

## ABOUT THE WIND POTENTIAL FROM THE SOUTH BANAT AND A TECHNICAL SOLUTION FOR USING IN INDIVIDUAL FARMS

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### **Abstract:**

*Based on the wind average diagram from the south region of Banat, (Danubes 'clisura'), recorded during 2002, it is consider as possible to use that wind potential. Such, in a first phase, it propose a technical solution, applicable for individual farmhouses, for that place, respective a windgenerator group, command by a simple control scheme.*

### **Keywords:**

*Wind installation, permanent magnet generator, automatic regulation scheme, and accumulator battery*

## **1. INTRODUCTION**

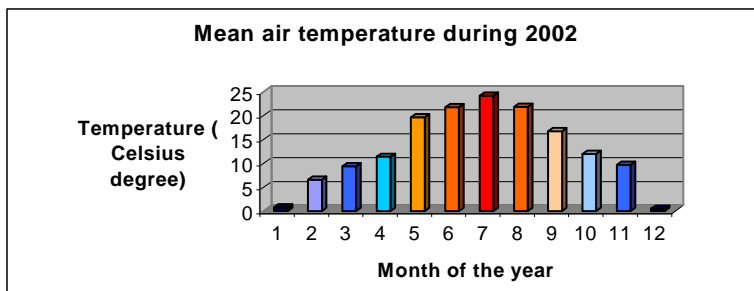
If the implementation of an extended wind park requires meteorological observation for a longer time period and a substantial investment effort, the creation of some windgenerator groups with a small power (<1kW) for the use of individual farms, can be considered as an easy beginning. That can have an immediate impact, which can wake peoples and autoritations interest for the renewable energy.

## **2. WINDPOTENTIAL IN SOUTH BANAT**

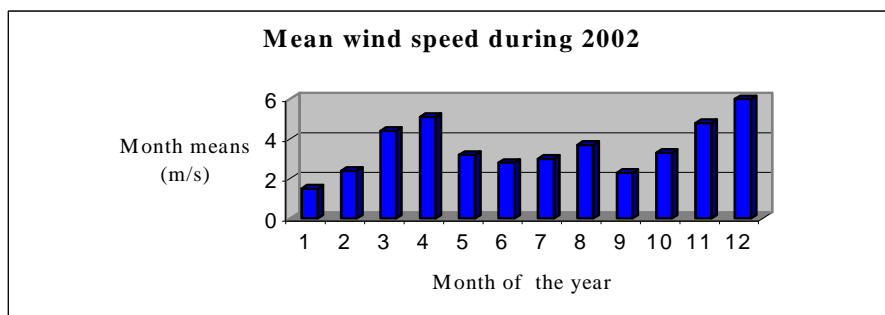
The south Banat, respectively Danube's Clisura, it's a region characterized by meteorological phenomenon that can be principal expressed by a constantly wind direction (southwest) and an acceptable wind mean that allows the utilization of this energy (figure 1). We can observe in figure 1 the repartition of the mean month temperature during 2002 (figure 1.a), respectively the mean month wind speed in the same period (figure 1.b).

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It's required specifying that this region has an easily access and, in winter, it's not affected by very less temperatures, massive snow falling, etc., like usual, in high mountain regions.



a.

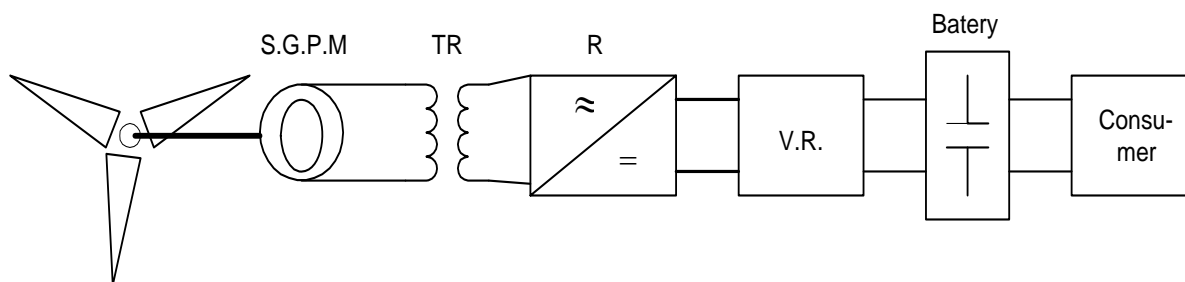


b.

Fig.1 Nomograms a. temperature b. wind speed

### 3. TECHNICAL SOLUTION OF A WINDGENERATOR FOR INDIVIDUAL FARMS

The electrical part of the windgenerator includes ensemble generator-transformer- rectifier-voltage regulator-accumulator and consumers, as presented in figure 2.



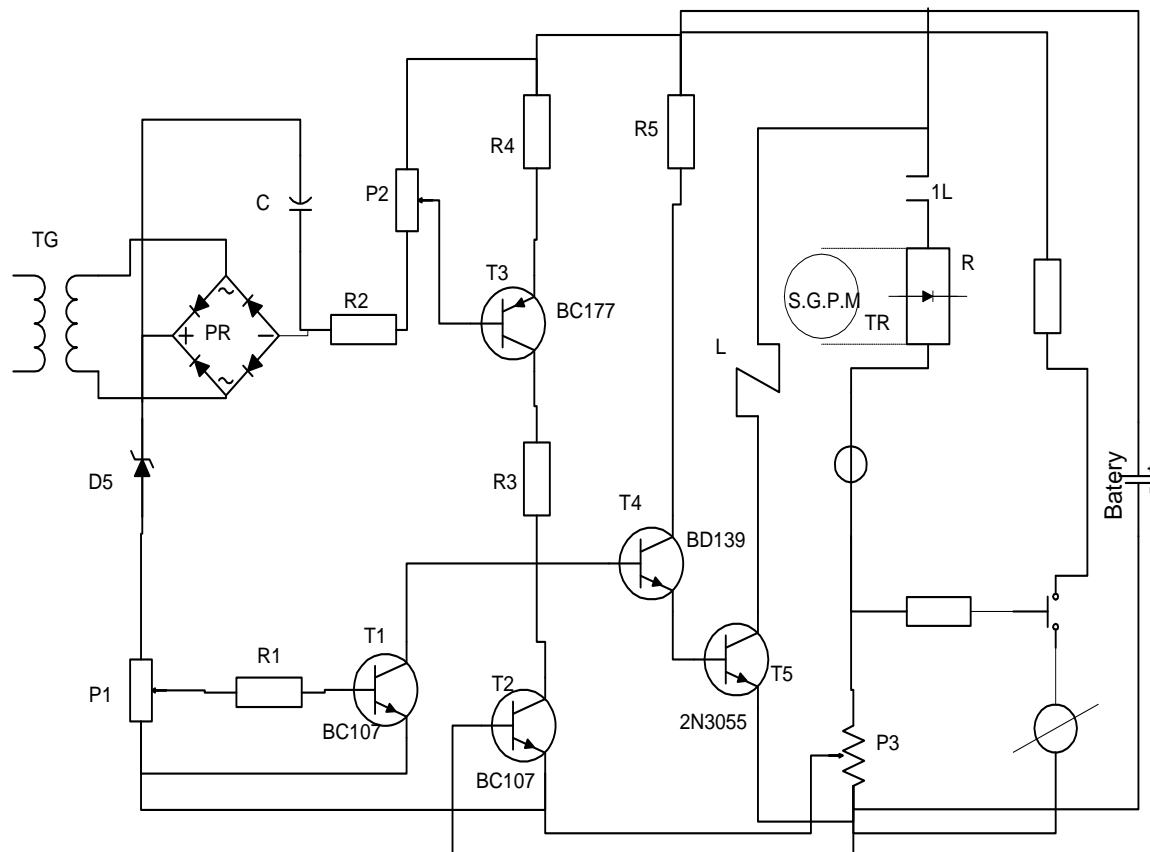
S.G.P.M.-Synchronous Generator with Permanent Magnet, TR – Transformer, R – Rectifier, V.R. – Voltage Regulator

Fig.2 Windgenerator ensemble

The mono-phased synchronous generator with permanent magnet has the following main parameters: power~1kW, 220Va.c. voltage by an rotation speed of 100rpm which can increase to 250rpm, so that the voltage frequency is contained between 50Hz and 125Hz, depending on the wind speed. It is obviously, that once with the wind increasing, the

produced power and voltage, by the permanent magnet generator, will grow, but this solicitation (electric and thermic) stay in acceptable limits.

For the good function of the generator in association with the rectifier and accumulator it's necessary that the loaded voltage and current should not exceed the maximum values determined by the battery capacity and temperature.



**Fig.3** Electric scheme of the windgenerator command

Figure 3 presents a command scheme for the windgenerator, that carries out following functions:

- assures the generator connection just when his speed generates a higher voltage that the batteries;
- adjust the accumulator loaded current, indifferently on the primary energy source variation, the wind in our case
- regulates the maximum loaded voltage

The measurement element that controls the generator rotation speed is a taho-generator. He is couplet to the generator shaft, for example through a belt. If we follow the electrical scheme from figure 3, the function ascertains as: the taho-generators voltage TG polarizes the transistor T3. When this voltage crosses over a certain value, T3 enters in conduction, which imposes the entering in conduction of transistors T4 and T5 and allows the generator to be connected through the relay L contact 1L. If we assume that the wind speed falls, then the generators speed falls also and implicit the taho-generators too. This will reduce the

voltage on the transistor base T3 and block transistor T5, consequently the generator will be disconnect through relay T.

The limitation loading function for the accumulator is carry out in this way: when the accumulators nominal voltage is overtaken, diode D5 opens and on the potentiometer terminal P1, appears a voltage that opens transistor T1, blocks transistor T4 and T5 and so the feeding contact 1L of the accumulator gets interrupted. Also, the potentiometer P3 is connected serial with the rectifier output, where, at his terminals, the voltage is proportional to the loaded current. When the loaded current overtakes a certain value, the transistor T2 gets open and T4 and T5 will be blocked, finally interrupting the accumulators feeding. For a better heat elimination, we notice that a radiator was connected on the T5 transistor; also, for the exact rapport of produced current and voltage, the electric scheme can be equipped with measurement instruments, as shown in figure 3.

The same command scheme can be also used for c.c. generator with derivation excitation, when the machine excitation is activated, just when his voltage is higher as the batteries.

#### **4. CONCLUSION**

The investigations of the energetic wind potential for favorable places like south of Banat (Danube 'clisura') and Banat Mountain (Semenic), needs an analyze and store a lot of meteorological parameters through a longer time period. For a the implementation of local applications, as the technical solution proposed in the paper, can be immediately started and depending of the obtained results and interest of users, can be spread on large scale.

#### **5. BIBLIOGRAPHY**

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