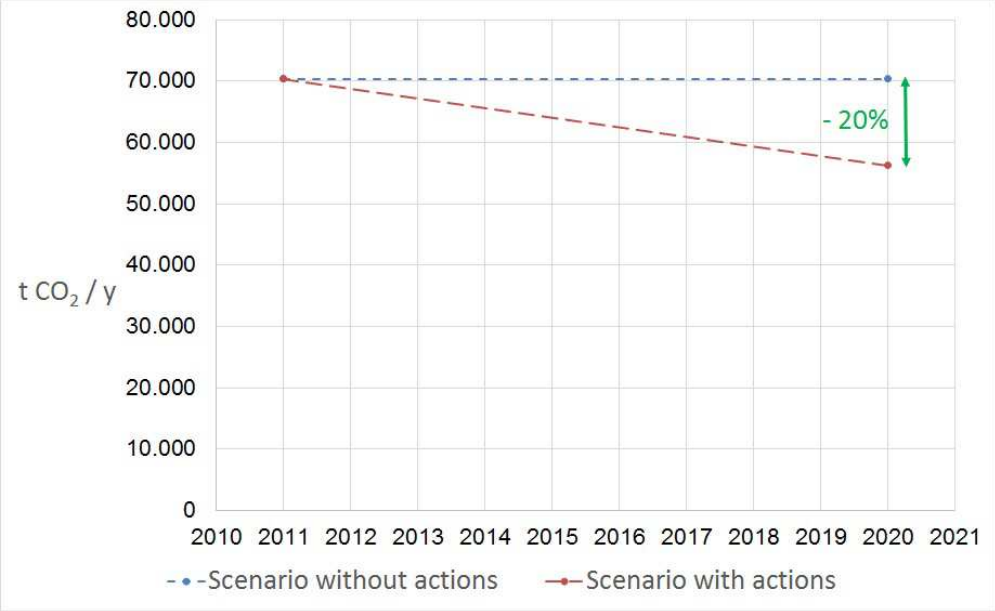

Figure 5: Objective of emissions' reduction for the year 2020

Here follow the graphs representing visually all data contained in the Baseline Emission Inventory

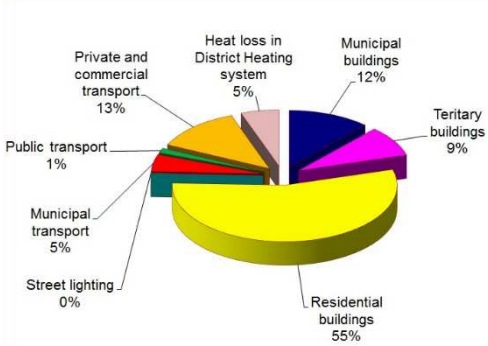

Figure 6: Energy consumptions mix, divided by sector

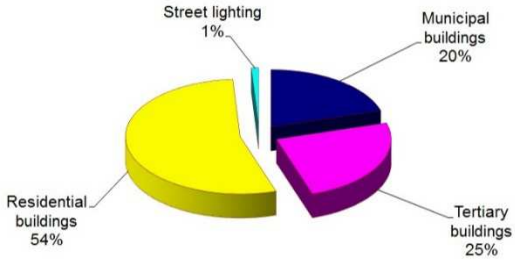

Figure 7: Electric energy consumptions mix, divided by sector

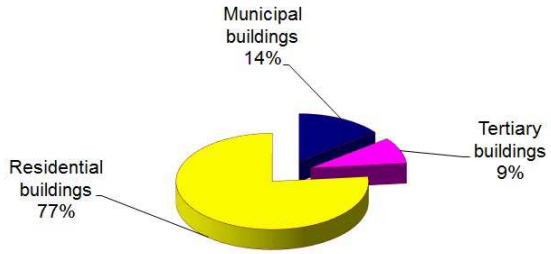

Figure 8: Thermal energy consumptions mix, divided by sector

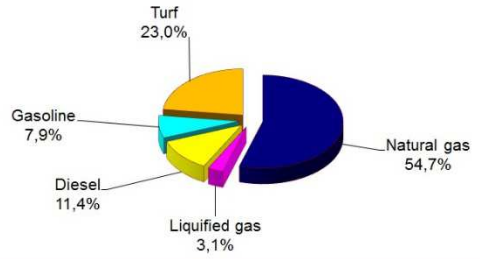

Figure 9: Fossil fuels used for heating

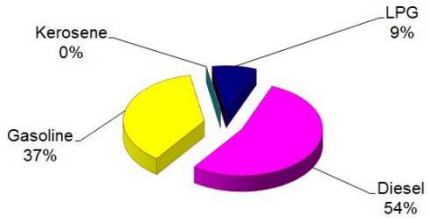

Figure 10: Fossil fuels used for transport

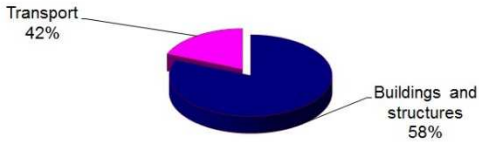

Figure 11: Comparison between transport and buildings consumptions

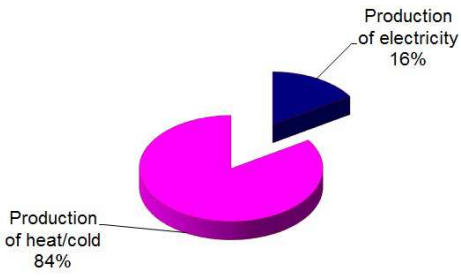

Figure 12: Comparison between electricity and thermal consumptions

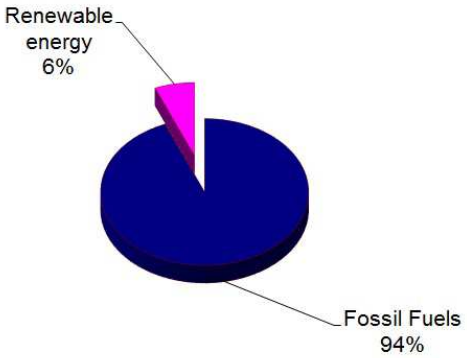

Figure 13: Quota of renewable energy used in total energy consumptions

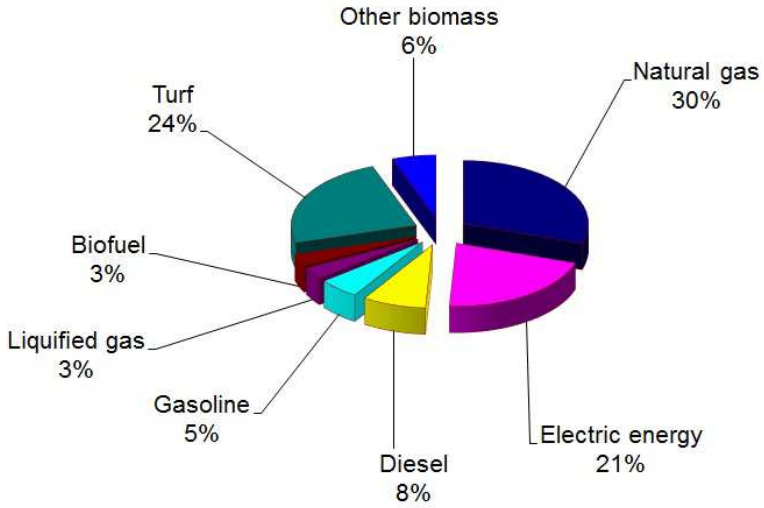

Figure 14: CO_2 emissions mix divided by energy source

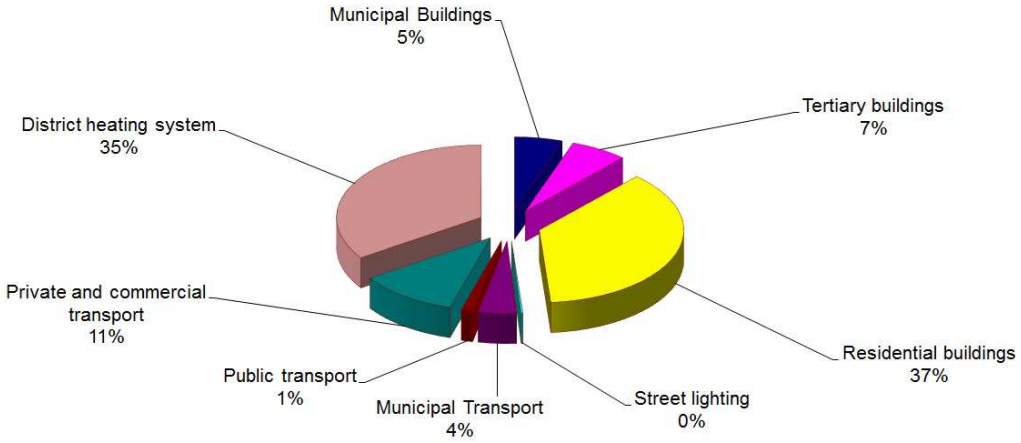

Figure 15: CO_2 emissions mix divided by sector

Finally, here follows the histogram representing the energy and emissions quota of Ashmyany, compared to Belarus and to EU

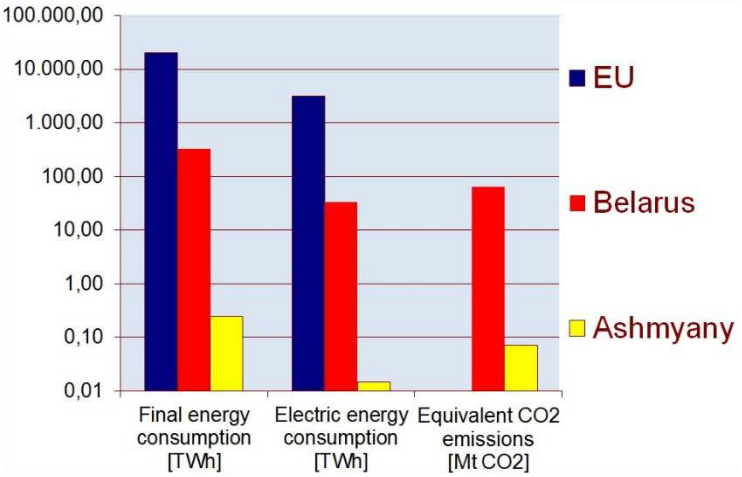

Figure 16: Energy and CO_2 values of Ashmyany, compared to Belarus and the EU (logarithmic scale)

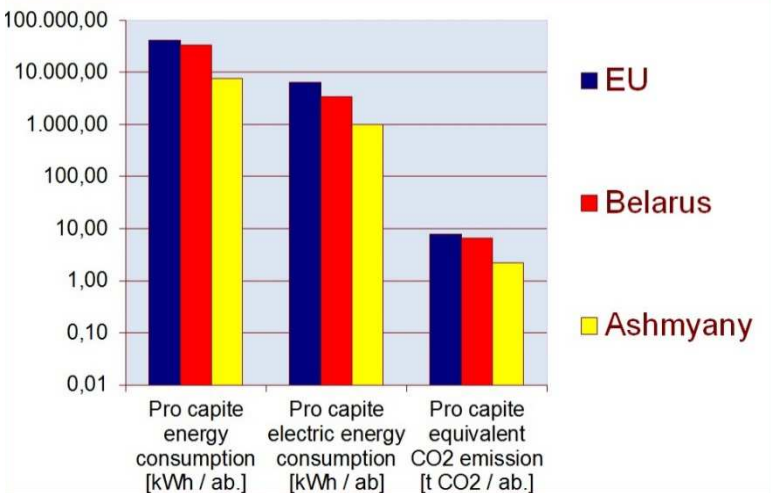

Figure 17: Pro capite energy and CO_2 values of Ashmyany, compared to Belarus and the EU (logarithmic scale)

Priorities

The baseline evidence the priority area of intervention in residential sector, both for heating (provided mainly by district heating network) and for electricity.

The Ashmyany energy policy must include a high participation of residents and citizens, in order to increase energy efficiency in residential buildings.

On the other hand, the Rayon will implement a deep modernization of their district heating network in several ways, as the substitution of fossil fuels with new environmentally friendly fuels, using also this opportunity as leverage for job's creation.

Actually, Ashmyany Rayon does not exploit renewable energy (with the exception of biomass used actually in dated and inefficient plants), although have been individuated many potential fields of intervention. A better use, with a great improvement of renewable energy is also a priority.

Finally, a local campaign of Place Marketing in the country (directed to tourist, foreign investors and citizens) is actually under development, by the modernization of campaigns (old Kolkhoz), management of new efficient public transport system, green ways, commercial and industrial international cooperation.

SEAP – Sustainable Energy Action Plan

Methodology

The Sustainable Energy Action Plan is composed by a set of actions planned by 2020, to realize and to monitor in order to reach the -20% of CO_2 emission reduction objective, according to the Baseline Emission Inventory. The general methodology aims to integrate actions already committed at Ashmyany by National Government, which intervene on energy situation of the Rayon, such as modernization of district heating network, introduction of LED technology and use of methane gas for automotive, with newly innovative actions, which at the present are not mandatory but can give a strong impulse to renewable energy sector.

Second types of newly innovative actions need pilot projects to verify the real feasibility of plants according to context and boundary conditions, in order to show to citizens and potential stakeholders (both local and international) the potentials for each type of technology, with the final purpose to boost replicability and a "snowball" effect.

Within the program, an increase of awareness and engagement by citizens is fundamental; in fact many actions are planned directly to residential sector – As example an Energy Point will be created in order reach this specific object.

In each actions expected results are indicated in terms of energy savings (MWh), CO_2 emissions avoided (tons) and renewable energy produced (MWh), as well as their percentages, in comparison with baseline data for each target area.

The target areas chosen originate directly from the CoM guidelines are 16, namely:

Action 1. Municipal buildings.
Action 2. Tertiary buildings.
Action 3. Residential buildings.
Action 4. Public lighting.
Action 5. Municipal fleet.
Action 6. Public transport.
Action 7. Private and commercial transport.
Action 8. Wind.
Action 9. Photovoltaic.
Action 10. Geothermal.
Action 11. District Heating.
Action 12. Strategic Urban planning.
Action 13. Strategic Urban Mobility Plan.
Action 14. Stakeholder Engagement and awareness campaign.
Action 15. Training.
Action 16. Actions on Sustainable Development and Place Marketing.

Every action is composed by several sub-actions, planned in order to guarantee the final result.

When possible and already determined by City calculations, the expected budget for each action has been reported, as well as a first estimation of simple payback time of each investment.

Finally, for each sub-action are listed specific indicators, qualitative and/or quantitative, with the purpose to monitor the progress of works and the approach to target objectives.

SEAP – Data report

Here follows an extract from the list of sub-actions.

Sustainable Energy Action Plan of Ashmyany

N°	Sector and activity	The main activities divided by sector	Department and Person in charge	period (start - end)	Approximate cost for activity (€)	Expected energy savings [MWh/y]	Estimated reduction in CO_2 emissions [t/y]	Expected amount of energy produced by renewable sources [MWh/y]	Planned energy savings to 2020 [MWh/y]	Planned CO_2 emissions reduction to 2020 [t/y]	Planned renewable energy production to 2020 [MWh/y]
	Buildings and structures								38.540	33.491	50.632
1	*Municipal buildings, structures*	Installation of a solar thermal collector on the orphanage	Ashmyany	2014-2015	110.000	32	8	20	0,10%	0,08%	0,79%
2		Installation of solar thermal collectors on the gymnasium and recreation complex	Ashmyany	2014-2015	75.000	22	6	14	0,07%	0,06%	0,54%
3		Modernization of pumping machines in district heating system. n°15 new pumps	Ashmyany	2013-2019	40.598	45,9	21,07		0,14%	0,21%	0,00%
4		Modernization of district heating network (3000 m / year).	Ashmyany	2013-2020	1.933.216	1.625	427		5,03%	4,30%	0,00%
5		Installation of new boilers in district heating system "Zhuprany", "Giorno", "Baruny", "Novosyolki", "Stone Log", "Krakovka."	Ashmyany	2013-2016	175.747	358	94		1,11%	0,95%	0,00%
6		Installation of photovoltaic panels in an orphanage	Ashmyany	2014-2015	40.000	0	6	13	0,00%	0,06%	0,51%
7		Energy Audit on public buildings	Ashmyany	2014-2020		867	247		2,68%	2,49%	0,00%
8		Creation of an energy management system in all public structures' system	Ashmyany	2014-2017	1500+(500*active building)	578	165		1,79%	1,66%	0,00%
9		Bringing biomass to sustainability	Ashmyany	2014-2017	NA	0	3.998		0,00%	40,24%	0,00%
10	*Tertiary buildings, structures*	Rehabilitation of the roof of Ashmyany Central Regional Hospital (1400 m^2)	Ashmyany	2014-2017	50.000	0,47	0,12		0,00%	0,00%	0,00%
11		Insulation of walls of Ashmyany Central Regional Hospital (1000 m^2)	Ashmyany	2018-2019	95.000	0,34	0,09		0,00%	0,00%	0,00%
12		Introduction of high efficiency lamps in Ashmyany Central Regional Hospital (780 pz.)	Ashmyany	2013-2020	8.200	12	5,51		0,04%	0,06%	0,00%
13		Substitution of windows of Ashmyany Central Regional Hospital (137 m^2)	Ashmyany	2013-2020	24.000	0,03	0,01		0,00%	0,00%	0,00%
14		Installation of solar collectors for retirement house and rehabilitation of roof	Ashmyany	2014 - 2015	112.000	47,58	12,51	29,74	0,15%	0,13%	1,17%
15		Communication and training of tertiary operators regarding EE and correct behaviour	Ashmyany - ENERGY POINT	2013-2020	NA (see ENERGY POINT)	644,38	186		1,99%	1,87%	0,00%
16	*Residential buildings*	Thermal Insulation of residential buildings	Ashmyany	2013-2020	2.114.209	2.028	533		6,27%	5,37%	0,00%
17		Creation of a ENERGY POINT in order to facilitate citizens in EE and RES	Ashmyany	2013-2020	(5000*year)+5000	NA	NA		na	na	0,00%
18		Creation-facilitation of new GPO (Group Purchasing Organization) for equipment regarding energy efficiency	Ashmyany - ENERGY POINT	2013-2020	NA (see ENERGY POINT)	6.760	1.032		20,90%	10,39%	0,00%
19		Communication and training of citizens regarding EE and correct behaviour	Ashmyany - ENERGY POINT	2013-2020	NA (see ENERGY POINT)	4.056	619		12,54%	6,23%	0,00%
20		Implementation of Trashware for Computer	Ashmyany - ENERGY POINT	2013-2020	2.000	NA	NA		na	na	0,00%
21		Installation of internet networks (CABLE and WI-FI)	Ashmyany	2013-2020	NA	NA	NA		na	na	0,00%
22		Training of citizens for the use of computers	Ashmyany - ENERGY POINT	2013-2020	NA	NA	NA		na	na	0,00%
23		Modernization of the medium and low voltage network	Ashmyany	2013-2020	NA	3.184	1.461		9,85%	14,71%	0,00%
24		Energy efficiency construction in new settlements	Ashmyany	2013-2020	NA	4.732	722		14,63%	7,27%	0,00%
25		Training of operators in construction field (planner, masons, electricians, plumbers..)	Ashmyany - ENERGY POINT	2013-2020	12.000	NA	NA		na	na	0,00%
26	*Transport*	Realization of a point of sale of Methan/LPG gas	Ashmyany	2015	NA	0	196		0,00%	1,97%	0,00%
27		Realization of bycicle paths	Ashmyany	2013-2020	100.000	NA	NA		na	na	0,00%
28		Improvement of bike use and bike sharing	Ashmyany	2013-2020	20.000	1.541	392		4,77%	3,95%	0,00%
29		Creation of reserved lanes for bus and taxi	Ashmyany	2013-2020	10.000	NA	NA		na	na	0,00%
30		Improvementes of the use of Public Transport	Ashmyany		200.000	4.624	1.177		14,30%	11,85%	0,00%
31		Improvements of private car's technology	Private	2013-2020	NA	617	157		1,91%	1,58%	0,00%
32		Transformation of municipal transports from gasoline to methane gas	Ashmyany	2013-2020	800*car	0	151		0,00%	1,52%	0,00%
33		Transformation of municipal and public transport from diesel to methane gas	Ashmyany	2013-2020	NA	0	239		0,00%	2,41%	0,00%
34		Car sharing/ Car pooling	Ashmyany - ENERGY POINT	2013-2020	1.000	925	235		2,86%	2,37%	0,00%
35		Optimization of public transport	Ashmyany	2013-2020	NA	344	88		1,06%	0,88%	0,00%
36		Reduction of private transport for administrative issues	Ashmyany	2013-2020	NA	617	157		1,91%	1,58%	0,00%
37		Consumption of products km 0	Ashmyany	2013-2020	NA	NA	NA		na	na	0,00%
38	*Renewable Energy Sources*	Installation of PV - PRIVATE	Ashmyany - ENERGY POINT	2013-2020	NA		1.492	3.250	0,00%	15,02%	127,58%
39		Solar Thermal Energy - PRIVATE	Ashmyany - ENERGY POINT	2013-2020	NA	4.375	1.151	7.000	13,53%	11,58%	274,78%
40		Construction of a wind farm (20 MW)	Ashmyany	2014-2020	40.000.000		18.360	40.000	0,00%	184,81%	1570,19%
41		Implementation of a geothermal energy project	Ashmyany	2015-2016	40.000	8	2,10	6	0,02%	0,02%	0,24%
42		Geothermal Energy - PRIVATE	Ashmyany	2015 -2020	NA	400	105,20	300	1,24%	1,06%	11,78%
43	*Municipal public lighting*	Introduction of LED technology in the lighting system for the main street of Ashmyany (20 pz.)	Ashmyany	2014-2015	7.241	12	5,49		0,04%	0,06%	0,00%
44		Substitution of mercury lamps with high pressure sodium lamps (454 pz.)	Ashmyany	2014-2020	12.742	37	17,16		0,12%	0,17%	0,00%
45		Introduction of lighting control systems in the entrance of big buildings (1.100 pz)	Ashmyany	2013-2017	3.427	47	21,75		0,15%	0,22%	0,00%
46	**Local production of electricity**										
					45.186.380,0			**TOTAL**	38.540,1	33.491,1	50.632,4
									49.112,09	14.064,91	3.722,23
					Total estimated cost			**Reached by applying the actions**	15,69%	47,62%	272,05%
									Energy savings	**CO_2 reduction**	**Renewable Energy increase**

Emissions factor [t CO_2 / MWh]	
Electricity	0,459
Average District Heating emissions factor	0,26
Average Fuel factor	0,25

Table 3: List of Sub-Actions, related costs and expected results

Globally, 45 sub-actions are planned for the coming years in order to reach the 20-20-20 objectives. Here follows the general description of actions. The complete list is attached in Annex I

Action 1. Municipal buildings

4 sub-actions are planned to set up in this sector.

2 demonstration renewable energy plants on public building (solar thermal panels) will be realized and monitored.

An internal promotion related to Energy Audits aimed to understand problems and priorities in every municipal building will be set up.

A new Energy Management System of public buildings will be implemented, in order to realize and maintain a correct use of energy after the Energy Audit phase.

Action 2. Tertiary buildings

5 sub-actions are planned to set up in this sector.

Actions concern mainly interventions on the local hospital, in order to implement energy efficiency in this structure and to avoid energy losses.

1 sub-action regards retirement house, with the installation of solar thermal collectors

Action 3. Residential buildings

3 different sub-actions are planned to set up in this sector

Ashmyany intends to act strongly in residential sector, with the general target of changing behaviour of occupants, incrementing ICT skills of people and evaluating the potentials for energy retrofitting. It is expected to increase awareness on the potential related to energy efficiency with retrofit insulation on existing buildings.

Thanks to the participation in national and regional project, the administration is going to raise efficiency on medium and low voltage network, in order to have fewer losses in their territory.

Action 4. Municipal public lighting

3 sub-actions are planned to set up in this sector

Actions in public lighting are in line with government general strategy to introduce LED lighting in the main streets and high-pressure sodium lamps in the secondary streets. Moreover, it is ongoing the program of introducing lighting control systems in entrances and external lamps of all buildings managed by Rayon, including residential buildings.

Action 5. Municipal Transport

1 action is planned to set up in this sector.

The administration aims to transform the public fleet, actually gasoline powered, to methane and LPG gas

Action 6. Public Transport

3 sub-actions are planned to set up in this sector

Main activities regard the implementation and optimization of public transport, with smart and efficient connections country – town and residential zone – working zone.

According to central government strategies, the use of methane gas as cars' fuel will be improved thanks to the realization of new refuelling points

Action 7. Private Transport

5 sub-actions are planned to set up in this sector

As well as residential buildings sector, transport sector is a key point in the Ashmyany local energy policy, with the implementation of different and complementary actions, in order to reach the objective of reduction in this sector.

The new cycle paths (planned in Urban Mobility) will be realized and supported by a creation of a free of charge bike sharing service.

Actual Private fleet is often old and inefficient, the sub-action aim to support the replacement with a newer and more efficient technology in private transport. On the other hand, the realization of a new Methane/LPG selling point dedicated to automotive will boost the implementation of bi-fuel engines.

The last sub-action aims to improve the realization of different services for private transport, such as car-pooling and car sharing, thanks to the engagement of several stakeholders such as entrepreneurs and local associations.

Action 8. Renewable Energy Sources – Wind

Thanks to the potential noticed during several studies, the purpose of this action is to facilitate and aware potential stakeholder in wind farm's potential. In the field of renewable energy, the main contribution should come from this sector, considering the high potential of the area (average wind speed of about 6 m/s at 30 m). Many potential investors are currently making business analysis on Ashmyany windy potential. The first wind farm is expected to be built in coming 2 years.

Action 9. Renewable Energy Sources – Photovoltaic

2 sub-actions are planned to set up in this sector

The PV pilot plants on municipal buildings will be used as demonstrator for private investors and citizens to increase the quota of solar thermal and PV panels in Ashmyany.

Thanks to the first sub-action, it is planned to support and facilitate the realization of PV plants by private investors, thanks also to national incentives.

Action 10. Renewable Energy Sources – Geothermal

2 sub-actions are planned to set up in this sector

A Geothermal pilot plant in the rural sector will be used as demonstrator for private investors and citizens to increase the quota of Geothermal plants.

Thanks to the first sub-action, it is planned to support and facilitate the realization of Geothermal plants by private investors.

Action 11. District Heating

4 sub-actions are planned to set up in this sector

District heating is a key component of this SEAP, especially related to the energy efficiency.

It is planned to renovate old boilers with newest one, to substitute pumping machines and to modernize the dispatching network, actually with high losses.

Another key sub-action is to generate a sustainable procurement of biomasses at local level, actually obtained without a green management of local resources. This action will be supported by national policies and funds.

Action 12. Strategic Urban Planning

Action in this field will guarantee the realization of new settlements with a control and rating on Energy label the design and implementation of new green buildings and neighbourhood. Actually there is no a concrete directive in this field.

This action will be supported by training activities directed to technicians and operators from the construction field.

Action 13. Urban Mobility

2 sub-actions are planned to set up in this sector

These actions aim to support the other sub-actions from the transport sector, encouraging a greener mobility and discouraging the use private cars.

New bicycle paths will be realized analysing normal activities and citizens flows and travel behaviour.

Reserved lines to bus and taxi will be realize in order to discourage the use of private cars in the city centre and in strategic points of the Rayon.

Action 14. Stakeholder Engagement

4 sub-actions are planned to set up in this sector

As already described, citizens play a key role in reaching the CO_2 emission reduction; in order to realize a concrete support in awareness and engagement campaigns the Administration has planned to realize a new Energy Point dedicated to stakeholders, that will organize and manage different sub-actions such as:

- Communication activities and campaigns
- Realization of purchasing groups at local level
- Realization of markets with products and goods produced at local level

Action 15. Training Activities

3 sub-actions are planned to set up in this sector

Several training courses will be realized in order to ensure a correct collaboration among different sectors and targets:

- Training dedicated to the tertiary and municipal's operators on energy efficiency and the correct use of energy
- Construction field, dedicated to the energy renovation and new building technologies
- Citizens: dedicated to a correct energetic behaviour
- Citizens: dedicated to improve the use and knowledge of computer (the course will be structured using common methodologies such as the European Computer Driving Licence)

Action 16. Other Activities – Place Marketing

2 sub-actions are planned to set up in this sector

In order to improve the knowledge and reduce the "digital divide" of the territory, 2 sub-action individuated will tackle the noticed problem, improving the internet/WiFi networks in the city and realizing a new project called "trashware".

The trashware means Computer recycling and/or electronic recycling is the recycling or reuse of computers or other electronic devices. It includes both finding another use for materials (such as donation to charity), and having systems dismantled, in a manner that allows for the safe extraction of the constituent materials for reuse in other products. The result should be a donation to local associations or schools with the installation of open-source software. This action is normally managed by an agreement between a local Association and the Administration (that support the Association in the start-up phase)

Targets

Targets by sector

Here follow the graph of the results by applying SEAP's actions, divided by three sectors: Buildings, transport, street lighting.

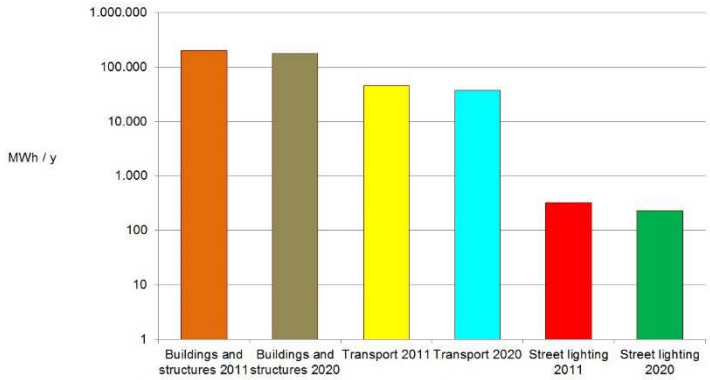

Figure 18: Expected energy savings by applying the actions, divided by sector (logarithmic scale)

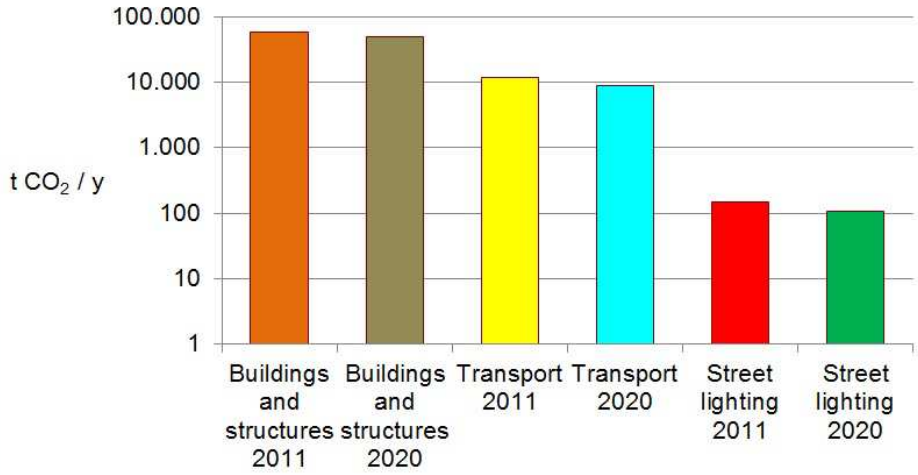

Figure 19: Expected emissions reduction by applying the actions, divided by sector (logarithmic scale)

District heating system is a key structure for the city of Ashmyany. Results expected by modernization of the district heating network are presented below:

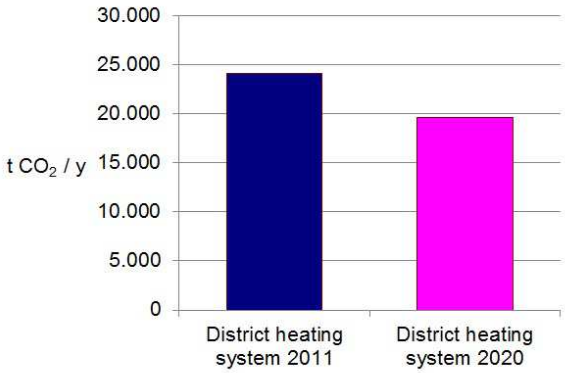

Figure 20: Expected emissions avoided by acting specifically on District Heating network

SEAP provides a strong impulse to renewable energy investments. In the baseline year, the only renewable energy used was biomass for heating purposes. In the year 2020, the expected renewable energy mix will be as follow:

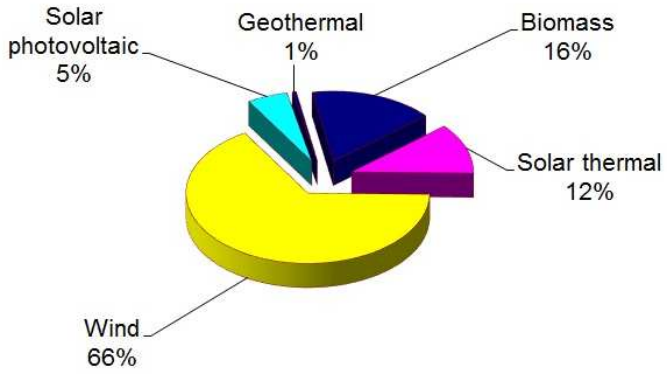

Figure 21: Expected new renewable energy mix, by applying the actions

Targets 20-20-20

The expected results of the SEAP are the following:

- Energy savings: 15,66%
- CO_2 emissions reduction: 47,59%
- Renewable energy increase: 271,74%

Here follow the graphs showing these targets compared to the baseline:

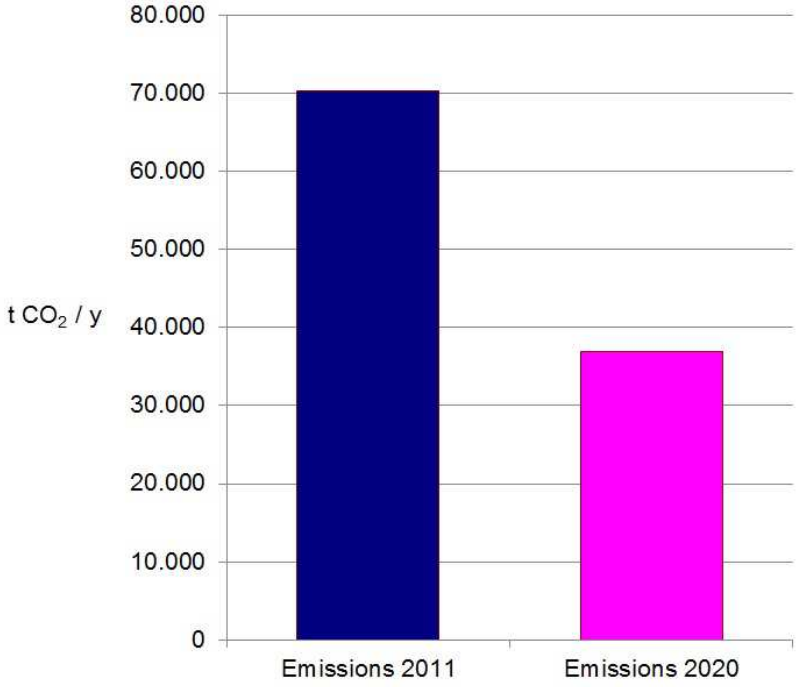

Figure 22: Expected emissions avoided by applying the totality of actions

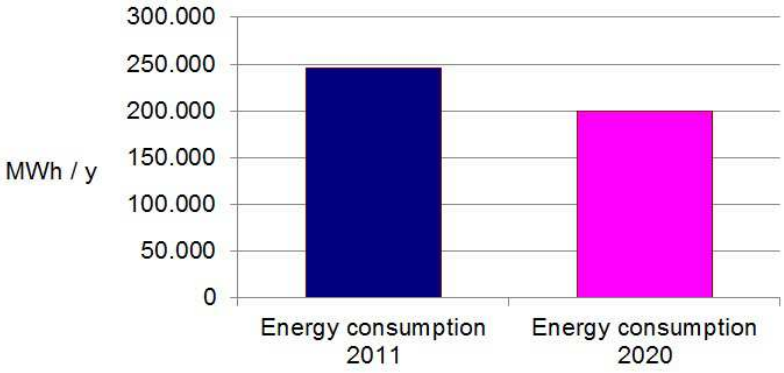

Figure 23: Expected energy savings by applying the actions

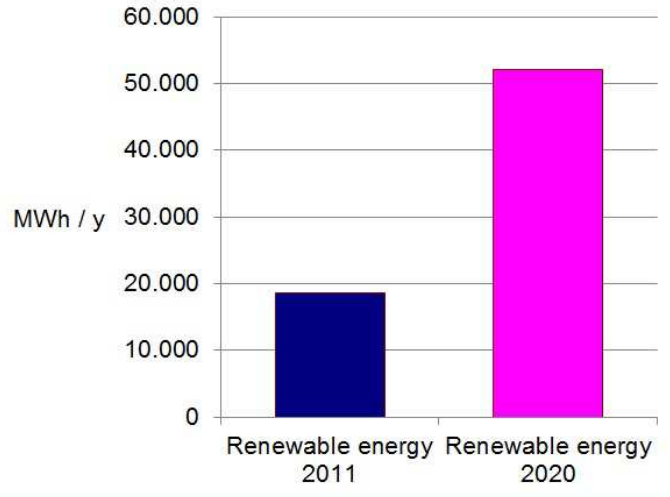

Figure 24: Expected renewable energy increase by applying the actions

MEI – Monitoring Emission Inventory

Monitoring of SEAP progress report is the key factor in energy policy strategy. Regarding monitoring, performance indicators can be divided in two groups:

- Indicators regarding effective implementations of renewable energy sources and energy efficiency interventions in the territory; Ashmyany Rayon keeps an archive with all information about urban and energy interventions which happen in town both from municipal, residential and tertiary part, so that it will be easy to verify the progress of SEAP implementation.
- Indicators regarding citizens' awareness and changing behaviour. Not all actions related directly to citizens can be quantified in numbers. The performance indicators will concern mainly the life of the new Energy Point: number of workers in the Energy Point, of citizens accessing the bureau, of information provided, of Energy Days organized, of people trained.
  Regarding specific actions, the following table summarizes the performance indicators for each of them

Sector		Action	Performance Indicator
Municipal buildings, structures	1.1	*Installation of a solar thermal collector on the orphanage*	Number of collectors installed m^2 of solar panels installed Number of citizens and students participating to related energy day
	1.2	*Installation of solar thermal collectors on the gymnasium and recreation complex*	Number of collectors installed m^2 of solar panels installed Number of citizens and students participating to related energy day
	1.3	*Energy audit of public buildings*	Number of building audited / year
	1.4	*Creation of an energy management system in all public building*	Number of people trained and employed in energy management system
Tertiary buildings, structures	2.1	*Rehabilitation of the roof of the Ashmyany Central Regional Hospital*	Square meters of roof rehabilitated
	2.2	*Insulation of walls of Ashmyany Central Regional Hospital*	Square meters of walls insulated
	2.3	*Introduction of high energy efficiency lamps in Ashmyany Central Regional Hospital*	Number of lamps substituted
	2.4	*Substitution of windows of Ashmyany Central Regional Hospital*	Number of windows substituted – total m^2
	2.5	*Installation of solar collectors for retirement house and rehabilitation*	Number of collectors installed

		of roofs	m^2 of solar panels installed m^2 of roof rehabilitated Number of citizens and students participating to related energy day
Residential buildings, structures	3.1	*Thermal insulation of residential buildings*	Number of buildings insulated / year
	3.2	*Modernization of the medium and low voltage network*	Meter renovated / year
	3.3	*Solar thermal energy - private*	Number of solar thermal panels installed by privates / year m^2 of solar thermal power installed / year kWh of solar thermal energy produced / year
Municipal/Public lighting	4.1	*Introduction of LED technology in lighting system for the main street*	Number of lamps substituted with LED for the main street
	4.2	*Substitution of mercury lamps with high pressure sodium lamps*	Number of high pressure sodium lamps substituted with mercury lamps / year
	4.3	*Introduction of lighting control systems in the entrance of big residential buildings*	Number of buildings with lighting control systems / year
Municipal Fleet	5.1	*Transformation of municipal transport from gasoline to methane gas*	Number of municipal cars transformed / substituted
Public Transport	6.1	*Transformation of public transport from diesel to methane gas*	Number of buses transformed / substituted
	6.2	*Improvement of the use of public transport*	Number of passengers/ year
	6.3	*Optimization of public transport*	Mileage / year
Private Transport	7.1	*Realization of a point for sale of methane / LPG gas*	Number of cars refueling / day
	7.2	*Improvement of bike use and bike sharing*	Number of communication days on possibilities for bikes / year
	7.3	*Improvements of private cars' technology*	Percentage of new cars circulating in the Rayon / year (estimation)
	7.4	*Car sharing / car pooling*	Number of communication days on possibilities for cars / year
	7.5	*Reduction of private transport for*	Number of communication days on ICT potential for

		administrative issues	administrative issues / year
Renewable Energy Sources - Wind	8.1	*Construction of a wind farm*	Number of wind turbines installed kW of wind power installed kWh of wind energy produced / year Number of citizens and students participating to the related energy day
Renewable Energy Sources - PV	9.1	*Installation of a photovoltaic panels on an orphanage*	kW_p of PV panels installed Number of citizens and students participating to related energy day
	9.2	*Installation of PV - private*	Number of PV panels installed by privates / year kW_p of PV power installed / year kWh of PV energy produced at local level / year
Renewable Energy Sources - Geothermal	10.1	*Implementation of a geothermal energy project*	kW of geothermal power installed kWh of geothermal energy produced Number of citizens and students participating to the project and to the related energy day
	10.2	*Geothermal energy - private*	Number of geothermal heat pumps installed by privates / year kW of geothermal power installed / year kWh of geothermal energy produced / year
District Heating	11.1	*Modernization of pumping machines in the district heating system*	Number of pumps substituted / year
	11.2	*Modernization of district heating network*	Meters of network substituted / year
	11.3	*Installation of new boilers in the district heating system*	Numbers of new boilers / year
	11.4	*Bringing biomass to sustainability*	Hectares of wood dedicated to sustainable biomass exploitation

			Tons of wood waste used as biomass for boilers
Strategic Urban Development	12	*Energy efficiency construction in new settlements*	Number of energy efficiency buildings constructed / year
Urban Mobility	13.1	*Realization of bicycle paths*	Kilometers of new bicycle paths / year
	13.2	*Creation of reserved lanes for bus and taxi*	Kilometers of reserved lanes / year
Stakeholder Engagement	14.1	*Creation of an energy point*	Number of people employed in the energy point Number of visitors of energy point / day Number of projects on energy efficiency participating by Ashmyany through the Energy Point / year
	14.2	*Creation and facilitation of new Group Purchasing Organizations*	Number of Groups created Number of people involved / Group
	14.3	*Communication and training of citizens regarding energy efficiency and correct behavior*	Number of energy days organized by energy point / year Number of visibility actions (brochures, posters) created by energy points / year Number of training for citizens organized / year
	14.4	*Production and consumption of products km 0*	Percentage of km 0 products on the total of consumptions / year (estimation)
Training	15.1	*Communication and training of tertiary building operators*	Number of people involved in energy day related to Ashmyany Central Regional Hospital Number of people from Hospital and tertiary sector in general trained about energy efficiency
	15.2	*Training operators in the construction field*	Number of workers, technicians and engineers trained / year in the field of energy efficiency for buildings
	15.3	*Training of citizens for the use of computers*	Number of training organized / year Number of citizens trained / year
Other	16.1	*Implementation of trashware*	Number of reconverted pc given to citizens / year
	16.2	*Installation of internet*	Number of buildings connected /

	networks (cable and Wi-Fi)	year

Table 4: type and value of indicators for the Monitoring Emission Inventory – MEI

Regarding official monitoring of SEAP progress, the indicators to report in the MEI are the same ones of the BEI (as reported in table 2):

- MWh of energy savings
- Tons of CO_2 emissions reduction
- MWh of renewable energy increase

Glossary

SEAP – Sustainable Energy Action Plan: plan for the city in order to reach energy and environmental objectives

BAU – Business as Usual: specific scenario for Eastern countries, in order to consider an actual constant increase of consumptions, in contrast with the past story of the area

BEI – Baseline Emission Inventory: sum of all CO_2 emissions taken at the baseline year

Baseline year: the year chosen as referee for the calculation of the CO_2 reduction target

CO_2 conversion factor: average values used to convert energy consumptions in CO_2 emissions, according to the fuels and energy sources used.

COM East – Covenant of Mayors going East: Initiative related to the Covenant of Mayors for the promotion of energy efficiency and renewable energy sources in the Eastern Neighborhood and Central Asian countries.

District heating system / network: centralized hot water system able to furnish heat to city buildings.

Electricity CO_2 conversion factor: average value used to convert electricity energy consumption in CO_2 emissions, according to the fossil fuels quota used to produce electricity at national level. It indicates the efficiency and sustainability of a country electricity production network.

Figure 25: Water mill in Ashmyany

Photo © Tomasz Michałowski, 1937

Annex I – Official signed document

Energy for Eastern Mayors Project

УТВЕРЖДАЮ
Заместитель председателя
Ошмянского райисполкома
_____ Г.С.Лютковская
«__» _____ 2014 г.

Проект «Энергия для восточноевропейских мэров» – Программа европейской поддержки

План Действий Устойчивого Энергетического Развития

Ошмяны - Гродненская область- Республика Беларусь

E4EM
Energy for Eastern Mayors Project

Контакты

Город:	Ошмяны
ФИО:	Галина Лютковская
Должность:	Зам.пред. Ошмянского Райисполкома
Телефон:	+375(1593) 4-32-12; +375(29) 6933139
Факс:	
e-mail:	1Lutik@tut.by

Город:	Ошмяны
ФИО:	Алексей Филиппов
Должность:	
Телефон:	+375(44)7565258
Факс:	
e-mail:	Aliaksei.Filipau@gmail.com

Проект E4EM:	Помощь в составлении ПДУЭР в Республике Беларусь
ФИО:	Франческо Тинти
Должность:	Энергоконсультант
Телефон:	+39 (051) 2090477
Факс:	
e-mail:	francesco.tinti@unibo.it

Проект E4EM:	Помощь в составлении ПДУЭР в Республике Беларусь
ФИО:	Даниэль Карати
Должность:	Консультант
Телефон:	+39 (051) 228048
Факс:	
e-mail:	caratti@ecuba.it

Annex II – Expected costs of the main sub-actions

Sector	Sub-Action	Cost (BYR)	Cost (€)	Note
Municipal buildings, structures	Installation of a solar thermal collector on the oprhanage	1.430.000.000	110.000	Expectations from EuropeAid policy
	Installation of solar thermal collectors on the gymnasium and recreation complex	975.000.000	75.000	Expectations from EuropeAid policy
	Modernization of pumping machines in district heating system. n°15 new pumps	462.000.000	35.538	Government program
	Modernization of district heating network (3.000 m / year)	22.000.000.000	1.692.308	Government program
	Installation of new boilers in district heating system "Zhuprany", "Giorno", "Baruny", "Novosyolki", "Stone Log", "Krakovka."	2.000.000.000	153.846	Government program
	Installation of photovoltaic panels in an orphanage	435.000.000	33.462	Expectations from EuropeAid policy
Tertiary buildings, structures	Rehabilitation of the roof of Ashmyany Central Regional Hospital (1400 m^2)	543.750.000	41.827	
	Insulation of walls of Ashmyany	1.033.125.000	79.471	

	Central Regional Hospital (1000 m^2)			
	Introduction of high efficiency lamps in Ashmyany Central Regional Hospital (780 pz.)	89.175.000	6.860	
	Substitution of windows of Ashmyany Central Regional Hospital (137 m^2)	261.000.000	20.077	
	Installation of solar collectors for retirement house and rehabilitation of roof	1.456.000	112.000	
Residential buildings, structures	Thermal insulation of residential buildings	24.059.700.000	1.850.746	
Renewable Energy Sources	Construction of a wind farm	435.000.000.000	33.461.538	Research of investors
Municipal public lighting	Introduction of LED technology in the lighting system for the main street of Ashmyany (20 pz.)	82.400.000	6.338	Expectations from EuropeAid policy. Part from municipal budget. Government program
	Substitution of mercury lamps with high pressure sodium lamps (454 pz.)	145.000.000	11.154	Government program
	Introduction of lighting control systems in the entrance of big buildings (1.100 pz)	39.000.000	3.000	Government program

Total number of sub-actions, with known cost: 14

Total cost: 486.476.400.000 BYR = 37.421.262 €