

Summary

of the North-Great Plain Regional Energy Strategy

ENEREA Észak-Alföld Regional Energy Agency



2010

Introduction

With an area of 17 729 km² and a population of one and a half million, the Northern Great Plains Region is the second largest among the seven statistical regions of Hungary. It consists of three counties:

- Jász-Nagykun-Szolnok (JNSZ) County,
- Hajdú-Bihar (HB) County,
- Szabolcs-Szatmár-Bereg (SZSZB) County.

Certain parts of the counties might belong to other counties but it is basically made impossible by the country border. However, there is a microregional identity which has developed on the basis of traditions as well as economic, social and cultural issues. Thus, regions are characterized more particularly by their microregions. All this is worth mentioning since they explain the heterogeneous character of the region.

It is particularly typical of SZSZB County that half of the microregions have no cities or towns resulting in the fact that regional development could not rely on the knowledge, economic strength and attraction of an urban settlement. As a consequence, half of the region has a different course of development.

The region is also characterized by a high unemployment rate. 45.3% of the population is employed whereas 10.8% is unemployed. It is to be noted that the region was affected by a high unemployment rate during the new economic crisis in 2008. While the unemployment rate of the region in 2000 was 75% of the national rate, in 2005 it was 55% and in 2008 it became as high as 124%!

The GDP per capita in the region is 2/3 of the national average.

The region has strong agricultural traditions. 34% of the total area of the orchards in Hungary can be found in SZSZB County just as 58% of the forests of the region.

With the exception of a few advantaged towns and microregions, the region is still searching for new opportunities. At the same time, Debrecen and Nyíregyháza show an outstanding progress.

In summary, the present state of the region is close to the average and its potentialities are very promising.

Why is a regional energy strategy needed?

When analyzing the situation of the region and the constituting counties, we have already mentioned that even in a region of the size of a county there are different characteristics, traditions and opportunities which should be taken into consideration when determining aims and purposes.

This is even more so in the case of a strategy, concept and action plan on the national level. Regional energy strategies are needed to make it possible for local strategies to open up ways for specific actions which can be determined only locally. If every region of the country works out a strategy which takes into account:

- the traditions of the microregions,
- the qualifications of the population (human resources),
- the features of the natural environment,
- the natural relationships reaching beyond the borders of the county, the region and the country,
- cumulative knowledge in universities, research and development organisations,
- the organizing and coordinating capacity of the local councils,
- the endeavours of the players in the economy,
- the helpfulness of the professional and civil organizations,

then there will be a national renewable energy strategy—reaching even beyond the borders — which will be regarded by the people as their own, and therefore it can be more easily realized.

National energy strategy and its regional influences

The Ministry of Economics has worked out its strategy on energy policy which has the security of supply, competitiveness and sustainability in the centre. The foundations of the long-term energy strategy must be rethought because the situation has changed radically since the last concept of 1993. The age of cheap energy is over. Hungary joined the European Union (in 2004) but at the same time it became the most defenseless among the EU countries in respect of natural gas.

As compared to the concepts of the past five years the new strategy means progress because it indicates that energy supply must be based on the requirements of the market. Nevertheless, it has been strongly criticized. Opponents of the concept argue that it is a reckoning or a description of the current situation in energy policy rather than a long-term strategy.

The strategy discusses such questions as national regulations in the energy sector and European Union regulations in the energy sector.

The structure of the utilization of Regional energy

In terms of structure, the region's utilization of energy does not differ from the national average.

The electricity and drinking water supply are nearly full-scope. The completeness of the sewage system varies region by region but on the whole it is around 80%.

The primary energy is natural gas which provides 50% of the energy used for heating. The traditional fuel of SZSZB County is firewood.

In the cities primary energy is typically natural gas just as in the larger townships whereas in small settlements it is firewood. To complement it, people often produce hot water with electric boilers. In these settlements the most commonly used energy source for cooking is Calor gas. In smaller settlements traditional electric bulbs are used most frequently whereas in towns and cities energy saving bulbs are becoming more and more popular. The use of electronic equipment for entertainment as well as electric domestic appliances can be regarded quite general. The degree of usage as well as modernization depends on age but in general it is also influenced by the size of the settlements.

SWOT Analysis

▪ Strengths

- Favourable natural circumstances for the utilization of some renewable energy sources
- Adequate capacity regarding renewable energy sources

- High potential for biomass (firewood) in Szabolcs-Szatmár-Bereg County
- High potential for energy plant both in Jász-Nagykun-Szolnok and Hajdú-Bihar County

- High potential for biogas in Hajdú-Bihar County
- High potential for biofuels in Szabolcs-Szatmár-Bereg County
- Favourable geothermal energy potential in the whole area
- Favourable wind energy potential
- Favourable solar energy potential
- Favourable hydraulic power
- A regional energy agency works in the Northern-Great Plain Region
- Growing interest and demand for utilization of renewable energy sources
- Reduction in fossil energy consumption
- More intensive application of public workers to energy management

- **Weaknesses**

- Low proportion of renewable energy resources in energy consumption
- Fossil energy sources prevail
- Low environmental awareness among the society
- Mistrust and lack of information related to the application of renewable energy
- Lack of a network of advisers
- Financial problems at local governments
- Half of the micro-regions are in the category of ‘the most disadvantageous’ and ‘the most disadvantageous with complex program’
 - 80% of micro-regions are stagnant or lagging

- **Opportunities**

- The necessary human resources are available
- Green electricity supports the spreading of micro power plants (hydropower, solar energy, biogas)
 - European Union requires the use of renewable energy resources
 - Having resort to application resources
 - Local government can join to the Covenant of Mayors
 - Local government can give tax reduction for energy awareness enterprises

- Buying energy at the open market
- Establishing energy organizations in common with more settlements
- Initiating local energy programs
- Teaching pupils environmental and energy awareness behaviour
- Rising the price of fossil energy resources
- Use harmful materials (i.e. sewage sludge, animal and slaughterhouse waste etc.) for energetic purposes

- **Threats**

- Continuance of economic crisis
- Different natural circumstances over the region and inside the counties
- Government does not supports the heat production based on renewable energy resources
- There is no harmony between cultivation of plants and demand of utilization
- There is a tension between agricultural and food production
- Longer drought period in the region

Future prospects

Strategic objectives in the field of energy use and efficiency in the region

The aim of the strategy is to set an optimistic but realistic objective for the utilization of renewable energy in Hungary in agreement with the European Union's concept of climate protection and energy set in 2007 for the period between 2007 and 2020.

The general directive of renewable energies to be worked out by the European Commission will contain the general national objectives of the member states, the sector objectives and the community's measures to implement these objectives. In order to realize the community objective, the member states must set their own national objectives taking the local features into consideration in respect of electric energy, cooling and heating as well as biofuels.

- **Water Power**

The generation of electricity in Hungarian hydroelectric power plants has never reached 1% of the total electricity produced in the power stations for public purposes, its current value is 183 GWh per year on the average. In Hungary only 4% of the water power potential is being realized. On the basis of preliminary surveys the construction of three power stations on the Danube, three on the Tisza and five on the Mura and the Dráva Rivers would make it possible to generate 585 GWh electric current per year.

At present there are no power stations on the Danube and the Dráva. The Tisza has the Tiszalök Power Plant — which in Hungarian terms is big — with a capacity of 11,5 MW as well as the most recent Kisköre Hydroelectric Station with a capacity of 28 MW. The majority of the small and mini power plants operate on the Rába and the Hernád and on their tributaries. The utilization of water power on the Danube, the Tisza and the Dráva is a current issue. It must be added that there are more potentials in the use of small power stations.

▪ **Wind-Power**

Wind-power in industrial measures is utilized by the wind power plants which work for the national electric current network. In addition to this, in many places it would be worth considering the construction of small capacity (under 100 kW) wind generators or wind engines to satisfy local energy demands (e.g. electrification of farms, irrigation systems, water pumping etc).

One of the main possibilities of using wind power would be to operate wind power plants and wind power parks working for public networks. Based on calculations, the Hungarian Energy Office gave permission for the building of a wind power of a capacity of 330 MW. According to calculations, the Hungarian system management of electric power is incapable of receiving a higher amount of uncontrollable energy. Therefore, the capacity of controllable power stations must be increased together with the inclusion of the wind power stations in the electric power system.

▪ **Solar Energy**

To determine the potential of solar energy a number of factors must be taken into account. This means that any form of the utilization of solar energy is influenced by complex relationships. The possibilities of the utilization of solar energy are primarily determined by the development of global radiation. In Hungary there is an average of 2100 hours of sunshine bringing a thermal power of 1300 kWh/m².

The two major fields of using electric power supply of solar cells (photovoltaic system) are as follows:

- autonomous electric current supply and
- its feeding into the direct electricity network.

At present in Hungary about 75% of all services fall in the category of autonomous power supply and 25% in the category of feeding into the direct electricity network. In the developed industrial countries the proportion of the latter is growing. This tendency will also prevail in Hungary but the role of the autonomous systems will also grow in the areas without electric power supply.

▪ **Biomass**

Before the utilization of biomass for energy purposes it should be decided what proportion is to be used for energy purposes and what proportion for food production. The basic vegetable materials must be cultivated somewhere and this usually happens in areas previously used for food production. It is a misconception that mass production for energy purposes can be done in bad quality fields unused for cultivation. In both cases economic efficiency is an essential requirement. That is, to achieve the highest possible yield on a given area within the shortest possible time in the most efficient way is the primary objective. For this, there is a need for cultivable land. The utilization of the by-products and waste material deriving from plant production and animal husbandry is a different matter. In this case there is no conflict between food production and cultivation for energy purposes since by eliminating waste material, an important environmental aim can also be achieved.

The analysis gives a detailed list of the various types of biomass according to state:

- solid arborescent plants (natural and planted woods),
- herbaceous plants (hay, reed etc.),
- liquid thin manure,
- gaseous organic methane (waste pile gas, biogas),

On the basis of the place of origin biomasses can be divided into the following groups:

- primary biomass: the whole vegetation coming into being through photosynthesis using solar energy,
- secondary biomass: biomass of animal origin coming into being basically from primary biomass (various organic animal manures),
- tertiary biomass: biomass-like material coming into being by the processing or utilizing biomasses containing various strange materials as well.

Then strategy goes on to describe the types of major basic material sources such as traditional silviculture, herbaceous plants for energy purposes as well as direct utilization, heating as well as pellet.

▪ **Geothermal Energy**

Geothermal energy is renewable energy which does not depend on the weather, the quantity of the reserve can be controlled and it can be renewed by re-placing it in the thermal water storage tank.

The utilization of generated geothermal energy in Hungary is very diverse: it is used for the heating of internal spaces, hot water supply, thermal baths, industrial purposes and agriculture. From the functioning 912 thermal springs approx. 80 million m³ of thermal water is generated. One-third of the thermal water springs is used for the supply of thermal baths (for balneological purposes). Another significant area of utilization is heating in agriculture: there are 202 springs used for such purposes. Only 21 water springs are used for communal heating and hot water supply and 68 for industrial purposes. The remaining one-third consists of the waterworks' springs providing water over 30 °C used for population supply.

At present only 5% of the heat content of the thermal water reserve is used meaning energy of about 3 PJ and we have all the means to increase this available.

Technological Objectives and Opportunities in the Region

It can be seen from the above that this region has many possibilities in the field of using renewable energies. However, these possibilities emerge not at the same time not everywhere and not evenly.

From a technical point of view it can generally be stated that:

- the generation and utilization of solar energy for heating and electric energy is possible everywhere,
- the use of the generated biomass is possible everywhere in the region but especially in areas less equipped with infrastructure where the storing of biomass can be solved and its utilization does not cause trouble for others,
- biogas can be used where generated or where it can be delivered profitably,

- theoretically “water” heat-pumps can be used everywhere but an expert’s help is needed since the soil is not homogeneous; practically, however, “air” heat-pumps can be used anywhere. In these cases the generation and utilization of energy typically happens at the same place but it can be delivered within a short distance as well,
- an expert’s help is also needed to decide whether it is possible to “catch” the power of the wind to generate energy,
- with the exception of a part of the above cases the generation of heat or electric power cannot happen anywhere; the marking of these locations happens primarily from technical aspects.

In the next part strategy summarizes business objectives and possibilities. The region has the possibility to use renewable energy of various capacities and functions:

- generation of heat and electric power for apartments and blocks of 2-4 apartments with the help of solar collectors, solar cells, wind generators, heat-pumps, wood or pellet heating,
- generation of heat and electric power for blocks of several apartments as well as community buildings with the help of solar collectors, solar cells, wind generators, heat-pumps, wood or pellet heating,
- generation of electric power for apartments, blocks of apartments and public buildings by partial or complete feedback into the supply network, with the help of solar cells and wind generators,
- production of goods using renewable energy for the purpose of sale.

The last chapter of the strategy presents the constructions of subsidy, credit and funding including the following programmes and their sub-programmes:

EEOP – Environment and Energy Operative Programme

EEF – Energy Efficiency Fund

Detailed description of ZBR PANEL sub-programme

Detailed description of ZBR Energy Saving sub-programme.

Strategic targets in the region

▪ Comprehensive strategic targets 2010 – 2020

To promote the national achievement of requires of the European Union our main strategic target has been determined: “making sustainable and livable environment”.

It means in details:

- Mitigation of the energy depending
- To accomplish the energy safety
- To achieve the energy efficiency in buildings
- To increase the proportion of the renewable energy resources and to decrease the CO₂ levels
- To develop the settlements’ environmental quality and the inhabitants’ quality of live
- To contribute the development of local economy in micro-regions
- To achieve the usage of the local energy resources in bigger proportion

▪ Specific strategic targets 2010 – 2020

- We have to decrease the aggregate energy consumption of the institutions in settlements 1% per year in proportion to the year 2009, by 2020.
- We have to increase the proportion of the use of the renewable energy sources, in the total energy use up to 13% in the micro regions.