POSSIBILITIES TO USE THE RENEWABLE ENERGIES IN ARAD COUNTY

POSIBILITĂȚI DE UTILIZARE A ENERGIEI REGENERABILE ÎN JUDEȚUL ARAD

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Abstract: *Romania has a wide range, but reduced the amount of primary energy resources (renewable resources): oil, natural gas, coal, uranium, and renewable resource potential capitalized relatively modest compared to other states.*

In terms of a sharp decline of depleting energy resources and the need for sustainable development perspective, it is clear that if the current mix of uses to store energy, the risk of major trouble in the future supply of resources. In this context, in the Arad County the authors analyzed the possibilities for promoting efficient and rational the use of energy from buildings to large consumers of energy and parallel the development of energy production systems from renewable sources.

Key words*: energy, resources, renewable, solar*

INTRODUCTION

Hydrocarbon deposits are limited, against a decline in domestic production and provided that no new deposits have been identified with high potential.

Renewable energy refers to energy forms produced by energy transfer of energy from renewable natural processes. So, the energy of sunlight, the wind, flowing water, biological processes andgeothermal heat can be captured by people using different methods. Between renewable

energy sources are: wind, solar and hydro energy, hydro, tidal, geothermal, energy derived from biomass: biodiesel, bioethanol, biogas.

MATERIALS AND METHODS

In order to be able to achieve the goals of the present paper, the autors used as research methods: data collection, data analysis, data processing, and data synthesis.

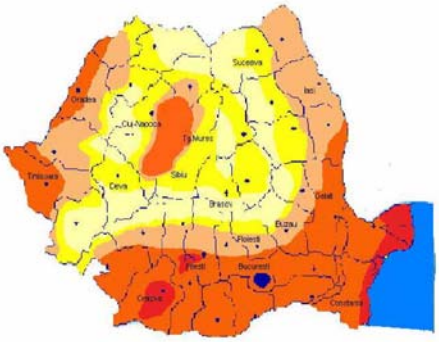
RESULTS AND DISCUSSION

The total area of Arad County is 7654 km^2, comprises 78 territorial units and administrative a municipality- Arad, city residence, 9 cities (Chişineu Criş, Curtici, Ineu, Lipova, Nădlac, Pecica, Pâncota, Sebiş, Sântana) and 68 common. County population at last census count is 461,791 inhabitants, 233,992 people belong to the urban environment.

Arad County has a important natural resources for use in the economic sector.

Arad County has the following possible to use renewable resources: solar energy, wind energy, energy from biomass, energy from biodiesel fue production, energy from the small hydro facilities, geothermal energy.

Solar maps show that almost no region in Romania that would not suit the production of such energy. Solar energy potential is high in our country because all marine climate and position in Europe. Solar energy is increasingly supported by the Romanian state (Fig. 1).



AREAS OF SOLAR RADIATION	SOLAR RADIATION DENSITY (kWh/m^2/an
I	>1350
II	1300-1350
III	1250-1300
IV	1200-1250
V	<1200

Fig. 1 Solar map of Romania

Source: Energy Strategy of Romania for the period 2007 – 2020

Technologies and equipment for recovery of solar radiation

Using sunlight to electricity can be done by several methods:

- the use of photovoltaic modules;
- the use of solar towers;
- the use parabolic concentrator;
- the use of Dish-Stirling system;

Photovoltaic systems (PV). Photovoltaic generator is organized as photovoltaic field including all elements of interconnection (wiring) protection (antiretur or bypass diodes) and/or specific parts (actuators for mobile panels, automatic guidance devices, etc..)



Fig. 2 Photovoltaic panel (PV)

There are,mainly, two types of operation:

- Operation without storage (with connection to the network)
- Storage operation (autonomous)

In case of autonomous power systems which exploit both solar and wind energy, the technological proposed solution will include a hybrid photovoltaic-wind structure(PV/EOL).



Fig. 3 Solar installation generating electricity with solar tower



Fig. 4 Solar power systems with parabolic concentrators

This type of concentrator consists of a parabolic mirror shaped trough focus essolar radiation on a pipe. In pipe flows a working fluid, in generally oil, who takes the heat to yield the water to produce steam which leads the turbine of an electric generator. The concentrator requires adjustment positive to the apparent movement of the sun indaytime. A variant of the parabolic concentrator is represented by the Fresnel concentrators.



Fig. 5 Generator Dish-Stirling (EuroDish)

Given the good sun exposure in Arad county (according to experts from 1200 to 1350kW/sqm/year) for administrative buildings, school, hospitals etc.., solar panels can be used together with other forms of energy, can provide high energy independence of these objectives. So the use of solar ovens who practical are some which some parabolic in which focus are produced temperatures above 900 degrees with automatic orientation by the sun, can provide a source of high energy.

Given the exposure of our county for producing electricity can be used photovoltaic panels (even with orientation by the sun) that could pose a substantial contribution to energy for rural communities and beyond. Also,

the photovoltaic panels can provide street lighting at night as we find it in most European countries or traffic signs.

Wind energy could be used in the West Plain and Hills Vineyard, in Mureş Gorge, given in consideration the wind blowing from the Hungarian Plains who in the neighbor country train a number of wind turbines such as the Sarvoş, from Hungary, close to Arad country. This could be planted wind central on Văsoaiei Hills (where, in fact before 1989 were has functioned a central wind to produce electricity for the stables of the Văsoaiei area), on the Mocrei Hill, on the hills of Arad Vineyard, in the Mureş Gorge, even climbing up on the Mountain Peaks Codru Moma or on the Plateau Izoi – Moneasa .

Locations for solar applications

These locations are identified by specialists given in view: - The potential map of solar energy in Romania (an average of 1275 kWh/m2/year global\ radiation falling on horizontal surfaces, potential which in join the Arad County – the solar potential distribution in the territory (which has relatively small variations in 200kW/h/m2/an between the southern, western and northern parts of our country); - the performance of solar equipment (thermal and photovoltaic) which is suitable for all applications thermal/electrical. **One can appreciate that in Arad County, in general, any sunny area, without major obstacles, is suitable for solar applications.**

Locations for solar thermal applications (thermal energy)

In this case, any space can be used if: - allow the location for the solar-thermal collectors -south preferential orientation and inclination depending up on latitude location. Is the case of the roofs of houses/blocks, adjacent building (covered parking etc..) or of land that can put solar thermalcollectors.

Locations for photo-voltaic (electricity)

Preliminary energy analysis and field studies have shown that the main area for installation of solar-electric power is the Dobrogea (Tulcea and Constanta Counties), but in Subcarpathians Southern or Romanian Plain, West and South Oltenia Plain. Based on these main criteria were considered for photovoltaic power system locations primarily located in Dobrogea (Tulcea and Constanta Counties).

Locations for wind applications

For the election of siting wind systems in Romania there are several areas:

- Dobrogea area;
- **Zona Banat** area;
- Zona Moldova area.

Establishing these areas was initially based on the fact that all are located in subarea of potential wind favorable I-II properly to the relief: hillsand plateaus, mountains area, coastal/high, plains (with wind speeds exceeding 5 m /s).

Concrete specification of the location of wind turbines is from investigations in the field, taking into account the plans of land, land configuration and other elements related to efficiency. In the county of Arad there are several investment implemented using solar energy.

Ongoing projects in Arad County- 2010:

- Solar system for completing the classic system to obtain DHW from Arad County Emergency Hospital;
- Solar system for completing the classic system to obtain DHW from The Centre for Neuropsychological Rehabilitation, common Petriş (completed);
- Photovoltaic Park in Free Curtici Area.

CONCLUSIONS

Because of the good potential that has Arad County and in generally Banat area, in the short term, the beneficiaries of programs and county projects using renewable energy sources will be public and private institutions, local and county councils, companies, NGO, educational institutions, professional associations and interested individuals.

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