

GREEN ENERGY - THE FUTURE ENERGY WITHIN BIOTERRA UNIVERSITY CAMPUS

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ABSTRACT

Green energies are widely implemented worldwide and also in our country. Our paper provides its applicability in terms of facilities within Bioterra University central campus in Bucharest and also in our Tourist and Students Practice Units located in Predeal – “TreiBrazi”, Bușteni – “Zamora”, Danube Delta – “Baltenii de Sus” and at the Seaside - EforieSud and Comorova Forest, Neptun resort (all being owned by Bioterra University of Bucharest).

At the United Nations Conference in Paris (held on 12 December 2015) regarding the Climate change, the partners reached a New Global Climate change Agreement: limiting global warming, well below 2 Celsius degrees, underlining the importance of using of the non-polluting renewable energies.

Beyond this limit, the scientists fear of the next irreversible effects:

- ⇒ *repeated extreme events - cyclones, droughts, etc.;*
- ⇒ *decline of agricultural yields;*
- ⇒ *extinction of some species.*

Rising with +2 Celsius degrees, the sea level will increase with 40 cm till 2100 year; rising with + 4-5 Celsius degrees, the sea level will increase with 80 cm and it will continue to ascend.

INTRODUCTION

Using Green Energy" syntagma we refer to renewable and non-polluting energy sources that come from natural phenomena that are theoretically inexhaustible and are considered to be infinite sources of energy, even if the Sun is expected to disappear somewhere after 5 billions of years!

The assumption of the energy predictability necessarily implies the design of new technologies, which are inevitably expensive to start with, but as large-scale implementation happens, cost prices will drop considerably. At about the same global current consumption, it can be estimated that the current reserves in the oil basins will be exhausted in about 60 years.

MATERIAL AND METHOD

Our students develop their speciality practice stages within our own tourist units equipped with renewable energy sources and green energy laboratories, thus choosing the clean energy sources for consumption they support the development of green energies that will reduce the environmental impact and increase the energy independence. Bioterra University's energy policy is based on:

- ⇒ the UE 2020 biodiversity strategy which provides the “20/20/20” objective, ie -20% reduction in greenhouse of gas emissions - 20% more green energy use - 20% increase in green energy efficiency;
- ⇒ ONU Conference on Climate Change in Paris (held on 12 December 2015) regarding the Climate change, the partners reached a New Global Climate

change Agreement: limiting global warming, well below 2 Celsius degrees, underlining the importance of using of the non-polluting renewable energies.

Thus, within the Faculty of Environment and Consumers Protection and, a research project was started which consisted in obtaining of the energy independence within our Comorova Ecotourism Unit.

Major investments have been made using own funds to achieve this goal by acquiring: wind turbines, photovoltaic panels, solar panels for hot water, heat pumps, infrared panels, led bulbs and eco-friendly means of transport. The study of weather phenomena, monitoring and processing of electrical parameters was done in real time due to modern computer assisted equipment and an Internet connection.

Bioterra University has set up a laboratory for the study of renewable energies and a laboratory dedicated to environmental protection.

RESEARCH RESULTS

In order to maintain the environmental control, the biodiversity conservation, the study of pollution and its reduction, it was considered appropriate and imperative to set up a laboratory for the study of renewable energies, both on the campus in Bucharest and in Comorova, Neptun tourism and practice unit of Bioterra University.

Bioterra University's Bioterra renewable energy specialists have twice traveled to China by purchasing energy equipment directly from the manufacturers, launching an application-oriented research project to achieve the energy independence of the Comorova Ecotourism practice unit.

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Figure 1 Wind turbine park in the Neptun-Comorva Tourist Complex

In order to reduce the carbon peak, the major consumers of electricity were replaced, ie the boilers within Comorova Unit used for the production of domestic hot water, also taking advantage of the opportune placement of this tourist unit according to Romania's „solar potential map”.Comorova Unit is located according to the wind potential of Romania in an area where investments in wind turbine installation are preferred; thus,

we opted for those with vertical axes due to the varying wind direction gusts monitored by the on-line weather station.

The monitoring of the electric power produced by the photovoltaic panels is done by means of the controller (Refusol brand) which has a web interface (Figure 2), being connected to the Internet, so we can know in every moment what green energy is injected into the network. At the same time, the data is stored on a server, which can generate graphs and statistical calculations for days, months, and years.

Also, there is the advantage of having an application on the smartphone, which can monitor the parameters in real time.

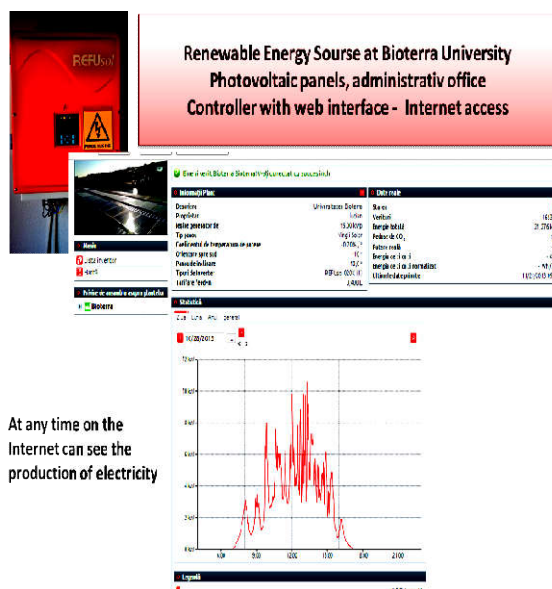


Figure 2 Digital controller interface

CONCLUSIONS

Summarizing, we can point out the main directions of action done at university level regarding the investment in clean, renewable energy, as follows:

- Bioterra University, through its energy policy, wants the investment in renewable energy sources (photovoltaic panels, wind turbines, solar panels) to achieve the energy independence within its students practice and tourism units, reducing the electricity consumption by replacing incandescent bulbs with the LED-SMD type and also the replacement of the three-phase electrical power-consuming electric heaters with those by induction.
- It is noted that renewable resources are part of the green category, thus contributing to the reduction of carbon peak. These subjects were disseminated among our students through the specialized courses of the Faculty of Environment and Consumer Protection as well as through the actions of the European projects accessed through the relevant Ministries: Environment, Tourism, Labor and Social Justice.
- The technical support is provided by the laboratories for the study of „Renewable energiese” and „Environment protection”, both in the headquarters of Bucharest and within the students tourist practice units (in the mountain, sea, Danube Delta areas). Due to the data provided by the Internet-connected digital weather stations, optimal wind turbine installation (12m, ground-to-generator), certified by the energy production read / recorded by the digital meters with

Internet connection, was obtained stored on the manufacturer's servers, being accessible from the university user account.

- Production of green energy at higher scale, both at the headquarters in Bucharest and within the four University's subsidiaries located in Focsani, Slobozia, Alexandria and Buzau. There is also a significant investment within all our the practice and tourism units.
- Noteworthy the investment in the human resources, specialists with training / study visits both in Europe and China.
- The formation of an "Eco" consciousness according to the concept: "*Earth is life and energy for all*" is our policy.

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