Conservation of Biodiversity and Sustainable Land Use Management in Dragash/Dragaš / Kosova

ENERGY BASELINE FOR MUNICIPALITY OF DRAGASH

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1 Discussion

Under the Conservation of Biodiversity and Sustainable Land Use Management Project in Dragash, UNDP is implementing a 3 year project (2010 to 2013) aiming at establishment of institutional framework to enable sustainable development. The four areas of intervention of this project include a) conservation of biodiversity, b) local economic development, c) development of a local sustainable energy strategy and d) the development of capacities within Municipality to ensure the above mentioned framework can be sustained in time.

Dragash is a 435 square kilometers mountain region, located in the southern region of Kosovo - Prizren, and is characterized today by its high level of poverty, migration and great landscape beauty and relevant water resources.

The challenges of the project refer to providing the Municipality with adequate instruments to promote development, based on conservation of biodiversity, adequate land use management an enabling environment for its communities and a sustainable local energy strategy. Within this framework the Municipal Energy Strategy will fill an important gap.

Based, amongst other baseline factors described in the project document, such as the rich water resources-base, in the frame of the existing legal and administrational framework an environmentally sound decentralized and commercial energy supply strategy will be developed in cooperation with the relevant national and municipal authorities by the project. Objective of this local energy strategy is to support local sustainable development of the Municipality.

2 Introduction

In the framework of the project “Conservation of Biodiversity and Sustainable Land Use Management in Dragash”, the energy component is assigned to develop a sustainable energy policy and strategy, economically sound and environment friendly for the development of municipality and capacity development for the implementation of that strategy.

This component aims:

- Analysis of the local energy resources and creation of a database elaborated on the sense of time and space
- Formulation of a request for energy elaborated with regard to the aim, quality and quantity of the energy services used in different municipal sectors, including environmental impacts
- Analyzing the request for environmentally and socially sound energy for the future, analysis with regard to the aim, quality and quantity of the required energy services.

For the attainment of the above mentioned aims, it is required a statistical database in the aspect of the current situation of the energy situation in the municipality, in the aspect of the consumption of all energy resources, supply with electric power, quality of the supply with energy, current situation of the public buildings and private ones in the entire municipality in the aspect of the efficient use of the energy, including the premises insulation, the kind of the lights, windows and the doors, the care on the use of the energy including people’s habits. The manner of the energy consumption has very
close connection with the social situation of people and all together has a direct impact on the environment.

3 The aim of the study

The aim of this study on the existing situation of energy consumption in the Municipality of Dragash is to create a database of information on consumption of electric energy and other energy resources for the entire Municipality of Dragash, taking into consideration also the potential for the increase of energy efficiency and possibility of using renewable energy resources for households and the existing knowledge that residents have in terms of preserving energy and environmental issues.

4 Role of the Study

The data that have been collected through the study constitute good grounds for future activities of the Municipality of Dragash and UNDP Project in Dragash in the energy area, and in particular, energy efficiency.

The study provides data for the following areas:

**General** – the study gives general data about the social aspect of the population, including economic situation,

**Electric energy supply** – indicates the supply with electric energy alongside the quality of electric energy supply for households,

**Lighting of interiors** – provides data on the types of light bulbs, the size of bulbs that are mostly used, which indicates approximately the average number of bulbs per household. Here we can find the potential of increasing lighting efficiency.

**Lighting of streets** – the study indicates the situation with lighting of streets and what is the impact of street lighting on the life of inhabitants.

**Heating of the facilities** – in this area the study provides data on the types of fuel used for heating household facilities, supply means with fuel and the cost of fuel for one year,

**Heating of sanitary water** – this indicates the energy resources mostly used for heating water and the reason why these resources are used. The study also provides data on the level of information of inhabitants about heating water with solar energy and how ready are they to apply using solar energy to heat water.

**Thermal isolation, doors and windows** – this part of the study provides important data on the situation of existing household buildings in the aspect of energy preservation. Hereby we can draw conclusions in relation to the potential of increasing energy efficiency and increasing the level of living comfort.

**Environmental Issues** – This chapter indicates how much information inhabitants have in terms of environmental impact of energy consumption, the awareness of inhabitants regarding environmental issues, how ready they are to learn more about the impact of energy on the environment and how ready they are to contribute to re-forestation of the area.

**Consumption of electric energy in the Municipality of Dragash in the last three years** – the study indicates in a detailed manner the consumption of electric energy according to areas of consumption.

This study will assist in creating the energy balance of the municipality and to forecast energy needs of the Municipality of Dragash for the coming years.

In addition, such information constitutes good grounds to create the energy strategy for the municipality; to plan a variety of projects to increase energy efficiency, and to plan awareness raising activities on energy efficiency and environmental issues.
5 Activities that were undertaken

The study was realized based on obtaining information in two ways:
I. Direct data from inhabitants through responding to questionnaires, and
II. Data obtained from the Energy Corporation of Kosovo (KEK) regarding energy consumption in the Municipality of Dragash in the last 3 years.

The following activities were undertaken to complete the study on the existing situation of energy consumption in the Municipality of Dragash:
- A questionnaire on energy use for households was drafted
- A questionnaire for street lighting targeted to villages working groups was drafted
- A table to process data was created
- Places of residence and samples were selected, where the questionnaires were filled
- The NGO that distributed questionnaires in the field was selected
- Training material for the NGO was compiled
- The NGO was trained on filling questionnaires in the field
- Results were processed and the report was drafted

6 Drafting of the questionnaire on household energy consumption

For the needs of this study, a questionnaire was drafted for the household energy consumption needs. The questionnaire comprises of 77 questions to which the respondents have answered briefly: text description, by placing numbers or selecting choices that were offered.

The questions included in the questionnaire do not directly address energy alone, but they also address other economic and social aspects of the life of the inhabitants.

The questionnaire is divided in sections or areas, in 7 parts:
- General part
- Electric energy supply
- Household lighting
- Street lighting
- Heating of facilities
- Heating of sanitary water
- Thermal isolation, doors and windows
- Environmental issues; and
- Section of respondents’ comments

7 Drafting of the questionnaire for the working groups on street lighting

The questionnaire for the street lighting comprises of 9 questions. This questionnaire is targeted to working groups in residential areas. This questionnaire includes only street lighting issues in the specific residential area.

8 Residential area selection method

The household questionnaires were filled in 200 families of the Municipality of Dragash dispersed in 7 residential areas. The questionnaires for the working groups were filled with working groups in the residential areas where the household questionnaires were targeted.
The residential areas were selected based on the geographical area, side of the residential area, ethnicity of the residents, and also by taking into consideration the existence of local working groups in these residential areas.

Thus, 3 residential areas of the two communities living in the Municipality of Dragash were selected, the residential areas of Albanians in the region of Opoja, and the areas where the Gorani-Bosniac community lives in the region of Gora. Also, Dragash was selected as the center of the municipality where inhabitants belong to both ethnic groups of the municipality (Albanian and Gorani-Bosniac communities).

Based on the above-mentioned criteria the following residential areas were selected:

- Dragash – Municipal Center
- Bellobrad (Opojë)
- Blaq (Opojë)
- Buqë (Opojë)
- Restelicë (Gora)
- Radeshe (Gora)
- Zlipotok (Gora)

### 9 Interview sample composition

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of residential area</th>
<th>Number of families interviewed</th>
<th>Number of local working groups interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Dragash town</td>
<td>40</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Bellobrad</td>
<td>30</td>
<td>1</td>
</tr>
<tr>
<td>3.</td>
<td>Blaq</td>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td>4.</td>
<td>Buqë</td>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>Restelicë</td>
<td>30</td>
<td>1</td>
</tr>
<tr>
<td>6.</td>
<td>Radeshe</td>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td>7.</td>
<td>Zlipotok</td>
<td>25</td>
<td>1</td>
</tr>
</tbody>
</table>

Total number of families and working groups interviewed: 200, 7

### 10 Interview sample selection method

Interview sample selection was made randomly.

### 11 Selection of the NGO to fill questionnaires in the field

NGO “Next Alternative”, a local NGO that has experience in similar research was selected to fill the questionnaires in the field.
12 Drafting of the training material for NGO “Next Alternative”

To ensure that the household interview process was conducted effectively and in a professional manner, it was planned to train the staff involved in the project. A training material was prepared for the needs of the training. The training material was compiled in such manner as to provide the staff engaged in the interviews some basic information on energy. This information served the interviewers to provide necessary clarifications on the questionnaire, its aim and to respond to a variety of questions about the consumption of the energy that respondents might have. As a result, the interviewers became more competent to conduct the field interview process. This material was prepared in PowerPoint presentation, with handouts printed that were distributed to the staff of the NGO involved in the interviews.

Questionnaires and the table with answers of the respondents served as training material. This material served as a practical part of the training.

13 Training of the NGO

In order to conduct interviews properly, the staff members of NGO “Next Alternative” that were hired to conduct field interviews were provided with a one-day training. The training aimed to prepare the staff on how to conduct interviews and to provide them with basic information on energy so that they would be prepared to respond to basic questions posed by the respondents.

The training lasted for one day and was given in two parts:

The theoretical part – where the interviewers and their supervisor acquired general knowledge on basic concepts of energy. This part of the training involved PowerPoint presentations. The theoretical part of the training lasted 4 academic classes.

In the second part of the training the questionnaires were presented in detail. During the training the participants filled out themselves the questionnaires based on information from their households. This served as practical part by applying the method of “role play”.

14 The process of interviewing (filling of the questionnaires)

Two mixed groups were created to conduct the interviews; each group was composed of one male and one female. One group conducted interviews in Opoja region, while the other group in Gora region.

Both groups had one supervisor who was part of the implementing staff.

On the first day of interviews, the process was closely monitored the entire day by the Local Energy Expert. Through continuous consultations in the first day of the interview process the uncertainties were eliminated.

The interview process commenced on 22 September 2011 and lasted until 4 October 2011.

15 Data processing

The interviewers have submitted the completed questionnaires to their supervisor. The supervisor was tasked with entering all data from the questions into the result processing table. When the table was filled with all answers from the questionnaires, it was submitted to the Local Energy Expert. The Local Energy Expert collaborated with the International Energy Expert to process the results.

Where possible, all processed data were presented as detailed charts for presentation.
16 Presentation of the results of the study

The processed results are presented in the report in accordance with the section, following the presentation of questions in the questionnaires and the report contains those in separate chapters.

The data in the report present the answers of the respondents that are presented as mean values of the answers, where possible; and for better visualization, they have been presented in charts.
17 In general

- Number of people who live in the household: 7.4
- Number of people 18 years and old: 5.01
- Number of peoples younger than 18 years: 2.39

![Diagram 1. Percentage of the family members based on the age](image1)

- Living conditions in the household, (Diagram 2):

![Diagram 2. Percentage of the households based on the living conditions](image2)

- Number of houses per one family: 1.08
- Average surface of the house: $S = 136.5 \, [m^2]$
- Average numbers of the rooms per house: 4.48
18 Electric energy supply

✓ Based on the answers given in the questionnaire, for electric energy consumption one household in Dragash yearly spend in average:

330.44 €

✓ Average electricity bill per household is:

Summer: 24.88 € per month
Winter: 30.6 € per month

✓ In the question if they know the electric energy price, answer of main numbers of the respondents was negative, (Diagram 3).

![Diagram 3. Knowledge of electricity price](image)

✓ When asked how many are pleased with electricity supply, most of the respondents replied that they are satisfied with the supply. While the reason why they are satisfied is that recently there has been regular supply with only small electricity reductions, (Diagram 4).

![Diagram 4. Electric energy supply](image)

The respondents who answered that are not satisfied with electricity supply have two arguments: first is the partially cuts of electricity, while second and most important is the low voltage of the electricity supply.
To the question if there are regular cuts of electricity supply, most of respondents answered negatively, (Diagram 5).

**Diagram 5. Electric energy cuts**

Regarding the possible damage caused by electrical energy in electrical equipment in the households, less than half respondents stated that they have had damage, (Diagram 6).

Average damages caused by the electricity due to the time of the interview at the domestic appliances, based on the answers is about: 591 € per household.

**Diagram 6. Damages from electric energy**

19 Lighting in the household

- In average one house has 15.04 electric lamps for lighting.
Based on the answers, in the households the dominant number have the incandescent lamps, (Diagram 7).

Diagram 7. Types of current installed lamps

Based on the answers mainly there are in use the incandescent lamps with size of 100 [W] which in percentage are about 58.5 [%], (Diagram 8).

Diagram 8. Current use of incandescent lamps

From the efficient lamps mainly are in use lamps with size of 20 [W] with about 53.0 [%] and bulbs with size of 15 [W] which are in use at about 31.29 [%], (Diagram 9).
Diagram 9. The use of efficient lamps

Diagram 10. The existence of street lighting

20 Street lighting

✓ To the question if the settlement has street lighting, 23 [%] of respondents have answered positively, (Diagram 10).

✓ From the answers it is seen that inhabitants are not satisfied with street lighting, (Diagram 11).
Diagram 11. Shows the percentage of the answers on how much they are satisfied with street lighting

✓ To the question on what kind of impact has the street lighting at the everyday life of the inhabitants, 72 [%] of respondents answered that street lighting has direct impact to the increasing of the security of people, (Diagram 12).

Diagram 12. The impact of the street lighting to the life of inhabitants

21 Space heating
Based on the answers of the respondents, only 1 [%] of the houses have installed the central heating system for space heating, (Diagram 13).

Diagram 13. Application of central heating for space heating in the houses

- Average surface which is heated in the house is: 35.4 [m²],
- Average heated rooms per households are: 2 room per household.
- The fuel source which is more used for space heating are fire woods, (Diagram 14). Based on the answers, the main reason why fire woods are the most used energy source, are:
  - Are cheaper
  - There are plenty on the market
  - It is easy to use them
  - There is not any other choice

Diagram 14. The energy source for space heating based on the percentage of the use

- One family which for space heating use the fire woods, consume in average: 8.89 [m³] fire wood for one year.
✓ One family which for space heating use the animal dung, in average consume: **6.28 \( [m^3] \) animal dung** for one year.

✓ Main part of firewood is purchased in the market; one part inhabitants cut by himself in the public forest for which they pay lower price and the lower part of the wood are cut in private forest by the users, (Diagram 15).

![Diagram 15. Way of supply with fire wood](image)

✓ Depending on the way of supply changes the price of firewood. In the Table 1 is shown the final price of fire wood supply depending on the way of supply, (Table 1).

<table>
<thead>
<tr>
<th></th>
<th>Price (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The average final price of the fire wood bought in the market trade:</td>
<td>40.39</td>
</tr>
<tr>
<td>The average price of the fire woods cut in the public forest:</td>
<td>19.16</td>
</tr>
</tbody>
</table>

22 Heating of the sanitary water

✓ The main energy source for heating the sanitary water, based on the answers of the respondents is electric energy which in percentage is 77 [%]. There exist also a number of families who use the electric energy in combination with other sources of energy as are: gas and fire woods, (Diagram 16).
Diagram 16. The ways of heating the sanitary hot water

- Based on the answers the reasons of use the electric energy for water heating are:
  - Electric energy is very efficasy
  - Cheap
  - Very easy to use
  - There are not other possibilities

- The use of the hot water is mainly during the Summer season, (Diagram 17).
- Sanitary hot water is mainly used for hygienic purposes.

Diagram 17. The use of the hot water based on the seasons of the year
The main part of the respondents have heard about the possibility of using the solar energy for sanitary water heating, (Diagram 18).

Diagram 18. Respondents knowledge about the possibility of using solar energy for water heating

Mainly of the respondents believe that solar energy could be used in their houses, (Diagram 19).

Diagram 19. The possibility of using the solar energy in the houses

Most of the respondents would consider to install water heating system with solar energy if they could pay less after the installment, (Diagram 20).
Diagram 20. Considering to install the solar water heating system

Most of the respondents would consider to install solar water heating system in their houses in case they know that such a kind of system was successful in public buildings, (Diagram 21).

![Diagram 20 Image]

Diagram 21. Percentage of respondents who could consider to install solar water heating system in their houses in case they have successful example from public buildings

Most of the respondents would install solar water heating system in their houses for the environmental reasons, (Diagram 22).

![Diagram 21 Image]

Diagram 22. Considering on using the solar energy for environmental reasons

At the question: How much could be able to invest on the solar water heating system? The answers were:
- The average amount for investment of the respondents is: 989.77 € per house,
- Some of respondents answered based on the percentage of possible investment. The average percentage of the investment is about 37.06 [%] of the total values of the solar water heating system.
- Percentage of the respondents who will not invest on the solar water heating systems is: 37 [%].

Mostly of the respondents responded that they would like to have more information’s solar water heating systems, (Diagram 23).
23 Thermal insulation, doors and windows

✓ In the question: Do you think that thermal insulation of the walls will save the energy, almost all respondents answered positively, (Diagram 24).

✓ Based on the answers only 12 [%] have insulated the outer walls, 18 [%] have only plastered outer walls, while 70 [%] of the houses are without any thermal insulation, (Diagram 25).
From the answers, only 28 [%] of the houses have insulated roofs, (Diagram 26).

In the question for the kinds of the windows in the houses, it seems that situation is relatively good, because 80 [%] of the answers was for the windows with double glass, (Diagram 27).

Material of the rams of the windows in most cases are made from wood and plastic, (Diagram 28).
Materials of the outer doors are mainly made from wood and plastic, (Diagram 29).

According to the answers it is clear that most of respondents have heard about the ways of saving the energy, (Diagram 30).

According to the responses it is indicated that most of respondents are aware of the energy savings from TV and newspapers, (Diagram 31).
Diagram 31. Media from where peoples are informed for energy saving

✓ 97 [%] of the respondents would like to know more about the ways of saving the energy, (Diagram 32).

Diagram 32. Willing of the respondents to know more about the energy savings

✓ To learn more about ways of saving energy, respondents stated that most of them prefer brochures, radio and seminars, (Diagram 33). The reason why TV is not very popular is the lack of signal in different parts of the municipality of Dragash.

Diagram 33. Preferred media for learning of the ways of energy saving

✓ 99 [%] of respondents think that would help in saving energy if children and youth will be more informed in schools about the ways of saving energy, (Diagram 34).
When asked about the knowledge of what is the reforestation, 97 [%] of respondents answered that they know what the reforestation is, (Diagram 35).

On the possibility of reforestation of areas 73 [%] of respondents responded that reforestation can be done at their settlement, (Diagram 36).

71 [%] of respondents responded that they would reforest their own land, (Diagram 37).
Diagram 37. Reforestation of the own land

- 98 [%] of respondents responded that they would support the reforestation of the municipal land, (Diagram 38).

Diagram 38. Support of the reforestation of the municipal land

- To the question if they see the air pollution as a problem, 58 [%] of respondents do not see the air pollution as a problem, (Diagram 39).
Diagram 39. Air pollution as a problem

Respondents who answered that see air pollution as a problem, stated that factors of the air pollution are several, (Diagram 40):

Diagram 40. Factors of air pollution

- Low awareness of residents 7.65%
- Solid waste 28.24%
- Solid waste together with black waters 35.25%
- Waste burning together with black waters 7.06%
- Pollution caused by burning coal in the schools 1.18%
- Burning of solid waste 4.71%

25 Questionnaire for the village working groups

To analyze the situation of street lighting in the framework of the study was designed questionnaire which was filled by working groups of villages. In villages where there do not exists the working groups, the questionnaire was completed by the mayor of the village in consultation with his associates.

The questionnaires for the local working groups were run in the same locations as questionnaires for the households:

Dragash as a city and then villages

- Bellobrad
- Błaqë
- Buqe
- Restelicë
- Radesha
- Zlipotok

The questionnaire for the working group has focused only on street lighting. Regarding to this below are presented the findings of these questionnaires:

- Street lighting is installed partially in 5 of the settlement that are interviewed.
- No one of the settlements has completely installed street lighting in all streets.
- In 3 of the settlements street lighting is installed from the inhabitants on their own and the payment of the bills is done by the inhabitants.
- All working groups answered that they are satisfied with the street lighting.
- From all existed lighting lamps only 6.67 [%] are efficient lamps, all others are incandescent lamps which consume much energy in comparison of the light they give, (Diagram 41).

![Diagram 41. Type of existed lamps for street lighting in the settlements that are interviewed](image1)

- From the number of installed lamps 66.67 [%] of them are not in working condition (have defects), (Diagram 42).

![Diagram 42. Current state of the lamps based on their functionality](image2)

- All interviewed working groups answered that they want to have street lighting in their settlement.
- Only one working group has answered that in their settlement exist the initiative for installing the street lighting.
- To the question “who is responsible to invest in the street lighting”, answered only 3 working groups and from them: one group think that the municipality has the obligation for street lighting, while two other groups answered that inhabitants are responsible for street lighting.

**Note:** In the results of the working groups, shown above, there are not data and answers from Dragash as a town.
26 Data on electricity consumption for Municipality of Dragash\(^1\)

Data for electric energy consumption in the Municipality of Dragash are taken from the Kosovo Energy Corporation (KEK) Regional Distribution – Prizren. Data are based on the billed consumption of the electric energy.

In the diagrams below is shown the billed electric energy consumption on monthly bases and yearly bases, for 3 last years 2008, 2009 and 2010. Also there is shown the consumption on the villages and the consumption on different sectors for 2009 and 2010.

\(^1\) Source: Kosovo Energetic Corporation - KEK
Diagram 43. Monthly billed electricity consumption for 2008 for Dragash Municipality in GWh
Diagram 44. Billed electricity consumption for the villages of Dragash Municipality for 2008
Diagram 45. Monthly billed electricity consumption for 2009 for Dragash Municipality in GWh

Diagram 46. Monthly electric energy consumption for different sectors for Dragash for 2009

Diagram 47. Electric energy consumption for Dragash for 2009 in [%]
Diagram 48. Monthly billed electricity consumption for 2010 for Dragash Municipality in GWh

Diagram 49. Monthly billed electric energy consumption for different sectors for 2010 in GWh

Diagram 50. Billed energy consumption for different sectors for 2010 in [%]
Diagram 51. Billed electricity consumption for the villages of Dragash Municipality for 2010
Total billed electric energy consumption for 2008 is: 25.30 [GWh]
Total billed electric energy consumption for 2009 is: 29.67 [GWh]
Total billed electric energy consumption for 2010 is: 32.05 [GWh]

During the year one family in Dragash consume in average about: 534.29 kWh electric energy per month.
Based on the analysis made to the data of KEK for 2009, for all sectors together for Dragash Municipality, the consumption on the higher tariff is bigger for about 15.8 [%].

Based on the data shown above the electric energy consumption has a growing trend. This trend is shown on the diagram 52.

Diagram 52. Comparison of general billed electricity consumption for last three years in Municipality of Dragash in GWh
27 Conclusion

Findings from the study provide sufficient evidence to guide policy of the Municipality of Dragash, UNDP project in Dragash and other stakeholders in terms of energy consumption, energy efficiency and environmental issues related to energy consumption mode.

If the average of the results of the study will be generalized at the municipal level, then this study is a good basis for calculating the annual energy needs for the municipality of Dragash, compilation of annual energy balance and assess the potential for energy efficiency. This study did not have the intention to create the data on energy consumption in the transport sector.