



BURGAS MUNICIPALITY

**“BURGAS MUNICIPALITY STRATEGY FOR  
SUSTAINABLE ENERGY DEVELOPMENT 2011 -  
2020”**

**“ACTION PLAN 2011 – 2013”**

**SUMMARY**

***BURGAS 2020 - CITY OF GREEN  
OPPORTUNITIES***



## INTRODUCTION

With increasing decentralization, municipalities in Bulgaria are playing a more significant role in the management of their regional energy supply and usage. Efficient use of energy resources is a major concern for all municipal authorities and during the last decade, concerns regarding the effect of greenhouse gases on climate change and the responsibility of authorities to control their “carbon footprint” has grown. Therefore, energy planning and ensuring energy independence has become a major component of each municipality’s sustainable energy development policy.

Through the development and use of renewable energy resources and the promotion of energy efficiency measures, the Municipality of Burgas has the potential to support a significant proportion of its local residential, industrial and commercial total energy requirements.

In 2009, Burgas Municipality joined the Covenant of Mayors Initiative - an initiative of the European Community that recognizes the leading role of local authorities in achieving a 20% reduction in CO2 emissions by 2020. The municipality is committed to develop a Local Action Plan to increase energy efficiency and utilize the possibilities of renewable energy sources.

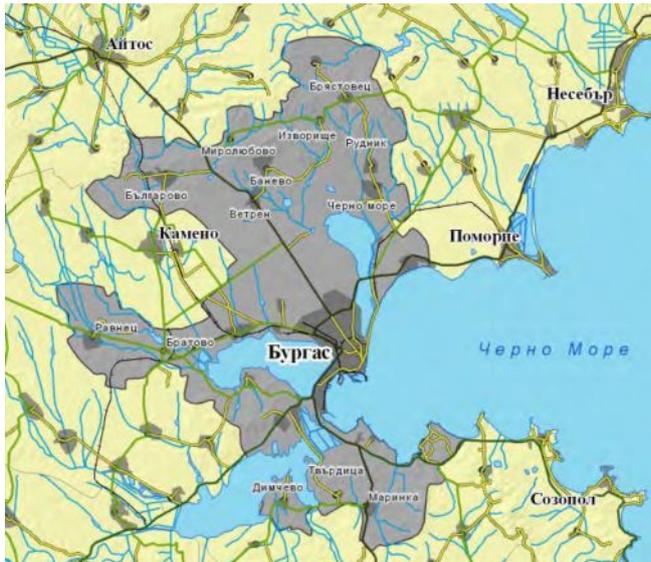
As a local authority, the Municipality of Burgas determines local sustainable energy policy and defines priorities in its development and creates conditions for the implementation of local energy initiatives as:

- Consumer and service provider;
- Key factor in local policy decision-making and ratifying energy efficiency standards;
- Model for energy behavior;
- Beneficiary and implementers of projects in the sphere of energy efficiency and alternative energy.



The Mayor of Burgas Municipality signs  
Covenant of Mayors – 10 February 2009

## MUNICIPALITY OF BURGAS



The Municipality of Burgas is the largest municipality located in southeastern Bulgaria on an area of 514,362 hectares, representing 0.43% of the country.

The municipality is bordered to east by the Black Sea, to the north - Pomorie Municipality, west - Kameno Municipality and south - Municipality of Sozopol. The Eastern boundary is a prerequisite for the development of port work, fishing, tourism, foreign trade, for concentration of productions and industries that rely on imported materials.

Surrounded by three firth lakes - Burgas, Mandra and Atanasovsko and with a width of 10-12.5 km and a water depth of 10-12 m, Burgas bay forms the most extensive part of the Bulgarian Black Sea coastline.

The availability of natural resources such as nature reserves, protected areas and natural attractions determine the wide biodiversity in the municipality of Burgas, which is an important factor and condition for development of tourism and other economic and non-profit activities, stimulating small and medium business and development of the labor market.

Due to favorable natural and economic conditions, a significant part of the population and economic potentials are concentrated in the Burgas Municipality.

The Municipality consists of 13 compound settlements - the city of Burgas, Balgarovo and 11 villages. Data from the official national census of 2011 showed a total of 212,902 people live within the Municipality, 94.9 % of whom live in the city of Burgas with 5,1% of the population living in Balgarovo and the Municipality's villages.

The city of Burgas is an important industrial, commercial, transport, tourism and administrative center of the Municipality and South-East region of Bulgaria. The economy has a diverse character, which makes the Municipality the economic leader and an important center for the development of the region. The main branches of economic activity within the Municipality are:

- industry, which accounts for 13.4%;
- services - 23.2%;
- transport - 8.3%;
- trade - 51%;
- construction - 5%.

The city of Burgas boasts an international airport which benefits from the area's unique year-round weather conditions and is only adopted to accept supersonic aircrafts. Here is also situated the largest port the country – port of Burgas which has the only oil terminal south of Balkan mountains

City of Burgas is one of the main logistical points of the European transport corridor № 8 (Barry - Vlora - Tirana - Skopje - Gyueshevo - Sofia - Plovdiv - Burgas - Varna). It is marked by the ports of Burgas and Varna as a key position for border crossing and road, rail and air traffic routes for national and international traffic.

The Municipality's road transport network and transport infrastructure is well developed, consisting of a total of 202.105 km. of roads - 141,205 km. of which are national routes. Over 90% of the public transport in the Municipality is served by the municipality-owned "Burgasbus" company. The "Burgasbus" fleet consists of 76 buses and 15 trolley buses serving passenger traffic in the city and 51 buses serving long-distance routes.

#### SUMMARY

Burgas Municipality Strategy for Sustainable Energy Development 2011 - 2020  
Action Plan 2011 – 2013



# PRODUCTION AND DISTRIBUTION OF ENERGY

## ELECTRICITY SUPPLY

The main energy source in Burgas is electricity. In the territory of the municipality there is no settlement which is not electrified.

A major consumer of electricity in the municipality is the city of Burgas - during the base year 2005, the city consumed 91% of the total Municipality electricity output.

Electricity distribution in the municipality of Burgas is carried out by 7 substations:

- "Slaveykov" (built in 1955) with a capacity of 105 MVA;
- "Pobeda" (built in 1964) with a capacity of 71,5 MVA;
- "Industria" (built in 1976) with capacity of 80 MVA;
- "Burgas-400" (built in 1980) capacity of 500 MVA;
- "Meden Rudnik" and "Lozovo" (built in 1982) with a capacity of 50 MVA each
- "Ribari" (built in 1983) 90 MVA.

The electricity infrastructure in Burgas is in good condition and its link to the national grid ensures a secure supply and covering the needs of the region.

## HEAT SUPPLY

As in all major cities in Bulgaria, Burgas has a functioning heat supply plant. "Toplofikacia" JSC covers about 42% of the city and produces heat for hot water (for heating and hot water purposes) and saturated steam (for technology needs). It also produces electricity bought by the national electricity company "NEC" AD. The capacity of the plant is currently 17.760 MW electric power capacity and 392.287 MW heat capacity.

In accordance with the priorities of the Energy Act to promote the combined production of electricity and heat, reduce production costs and increase efficiency of the heat in the district heating system an installation for combined heat and electricity production was built with total electricity and heat capacities of 17,82 MW and 18,59 MW respectively. The Cogeneration plant includes 6 pcs. gas reciprocating engines and auxiliary equipment. The construction is made to cover the heat load for hot water throughout the year, like the rest of the necessary heat for heating and hot water is covered by water boilers.

## GAS SUPPLY

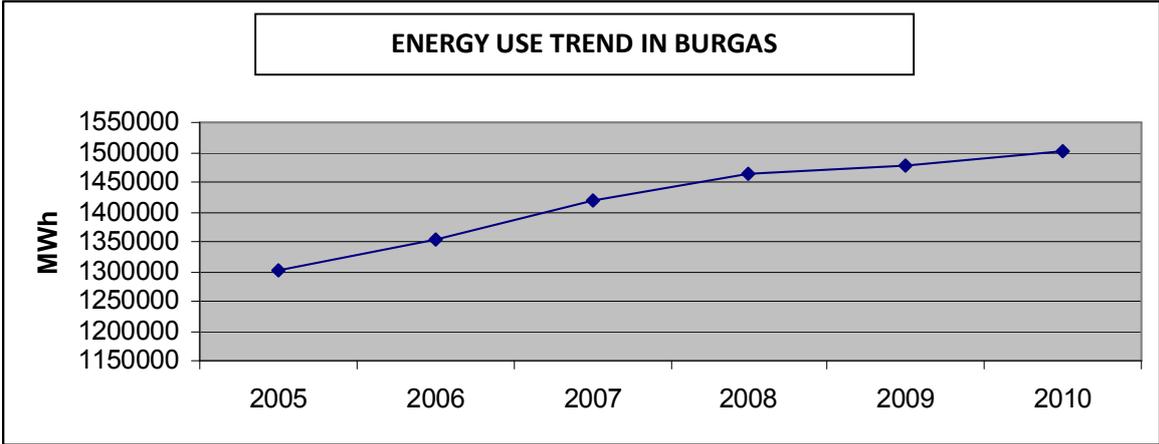
Natural gas is a very good alternative to conventional fuels and electricity. Over 80% of European citizens daily use natural gas in households, but in Bulgaria the level of use of natural gas by households, small and medium businesses and public bodies is still relatively low.

Natural gas is clean, with high caloric value and very safe. Despite its wide application for heating, hot water for household, cooking and cooling in the hot summer months, the use of natural gas is still not widely spread in Bulgaria. Usage of natural gas by households in the Municipality of Burgas has only been possible since 2006, which is one reason why the share in energy mix is still very low compared to other EU countries.

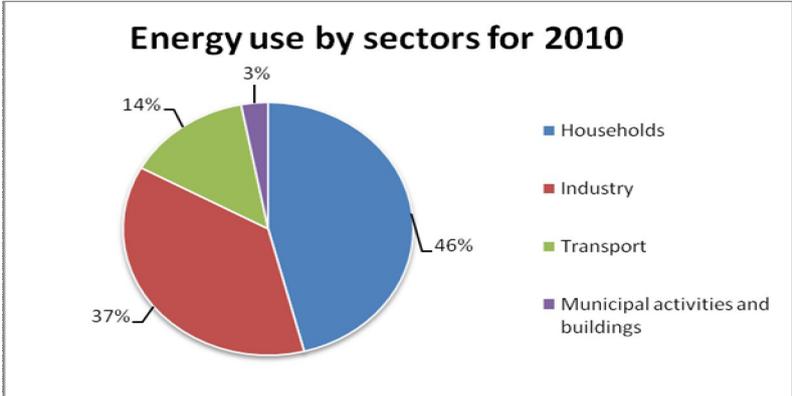
At present, the length of the laid distribution network is 72.5 km., with on-going expansion.

# ENERGY CONSUMPTION IN THE MUNICIPALITY OF BURGAS - STATUS, TRENDS AND FORECASTS

For the purposes of this strategy an analysis of energy consumption by final energy users has been separated into the following groups: "Municipal activities, services and buildings," "Industry", "Households" and "Transport". The analysis covers the period from 2005 to 2010 as the base year used is 2005.

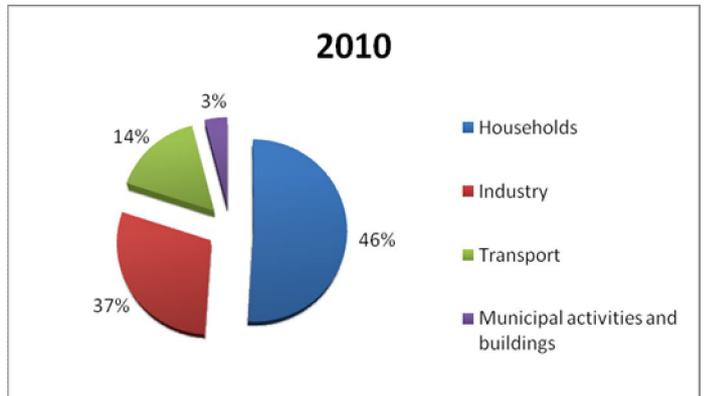
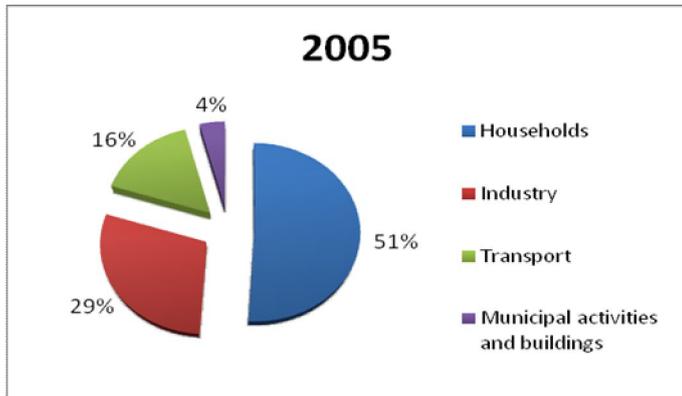


The general trend is a progressive increase in energy consumption. In 2010, the higher consumption of energy is in the "Households" sector (46%), followed by "Industry" (37%) and "Transport" (14%). The lowest share is within "Municipal activities, services and buildings" (approx. 3%).



End energy use in Municipality of Burgas by sectors for 2010

Share distribution of energy consumption by sectors in year 2005 and 2010 are preserved. There is a significant increase in electricity consumption in the "Industry" sector, which is a consequence of intensive economic development in the municipality of Burgas, a minor reduction in consumption within the "Households" and "Transport" sectors and a minor reduction in the "Municipal activities, services and buildings".



Distribution of use of energy and fuels for Municipality of Burgas for 2005

Distribution of use of energy and fuels for Municipality of Burgas for 2010

The forecast for the next 20 years (with intervals of 5 years) is based on final energy consumption. The forecast includes the estimated increase of final energy consumption:

- Provided that no measures for energy saving are implemented;
- Provided that the planned measures are implemented;

The forecast for energy consumption, if energy saving measures (ESM) are not implemented is based on application of the baseline following the current trend of growth of consumption:

- Electricity (households by 31%, business 4.4% for municipal buildings 10%)
- Natural gas (for all sectors by 5%)
- Heat (for all sectors is also 5%).
- Liquid and gas fuels for transport - 5%.

The forecast for energy consumption in the event that energy saving measures (ESM) are implemented, increased use of renewable energy sources and development of systems for energy monitoring is the preferred scenario. Its implementation will ensure reduction in energy consumption and reduce carbon emissions by energy saving and reduction of the consumption of electricity, such as for heating. Estimates are made for 10% reduction in energy consumption for every 5 years.

				5%	5%	5%	5%	-10%	-10%	-10%	-10%
				Base change (without applying ESM)				With applying ESM (-20%)			
HOUSEHOLDS		2005	2010	2015	2020	2025	2030	2015	2020	2025	2030
Electricity	MWh	298 074	391 976	515 459	677 842	891 381	1 172 191	352 778	317 500	285 750	257 175
Electricity for basic needs	50%	149 037	195 988	257 730	338 921	445 691	586 096	176 389	158 750	142 875	128 588
Electricity for cooling	20%	59 615	78 395	103 092	135 568	178 276	234 438	70 556	63 500	57 150	51 435
Electricity for heating	30%	89 422	117 593	154 638	203 353	267 414	351 657	105 833	95 250	85 725	77 153
Natural gas	MWh		2 409	2 393	2 513	2 638	2 770	2 051	1 846	1 661	1 495
Central heating	MWh	289 048	204 056	220 097	231 102	242 657	254 790	188 654	169 789	152 810	137 529
Energy from wood burning	MWh	80 603	97 662	94 444	99 166	104 124	109 330	80 952	72 857	65 571	59 014
Total heating		459 073	421 720	471 571	536 133	616 833	718 547	377 491	339 742	305 767	275 191
Total households	MWh	667 725	696 103	832 392	1 010 622	1 240 800	1 539 081	624 435	561 992	505 793	455 213

INDUSTRY AND SERVICES											
Electricity	MWh	374 911	391 256	408 313	426 114	444 691	464 078	352 130	316 917	285 225	256 703
Electricity for basic needs	50%	187 456	195 628	204 157	213 057	222 346	232 039	176 065	158 459	142 613	128 351
Electricity for cooling	30%	112 473	117 377	122 494	127 834	133 407	139 223	105 639	95 075	85 568	77 011
Electricity for heating	20%	74 982	78 251	81 663	85 223	88 938	92 816	70 426	63 383	57 045	51 341
Natural gas	MWh	140 000	151 835	159 427	167 398	175 768	184 557	136 652	122 987	110 688	99 619
Central heating	MWh	6 684	6 135	6 300	6 615	6 946	7 293	5 400	4 860	4 374	3 937
<b>Total heating</b>		<b>221 666</b>	<b>236 222</b>	<b>247 389</b>	<b>259 236</b>	<b>271 652</b>	<b>284 665</b>	<b>212 478</b>	<b>191 230</b>	<b>172 107</b>	<b>154 896</b>
<b>Total industry and services</b>	<b>MWh</b>	<b>521 595</b>	<b>549 227</b>	<b>574 040</b>	<b>600 127</b>	<b>627 405</b>	<b>655 928</b>	<b>494 182</b>	<b>444 763</b>	<b>400 287</b>	<b>360 258</b>
TRANSPORT											
Naphtha for public transport	MWh	31 490	24 444	29 454	30 926	32 473	34 096	25 246	22 721	20 449	18 404
Natural gas (CNG) for public transport	MWh		3 344	3 705	3 890	4 084	4 289	3 175	2 858	2 572	2 315
Fuels for transport from population	MWh	171 311	181 000	187 013	196 364	206 182	216 491	160 297	144 267	129 841	116 857
<b>Total transport</b>	<b>MWh</b>	<b>202 800</b>	<b>208 788</b>	<b>220 172</b>	<b>231 180</b>	<b>242 739</b>	<b>254 876</b>	<b>188 719</b>	<b>169 847</b>	<b>152 862</b>	<b>137 576</b>
MUNICIPAL ACTIVITIES, SERVICES AND BUILDINGS											
Electricity	MWh	15 121	16 589	18 199	19 965	21 903	24 028	14 930	13 437	12 093	10 884
Electricity for basic needs	50%	7 561	8 295	9 100	9 983	10 952	12 014	7 465	6 719	6 047	5 442
Electricity for cooling	30%	4 536	4 977	5 460	5 990	6 571	7 208	4 479	4 031	3 628	3 265
Electricity for heating	20%	3 024	3 318	3 640	3 993	4 381	4 806	2 986	2 687	2 419	2 177
Natural gas	MWh	4	3 446	3 618	3 799	3 989	4 189	3 102	2 791	2 512	2 261
Central heating	MWh	14 744	14 121	15 128	15 884	16 678	17 512	12 967	11 670	10 503	9 453
Naphtha for heating of municipal buildings	MWh	11 691	6 118	6 867	7 210	7 571	7 949	5 886	5 297	4 768	4 291
Energy from wood burning for municipal buildings	MWh	133	93	123	129	135	142	105	95	85	77
Energy from coal burning for municipal buildings	MWh	19	-	-	-	-	-	-	-	-	-
<b>Total heating</b>		<b>29 614</b>	<b>27 097</b>	<b>29 375</b>	<b>31 015</b>	<b>32 754</b>	<b>34 598</b>	<b>25 045</b>	<b>22 541</b>	<b>20 286</b>	<b>18 258</b>
<b>Total municipal activities, services and buildings</b>	<b>MWh</b>	<b>41 711</b>	<b>40 368</b>	<b>43 935</b>	<b>46 987</b>	<b>50 276</b>	<b>53 820</b>	<b>36 989</b>	<b>33 290</b>	<b>29 961</b>	<b>26 965</b>
Electricity for street lightning	MWh	6 421	7 246	8 177	9 227	10 413	11 750	6 521	5 869	5 282	4 754
<b>TOTAL</b>	<b>MWh</b>	<b>1 440 252</b>	<b>1 501 732</b>	<b>1 678 716</b>	<b>1 898 144</b>	<b>2 171 634</b>	<b>2 515 455</b>	<b>1 350 845</b>	<b>1 215 761</b>	<b>1 094 185</b>	<b>984 767</b>

## SUMMARY

Burgas Municipality Strategy for Sustainable Energy Development 2011 - 2020  
Action Plan 2011 – 2013

## GREEN HOUSE GAS EMISSIONS

Baseline greenhouse gas emission is formed by the quantity of energy flows and the corresponding emission factor.

According to the instructions of the "Covenant of Mayors" the base year is considered 1990 or the closest to 1990 for which there is available data on energy consumption, heat generation, fossil fuels, liquid fuels and others in the municipality. For the Municipality of Burgas the chosen base year is 2005. Future actions and targets for 2020 will be tied to the base year and the results will be compared with 2005.

Energy production and domestic consumption on the territory of the city of Burgas, and associated emissions of CO<sub>2</sub> were measured in sectors included in the plan for sustainable energy development, namely:

- Municipal activities, services and buildings;
- Residential buildings;
- Municipal street lighting;
- Transport - public and private;

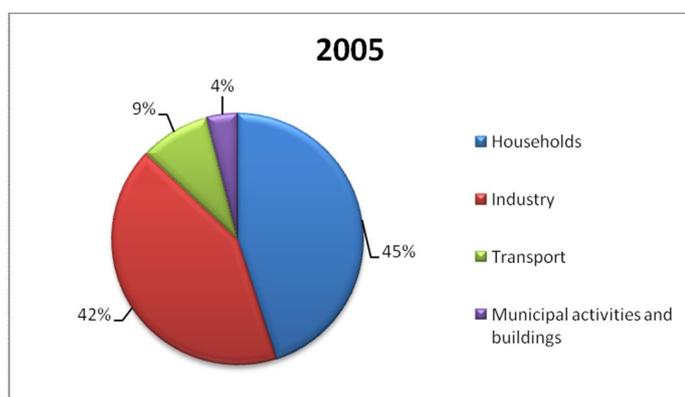
### Harmful emissions by sectors

<b>Household</b>		<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
Electricity	t CO <sub>2</sub>	203585	216952	204055	223785	238475	240673
Natural gas	t CO <sub>2</sub>	0	0	64	245	531	595
Heat	t CO <sub>2</sub>	71395	68185	59195	55313	53148	50402
Wood	t CO <sub>2</sub>	484	512	525	557	574	586
<b>Total Households</b>	<b>t CO<sub>2</sub></b>	<b>275463</b>	<b>285649</b>	<b>263839</b>	<b>279900</b>	<b>292729</b>	<b>292256</b>
<b>Industry</b>		<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
Electricity	t CO <sub>2</sub>	256064	275115	251190	256249	249511	240231
Natural gas	t CO <sub>2</sub>	0	471	23542	24126	26375	37503
Heat	t CO <sub>2</sub>	1651	1455	1360	1405	1505	1515
<b>Total Industry</b>	<b>t CO<sub>2</sub></b>	<b>257715</b>	<b>277041</b>	<b>276092</b>	<b>281780</b>	<b>277392</b>	<b>279250</b>
<b>Transport</b>		<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
Naphtha , public transport	t CO <sub>2</sub>	9 793	9 406	9 033	8 803	7 706	7 602
Natural gas, public transport	t CO <sub>2</sub>				123	917	826
Fuels, private vehicles	t CO <sub>2</sub>	44198	46916	44236	46972	46691	46698

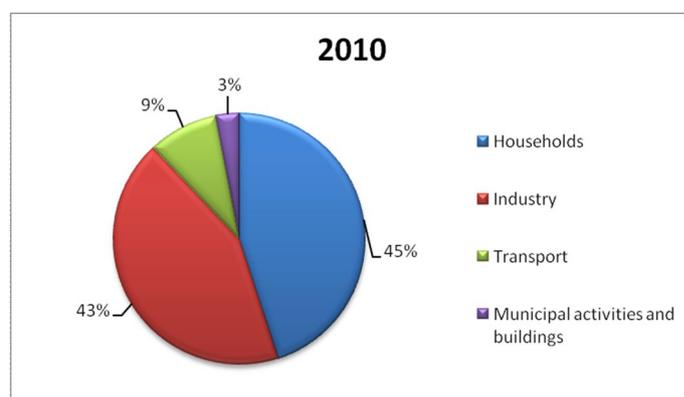
Total transport	t CO2	53991	56322	53268	55898	55315	55126
<b>Municipal activities, services and buildings</b>		2005	2006	2007	2008	2009	2010
Electricity	t CO2	10328	10784	9508	9426	10113	10186
Natural gas	t CO2		1	287	619	743	851
Heat	t CO2	3642	3867	3324	3796	3235	3488
Naphtha	t CO2	3636	3542	2914	2560	2165	1903
Wood	t CO2	1	120	118		114	93
Coal	t CO2	8	14	5			
Petrol for transport	t CO2	32	31	20	18	15	21
Naphtha for transport	t CO2	17	53	29	37	53	56
Street lightning	t CO2	4386	4340	3991	4142	4387	4449
<b>Total municipal activities, services and buildings</b>	t CO2	<b>22050</b>	<b>22751</b>	<b>20196</b>	<b>20598</b>	<b>20824</b>	<b>21047</b>
<b>TOTAL</b>	t CO2	<b>609220</b>	<b>641764</b>	<b>613395</b>	<b>638176</b>	<b>646260</b>	<b>647679</b>

The summarized data from the study of carbon emission showed the following results:

- Energy consumption of the household sector is the main source of emissions;
- Electricity is the main energy source, as is the highest consumption in the household sector;
- Heat from “Toplofikacia” Ltd Burgas is the second most used energy source within the Municipality. When calculating the data should be borne in mind that the heating network is built only 42 percent of the territory of Burgas Municipality;
- Natural gas has a minimum share of energy;
- A significant share of firewood, which is biomass with a low emission factor but is burned in stoves of low efficiency and therefore is a major producer of fine particulate matter;



Carbon emissions by sectors in Municipality of Burgas – year 2005



Carbon emissions by sectors in Municipality of Burgas – year 2010

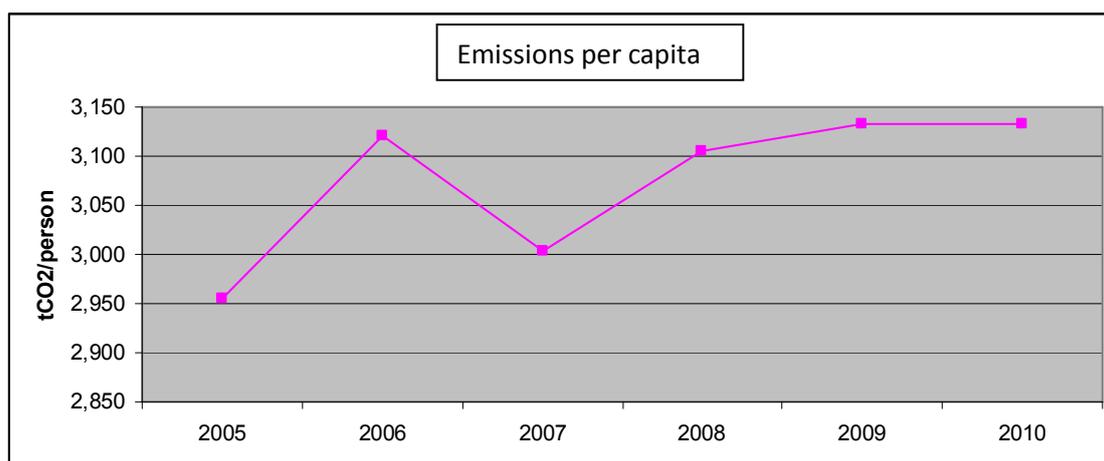
The comparative analysis of carbon emissions in 2005 and 2010 shows that households and industry sectors is with the highest share in energy mix of Burgas and hence the largest share of pollution. The energy efficiency measures introduced until 2010 in the transport and municipal buildings have no significant impact on energy consumption and carbon emissions.

To achieve high levels of emission reduction need to implement energy efficient measures in the sectors with most weight - Industry and households. Based on research done an analysis of strengths and weaknesses by sector is prepared.

The trend is towards increasing **emissions per capita** in the municipality of Burgas. The main reason for this is mechanical and natural population growth, although statistics on the number of people who work, study and live in the city is relatively constant. As the majority of people are not registered as residents of Burgas, this leads to variations in official statistics.

**Data on total emissions, population and emissions per capita in municipality of Burgas.**

		2005	2006	2007	2008	2009	2010
Total emissions	t CO2	609220	641764	613395	638176	646260	647679
Population	people	206110	205691	204175	205467	206343	206700
Emissions per capita	tCO2/capita	2,956	3,120	3,004	3,106	3,132	3,133



**Emissions of greenhouse gases per capita of the Municipality of Burgas**

## SWOT ANALYSES

MUNICIPAL ACTIVITIES, SERVICES AND BUILDINGS	
Strengths	Weaknesses
<ul style="list-style-type: none"> <li>Gasified municipal buildings, including schools and kindergartens, leading to reduction of the emissions.</li> <li>Reduced usage of naphtha and coals for heating of public buildings is, which on is a premise for the decrease of the emissions PM-10 and elimination of the pollution sources.</li> <li>Improved energy performance of the buildings through introduction of measures for energy efficiency in municipal buildings, planned in the energy efficiency audits.</li> <li>Implemented pilot project for the renovation of multifamily resident buildings.</li> <li>Used the opportunities of renewable energy sources - solar collectors for DHW are installed in municipal buildings.</li> </ul>	<ul style="list-style-type: none"> <li>Significant increase of the usage of electricity energy thus increase of the share of the evolved harmful emissions in the atmosphere</li> <li>Increase of the final energy consumption because of conventional energy usage</li> <li>The capabilities of the renewable energy sources aren't used enough in the sector of municipal activities, buildings and services</li> <li>Low degree of information of the owners/managers of municipal objects regarding the ways of rational energy usage and introduction of energy saving measures;</li> <li>Insufficiently realized measures for energy efficiency and insufficiently used potential of renewable energy resources.</li> </ul>

INDUSTRY	
Strengths	Weaknesses
<ul style="list-style-type: none"> <li>Increase of the share of the used renewable energy resources – natural gas has the highest share.</li> <li>Lower price of the natural gas compared to the prices of electricity for industrial enterprises and services</li> <li>Tendency for reduction of the usage of electricity in the sector.</li> <li>Reduction of the share of the evolved carbon emissions with the biggest reduction share of the emissions, generated from the usage of electricity.</li> <li>Increased number of industrial enterprises, business and trade buildings</li> </ul>	<ul style="list-style-type: none"> <li>Sector Industry is a main source of harmful emissions simultaneously with the sector households;</li> <li>A common tendency for the increase of energy use in sector Industry;</li> <li>An increasing share of the carbon emissions in the industry sector and, in particular, usage of electricity;</li> <li>Low rate of increasing the usage of renewable sources in the industry;</li> <li>Technological obstacles in the transition to natural gas of some productions;</li> <li>Necessity of a relatively high investment for transition to natural gas;</li> </ul>

### SUMMARY

Burgas Municipality Strategy for Sustainable Energy Development 2011 - 2020  
Action Plan 2011 – 2013

INDUSTRY	
Strengths	Weaknesses
	<ul style="list-style-type: none"> <li>• Insecurity in the deliveries of natural gas;</li> <li>• A high price for the installment of RES capacities</li> <li>• Lack of local and state stimuli for the usage of RES of the small enterprises</li> <li>• Obstacles in the joining of the installed RES capacities to the electro-conductive network –slow procedures on behalf of the electro-conductive union</li> </ul>

TRANSPORT	
Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• Reduction of energy usage in the transport sector.</li> <li>• Reduction of the emissions in the atmosphere, evolved from the vehicles.</li> <li>• Gradual reduction of the usage of naphtha in the transport.</li> <li>• Increase the number of vehicles of urban transport, driven with natural gas</li> <li>• Increase of the share of environmental friendly and alternative fuels, used in the transport.</li> </ul>	<ul style="list-style-type: none"> <li>• Low rate of reducing the share of emissions evolved in the atmosphere.</li> <li>• Slow/flowing rates in the usage of natural gas as a fuel</li> <li>• Usage of old, amortized and relevantly energy-intensive vehicles for public and private needs</li> <li>• Significant increase of the number of private cars.</li> </ul>

HOUSEHOLDS	
Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• Introduced energy efficiency measures in residential buildings;</li> <li>• Built a gas pipeline network in central areas and neighborhood residential quarter;</li> </ul>	<ul style="list-style-type: none"> <li>• Tendency for increase energy consumption in sector "Households"</li> <li>• Proportional increase in carbon emissions compared to energy consumption;</li> <li>• Common trend of increasing of the released carbon emissions</li> <li>• The high electricity consumption in the sector "Households" is the main source of emissions</li> </ul>

HOUSEHOLDS	
Strengths	Weaknesses
	<ul style="list-style-type: none"> <li>• Reduce the share of the heat energy from “Toplofikacia” Ltd Burgas;</li> <li>• Slow pace of increase use of renewable energy sources in households.</li> <li>• Poor heat - physical characteristics of the panel housing and the older one and multi-family buildings</li> <li>• Need of relatively high investment in switching to natural gas</li> <li>• Widespread use of low effective heaters on wood</li> <li>• Low profitability of heat energy</li> </ul>

INSTUTIONAL CAPACITY	
Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• Availability of resources and expertise in municipal administration for the preparation and implementation of long-term projects;</li> <li>• Established Advisory Council for sustainable energy development with experts from the regional administration, regional companies, manufacturers and suppliers in the region;</li> <li>• Annually conduction of information campaigns and initiatives to change the energy behavior of the population</li> <li>• Awareness of the role the local authorities as a model of energy efficient behavior</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of clearly distinct structural unit in the municipal administration for planning, implementation and monitoring of sustainable energy policy at local level;</li> <li>• Difficulties in assessing what proportion of the municipal budget is invested in the implementation of ESM;</li> <li>• Limited application of energy saving measures and use of renewable energy, lack of mechanisms for reporting and control;</li> </ul>

## OPPORTUNITIES AND PERSPECTIVES

### VISION

#### “BURGAS 2020 – CITY OF GREEN OPPORTUNITIES”

In 2020 Burgas Municipality is a municipality of the effective and stable management of energy resources and the green economic growth, offering high quality services for the population, healthy and accessible environment, with real perspectives for business investments.



### ENERGY TARGETS

- Reduction of the CO2 emissions in Burgas Municipality **25 % to 2020r.**
- Reduction of the energy usage in Burgas Municipality **27 % to 2020r.**
- RES share in the energy mix of Burgas Municipality **26 % to 2020r.**

### TARGETS DISTRIBUTION

#### ENERGY EFFICIENCY

	Energy savings	Cost savings	Investment	Reduction of harmful emissions	Reduction of CO2	Reduction of energy consumption
	MWh/year	lv./year	lv.	t CO2/ year	%	%
Energy efficiency in municipal buildings	11 054	1 603 656	9 677 149	3 678	0,60%	0,85%
Energy monitoring of municipal property buildings	1020	15 682	649 700	368	0,06%	0,08%
Construction of energy grid independent street lighting	7246	1 700 000	30 000 000	4949	0,81%	0,56%
Energy efficiency in Household sector	266 860	80 000 000	784 500 000	110 028	18,06%	20,52%
Reduction of the losses from the heating network	37 000	10 000 000	130 000 000	17290	2,84%	2,85%
Energy efficiency in Industry sector	30 000	10 000 000	100 000 000	20490	3,36%	2,31%
Optimizing and renovating the public transport	4899, 151	1 203 806,256	7 834 3000	1308	0,21%	0,37%
Alternative modes of transport	749	184 068	4 600 000	200	0,03%	0,05%
<b>TOTAL</b>	<b>358828,15</b>	<b>104 707 212,26</b>	<b>1 137 769 849</b>	<b>158 311</b>	<b>25,97 %</b>	<b>27,59 %</b>

#### SUMMARY

Burgas Municipality Strategy for Sustainable Energy Development 2011 - 2020  
Action Plan 2011 – 2013

## RENEWABLE ENERGY SOURCES

	Installed capacity	Produced energy per year	Income	Investment	Reduction of harmful emissions	Share of RES
	kW	MWh/year	лв/год.	lv	t CO2/ year	%
Photovoltaic modules integrated in municipal buildings	1 613	2 078	1 157 723	9 649 496	1 324	0,16%
Indicators for solar collectors for hot water		615	123 261	1 123 199	182	0,05%
Biomass	12 000	53 859	10 502 505	24 000 000	36 785,697	4,14%
Biogas from wastewater treatment plants and landfills	830	6 938	1 723 500	3 750 000	4 738,654	0,53%
Photovoltaic modules integrated into privately owned buildings	70 000	88 000	50 887 655	420 000 000	60 288	6,77%
Wind plants	150 000	185 000	32 005 000	381 450 000	126 355	14,23%
Big solar installations	6 000	7 500	3 637 500	29 340 000	5 122,5	0,58%
<b>TOTAL</b>	<b>240 443</b>	<b>343 990</b>	<b>100 037 144</b>	<b>869 312 695</b>	<b>234 795, 851</b>	<b>26,46 %</b>

## TRANSPORT

	Reduced mileage	Fuel reduced	Income	Investment	Reduction of harmful emissions
	km	liters	Lv/year	lv	t CO2/ year
Reducing the mileage of the buses serving urban transport within "integrated urban transport project"	1 319 963	501 585,94	1 203 806,256	132 000 000	1308

### SUMMARY

Burgas Municipality Strategy for Sustainable Energy Development 2011 - 2020  
Action Plan 2011 – 2013

## **PRIORITY 1:**

### **BUILDING AND DEVELOPMENT OF SUSTAINABLE INFRASTRUCTURE**

<b>Specific Objective 1.1:</b> Increase energy efficiency in public infrastructure	<ul style="list-style-type: none"><li>➤ Reconstruction and renovation of existing municipal social, cultural, educational and administrative infrastructure and introduction of energy saving measures;</li><li>➤ Introduction and establishing a system of energy efficiency standards in the construction of new buildings - municipal property;</li><li>➤ Improving the systems for control and monitoring of energy consumption of buildings - municipal property.</li></ul>
<b>Specific Objective 1.2:</b> Increase energy efficiency in households	<ul style="list-style-type: none"><li>➤ Perform audits for energy efficiency of residential buildings in the territory of Burgas Municipality;</li><li>➤ Introduction of energy efficiency measures in residential buildings in the municipality with priority on multifamily buildings;</li><li>➤ Development and implementation of information and consultation mechanisms to promote energy efficiency measures in housing;</li><li>➤ Development and implementation of local financial mechanisms to support the introduction of energy efficiency measures in housing;</li><li>➤ Introduction of standards for energy efficient management of social housing in the municipality of Burgas;</li><li>➤ Development and implementation a municipal programme to stimulate creation of housing associations and other relevant forms of cooperation with a view to facilitate the financing and implementation of projects for energy efficiency and renewable energy in multifamily buildings;</li><li>➤ Establishment of effective systems for monitoring the results of implementing energy efficiency measures in residential buildings.</li></ul>
<b>Specific Objective 1.3:</b> Increase energy efficiency in street lightning	<ul style="list-style-type: none"><li>➤ Preparation and maintenance of a lighting and power system data of street lighting in the Municipality of Burgas;</li><li>➤ Repair of existing and construction of new street lighting, introduction of energy efficiency measures;</li><li>➤ Establishment of an autonomous energy efficient street lighting in problematic areas and residential complexes in several stages;</li><li>➤ Introduction of systems for effective management of street lighting;</li><li>➤ Development of effective systems for maintenance and operation of street lighting, with the participation of citizens.</li></ul>

## **PRIORITY 2:**

### **DEVELOPMENT OF SYSTEMS FOR SUSTAINABLE URBAN MOBILITY**

<b>Specific Objective 2.1:</b> Increase the energy efficiency of public transport	<ul style="list-style-type: none"><li>➤ Renovation of bus and trolley fleet of public transport;</li><li>➤ Introduction of a bus rapid transport (BRT);</li><li>➤ Introduction of traffic lights system for bus priority;</li><li>➤ Optimizing the public transport network;</li><li>➤ Introduction of a system for monitoring and control of public transport;</li><li>➤ Introduction of new environmentally friendly technologies in public transport system.</li><li>➤ Development and introduction of transport systems based on demand.</li></ul>
<b>Specific objective 2.2.:</b> Support for effective traffic management	<ul style="list-style-type: none"><li>➤ Introduction of a system for integrated traffic management in urban environment;</li><li>➤ Improvement of the existing and building of a new transport infrastructure;</li><li>➤ Optimization of the parking system and its integration with the public transport system;</li><li>➤ Development and implementation of innovative solutions for freight transport in urban areas;</li><li>➤ Develop and implement a system of incentives for the purchase and use of environmental friendly transportation technologies.</li></ul>
<b>Specific objective 2.3.:</b> Promote alternative modes and a new behavioral approach for urban mobility	<ul style="list-style-type: none"><li>➤ Establishment of an integral system of bicycle routes connecting major urban areas and public spaces;</li><li>➤ Introduction of a system for bicycles rent;</li><li>➤ Expansion of pedestrian routes and zones in urban areas;</li><li>➤ Planning and implementation of public campaigns to promote alternative modes of transport.</li></ul>

## **PRIORITY 3:**

### **UTILIZATION OF RENEWABLE ENERGY SOURCES**

<b>Specific objective 3.1.:</b> Increasing share of renewable energy used in the public sector	<ul style="list-style-type: none"><li>➤ Installation of systems using renewable energy sources in buildings - municipal property (solar, photovoltaic installations, heat pumps, biomass);</li><li>➤ Development and implementation of measures for the introduction of hybrid street lighting;</li></ul>
<b>Specific objective: 3.2.:</b> Increasing the share of use of energy produced from RES in the housing sector	<ul style="list-style-type: none"><li>➤ Carrying out information campaigns to promote use of renewable energy sources in residential buildings - natural gas, biomass, solar energy – solar panels and photovoltaic;</li><li>➤ Establish a consultative mechanism for technical assistance to households for construction of small photovoltaic plants and installation of solar panels on the roofs of multi-family buildings</li></ul>
<b>Specific objective 3.3.:</b> Encourage business investment for the construction of RES plants in Burgas Municipality	<ul style="list-style-type: none"><li>➤ Installation of photovoltaic and solar systems on large roof areas and building of manufacturing plants, warehouses, commercial and office buildings;</li><li>➤ Using the possibilities of producing energy from waste treatment and sewage sludge from treatment plants</li><li>➤ Installation of small wind power plants for industrial use;</li><li>➤ Use of high-efficient heating fitting using biomass in small and medium enterprises;</li><li>➤ Establishment of partnerships to develop and implement a system of consulting services for small and medium enterprises for the introduction of renewable energy;</li><li>➤ Administrative stimulus for business and industry for use of renewable energy - tax breaks, special administrative services;</li><li>➤ Development of mechanisms for public - private partnership for construction of RES plants on the territory of Burgas Municipality;</li><li>➤ Creation of energy information data base of installed RES.</li></ul>

## **PRIOTRITY 4:**

### **SUPPORT FOR CHANGE OF ENERGY BEHAVIOUR**

<b>Specific Objective 4.1:</b> Increase public awareness and developing a new energy efficient behavior in the home and business	<ul style="list-style-type: none"><li>➤ Organize and conduct information campaigns based on the principle of social marketing;</li><li>➤ Establishment of partnerships with local and regional civil society, media and businesses to carry out joint initiatives to promote energy efficiency measures in households;</li><li>➤ Develop and implement training programs in school and outdoor</li></ul>
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	<p>activities;</p> <ul style="list-style-type: none"> <li>➤ Develop and implement effective information models for the promotion of European, national and local legislation on energy efficiency;</li> <li>➤ Promote green investments and support for implementation of energy efficient practices and innovative technologies in business;</li> <li>➤ Establishing partnerships to develop and implement a system of consulting services for small and medium enterprises;</li> <li>➤ Administrative stimulus for industry and business for introduction innovative and energy efficiency technologies;</li> </ul>
<p><b>Specific Objective 4.2:</b> Create and promote "green" identity of Burgas Municipality</p>	<ul style="list-style-type: none"> <li>➤ Develop and implement rules for energy efficient behavior of employees in municipal administration and other municipal structures;</li> <li>➤ Development and implementation of principles and rules for the preparation of so-called "Green procurement", stimulating the rational use of natural resources;</li> <li>➤ Creating international partnerships, preparation and implementation of partnership projects in the area of energy efficiency.</li> </ul>

## **PRIORITY 5:**

### **STRENGTHENING LOCAL CAPACITY FOR SUSTAINABLE ENERGY DEVELOPMENT**

<p><b>Specific Objective 5.1:</b> Increase the capacity of municipal administration for planning, implementation and monitoring of energy efficiency measures</p>	<ul style="list-style-type: none"> <li>➤ Establishment of an unit of the municipal administration, responsible for coordinating the entire process of planning, implementation and monitoring of sustainable energy policies at local level;</li> <li>➤ Introduction of an adequate system for training of experts in local administration involved in the planning, implementation and control of capital investment and regional development policies;</li> <li>➤ Introduction and establishment of a system for allocation of duties and responsibilities of key figures and structural units in the municipal administration for planning, implementation and monitoring of local policies on energy efficiency;</li> <li>➤ Improve the system for reporting, monitoring and analysis of energy consumption in the Municipality.</li> </ul>
<p><b>Specific Objective 5.2:</b> Mobilizing public support for implementation of the Strategy for sustainable</p>	<ul style="list-style-type: none"> <li>➤ Establishment and operation of municipal information center for energy management</li> <li>➤ Establishment and operation of the Advisory Council for</li> </ul>

energy development based on broad partnerships with business and civil society organizations	<p>Energy Efficiency in Burgas;</p> <ul style="list-style-type: none"> <li>➤ Preparation and conduct public information campaign to promote the objectives of the Strategy; priorities of energy policy of the Municipality of Burgas; reporting on achievements and results of its implementation;</li> <li>➤ Introduction of partnership mechanisms for continuous monitoring, analysis and assessment of progress in implementing the strategy for sustainable energy development of the Municipality of Burgas 2011 - 2020.</li> </ul>
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## ACTION PLAN 2011 - 2013

The Action Plan is an essential part of the strategy for the Municipality's sustainable energy development. Implementation of planned activities will help reduce energy consumption and thus achieve the 25% reduction in CO2 emissions target by 2020.

This section presents the measures that local authorities can take in the sectors covered in the inventory of energy consumption and CO2 emissions (municipal activities, services and buildings, households - households, transport, street lighting).

### PRIORITY 1: BUILDING AND DEVELOPMENT OF SUSTAINABLE INFRASTRUCTURE

Specific objective	Measure / Project	Indicators
<b>Increasing energy efficiency in public infrastructure</b>	Perform energy audits of buildings - municipal property	Carried out energy audits of 100% of public municipal buildings with area over 1000m2 Savings of 11,053,634 kWh / year Saved 3678 tCO2/year
	Phased implementation of the measures from energy auditing reports focusing on education and social infrastructure	Savings of 11,053,634 kWh / year Saved 3678 tCO2/year
	Introduction of energy monitoring systems in municipal buildings	Introduced systems for energy monitoring in 5 municipal buildings; 188,740 kWh / yr. savings; Saved 72.76 tCO2/year
	Development of a system of energy efficiency standards in the construction of new buildings - municipal property	Developed system of standards
<b>Increasing energy efficiency in residential buildings</b>	Perform audits and implement energy efficiency measures in multifamily residential buildings in Burgas Municipality	Conducted audits for energy efficiency on at least 5 multi-family buildings in the municipality; Implemented energy efficiency measures on at least 3 multi-family buildings in the municipality of Burgas; 180,000 kWh / yr. savings; Saved 72 tCO2/year

Specific objective	Measure / Project	Indicators
	Development of a mechanism for financing municipal projects for introducing energy efficiency measures in residential buildings	Created fund for financing of energy efficiency measures in residential buildings in the territory of Burgas; Approved for funding at least 3 projects for introducing energy efficiency measures in multifamily residential buildings.
	Development and introduction of an information portal for promoting energy efficiency measures and funding opportunities aimed at owners and owners' associations in multifamily buildings	Established and operating information portal
	Development and implementation of projects with external sources of funding for the introduction of sustainable energy management in buildings	Developed projects for introducing energy efficiency measures in at least 3% of multifamily housing in the municipality of Burgas.
<b>Improving the energy efficiency of street lighting</b>	Preparation and maintenance of a database on lighting and power system of street lighting in Burgas	Established and operational database
	Introduction of measures for energy efficient street lighting in central and housing areas and complexes - I stage	Developed at least 2 project to introduce measures for energy efficient street lighting; Savings of 5% of energy consumption in the renovated urban areas
	Establishment of systems for effective management of street lighting - I stage	Developed projects for intelligent and adaptive street lighting central and residential areas
	Development and implementation of an interactive portal for monitoring and maintenance of street lighting	Operating interactive portal

**PRIORITY 2:  
DEVELOPMENT OF SYSTEMS FOR SUSTAINABLE URBAN MOBILITY**

Specific objective	Measure / Project	Indicators
<b>Increase the energy efficiency of public transport</b>	Renovation of the bus fleet of the urban public transport	Purchased and put into service 67 new buses for urban transport; Saved 1500 tCO2/year
	Renovation and reconstruction of secondary transport infrastructure	Updated 2 terminals in the public transport system; Built accessible stops; Reconstructed depot and workshop for maintenance and repair of bus fleet
	Establishing a system of rapid bus lines	Built 15 km. rapid bus lines
	Introduce intelligent systems for public transport management	Introduced and operating system for public transport management
	Develop a strategy for the introduction of measures for efficient transport solutions based on consumer demand	Implemented at least 1 pilot initiative for efficient transport solutions based on consumer demand

Specific objective	Measure / Project	Indicators
Support for efficient traffic management	Design and construction of integrated system for traffic management	Prepared design project for integrated system for traffic management
	Feasibility studies and design of park and ride facilities	Feasibility studies for at least 2 buffer parking in key urban areas
	Preparation of feasibility studies and development of a system of incentives for the purchase and use of environmental friendly transportation technologies – electric cars, hybrid buses, etc..	Prepared feasibility studies and system of incentives
Encouraging alternative modes of transport and a new culture for urban mobility	Establishing an integral system of bicycle routes connecting major urban areas and public spaces	Built 20 km. cycle routes
	Development and implementation of a pilot system for rent of bicycles	Developed pilot project for a system for rent of bicycles in central urban area
	Planning and conducting public awareness campaigns to promote alternative modes of transport	Developed and conducted a minimum 4 campaigns

**PRIORITY 3:  
UTILIZATION OF RENEWABLE ENERGY SOURCES**

Specific objective	Measure / Project	Indicators
Increasing the share of RES in the public sector	Development and implementation of projects for the installation of systems using renewable energy sources in buildings - municipal property	Completed at least 2 projects for installation of systems using renewable energy sources in buildings - municipal property; Saved 70 tCO <sub>2</sub> /year
	Investigation of the applicability of measures for the introduction of hybrid street lighting	
Increasing the share of energy used in the housing sector from RES	Organizing and conducting information campaigns to promote opportunities for introduction of renewables in residential buildings	Developed and conducted at least 2 campaigns
Encouraging business investment for the construction of RES plants in Burgas Municipality	Creating effective partnerships for the construction of photovoltaic installations in the municipality of Burgas Municipality	Potential of 10 000 MWh / year of built photovoltaic installations;
	Preparation and implementation of partnership projects to build wind power plants on the territory of Burgas;	Potential of 66,230 MWh / year
	Identifying potential areas for development of renewable energy installations in the municipality of Burgas	Prepared feasibility studies and investment project
	Using the possibilities of producing energy from waste treatment	Prepared feasibility studies and investment project
	Using the possibilities of producing energy from sewage sludge from treatment plants	Prepared feasibility studies and investment project

Specific objective	Measure / Project	Indicators
	Creating a center for technology transfer and support for SME for the introduction of technologies based on RES	Established center for technology transfer
	Create an energy database of installed RES	Created an energy information database

**PRIOTRITY 4:  
SUPPORT FOR ENERGY BEHAVIOUR CHANGE**

Specific objective	Measure / Project	Indicators
<b>Raising public awareness and establishing a new energy efficient behavior in home and business</b>	Organize and conduct information campaigns based on the principle of social marketing	Conducted at least 2 campaigns
	Develop and disseminate a package of informational and educational materials for children and youth in the school environment	Developed a set of informational/educational materials; Conducted at least 2 pilot initiatives in educational institutions in the municipality
	Develop and introduce a system of consulting services for small and medium enterprises	Built municipal center on energy efficiency
	Develop and apply effective information models to promote European, national and local legislation on energy efficiency;	Created a database of information resources on the website of the Municipality of Burgas; Built municipal center on energy efficiency
<b>Create and promote "green" identity of Burgas Municipality</b>	Development and implementation of rules for energy efficient behavior of employees in municipal administration and other municipal structures	Developed code for energy behavior of municipal employees
	Development and implementation of principles and rules for the preparation of procedures for procurement, incentives energy efficiency measures	Developed internal rules to prepare tenders in Burgas Municipality incentives energy efficiency measures
	Establishing international partnerships, preparation and implementation of partnership projects in topic of energy efficiency	Number of developed and implemented projects on cross-border and transnational cooperation

**PRIORITY 5:  
STRENGTHENING LOCAL CAPACITY FOR SUSTAINABLE ENERGY DEVELOPMENT**

Specific objective	Measure / Project	Indicators
<b>Increasing the capacity of the municipal administration for planning, implementation and monitoring of energy efficiency</b>	Creating a structural unit of the municipal administration for planning, implementation and monitoring of sustainable energy policies	Formed structural unit by qualified experts

Specific objective	Measure / Project	Indicators
measures	Organizing training on planning and management of municipal energy policies of the municipal administration experts	Conducted at least 2 training on planning and management of municipal energy policies of the municipal administration experts
	Introduction and establishment of internal systems for planning, implementation and monitoring of local policies on energy efficiency	Developed the concept of division of responsibilities and a system for planning, implementation and monitoring of local policies on energy efficiency
<b>Mobilizing public support for implementation of the Strategy for sustainable energy development based on broad partnerships with business and civil society organizations</b>	Creating a community center on energy management to advice citizens and businesses to introduce energy efficiency measures and renewable energy sources	Created community center on energy efficiency
	Establishment and functioning of Advisory Council for Energy Efficiency in Burgas Municipality	Advisory Council for Energy Efficiency covers a maximum range of stakeholders at local level; Regular meetings of the members of the Advisory Council
	Prepare and conduct public information campaign to promote the objectives of the Strategy's priorities in energy policy of the Municipality of Burgas, reporting achievements and results in its implementation	Conducted at least 2 campaigns

## FINANCIAL FRAMEWORK OF THE STRATEGY FOR SUSTAINABLE ENERGY DEVELOPMENT 2011 - 2020 AND ACTION PLAN 2011 – 2013

A vital element of the strategy is its financial security. In setting the financial framework of the Municipality's strategy for sustainable energy development are considered a number of options . The possibility of providing funds from the municipal budget is limited, therefore, attracting external resources from currently available financial planning tools - operational programs, international programs and initiatives, credit lines and developing new forms of investment partnerships or combinations of two or more sources of funding will lead to achieving results and ensuring their sustainability.

## CONCLUSION

The strategy for sustainable energy development of the Municipality of Burgas 2011 - 2020 and Action Plan 2011 - 2013 have been developed in accordance with European and national policies for energy development and implementation of commitments made by signing the Covenant of Mayors. Its implementation will lead to achieving the set goals of the European Union's 20-20-20 by 2020 and will support the establishment of Burgas as a sustainable energy community.