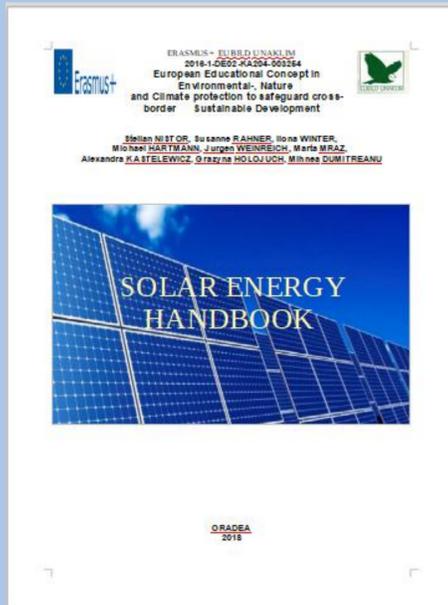


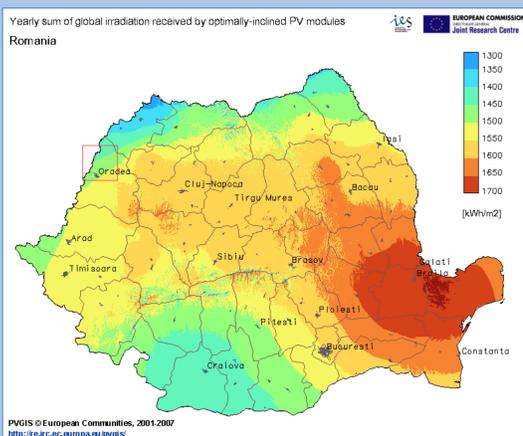
# SOLAR ENERGY HANDBOOK

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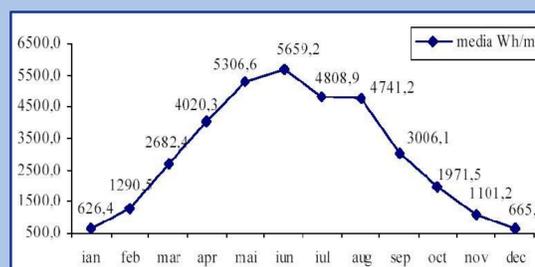
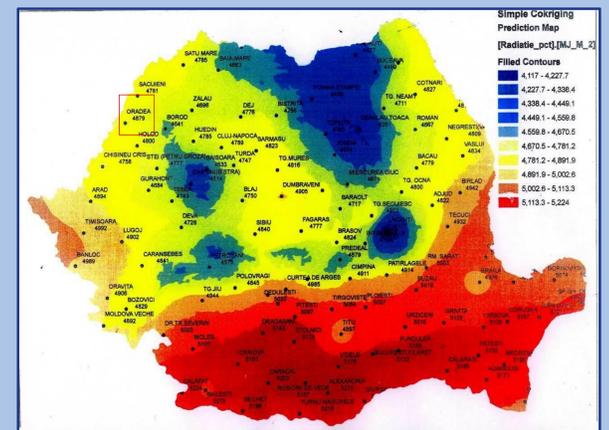


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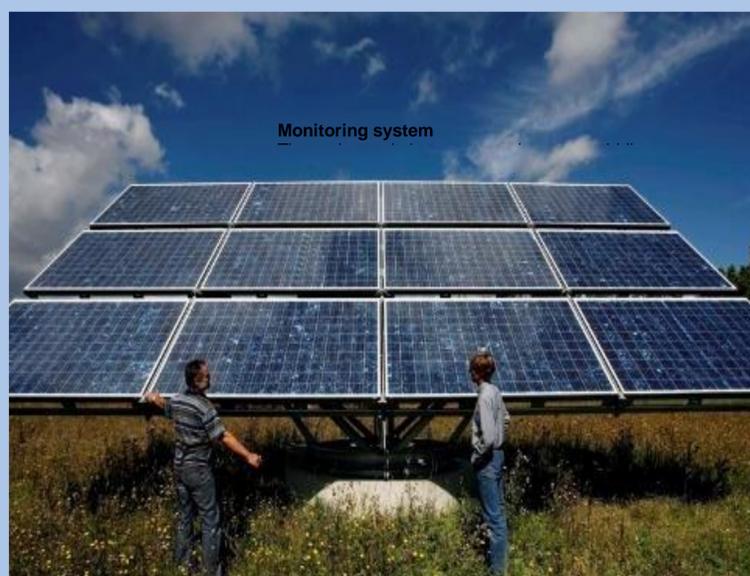


Geographical location and climatic conditions of Romania provides the necessary context for producers of electricity using sunlight.  
 Areas of special interest for electric power applications of solar energy in Romania are: - the Romanian Plain, the West Plain, Banat and part of the highlands of Transilvania and Moldova. These areas have streams of solar energy with an annual average between 1700 and 2050 hours of sunshine per year, and areas such as Dobrogea, Romanian coast of the Black Sea and the Danube Delta, presents special features, with an average annual solar flux extremely favorable reaching a number of over 2,200 hours of sunshine a year.



**Power line network.** In the structure are mounted 9480 of the modules with a power rating of 75 W which require 30 inverters at 18 KW and 18 inverters at 3.3 KW to convert the direct current produced by the panels into alternating current, which is transported to the National Power Grid. The 9480 modules are arranged in 6 identical groups of 99.9kW of generated power, and 118.5 KW installed power. Each group contains 1580 modules, 1400 modules are wired to 5 inverters of 18 KW, and 140 modules are wired to 3 inverters of 3.3 KW.

**Solar radiation potential** where the solar system is located, this enables capturing the full potential of solar radiation in Bihor County, in a year, 5659.2 Wh/sqm. In this way solar energy flows reach annual average between 1700 and 2050 hours of sunshine a year, which can generate a real electrical current production of 650,000 kWh/year for that installation of 0.6 MW.



**Monitoring system**  
 The photovoltaic system have a bidirectional electronic three-phase counter of low voltage and an indirect measure of energy which measure the energy produced by the photovoltaic system and the consumption of the photovoltaic installation.  
 Essential characteristics of the measurement equipment are:  
 Capable of measuring the active power (bi-directional) and reactive (4 quadrants)  
 Availability for 3 counters  
 Computing power, maximum demand, and excess power  
 Communication ports, local and remote reading  
 Availability of 4 free power contacts to transmit signals to an external device  
 LCD viewer

**The photovoltaic panel** used for this facility is a thin film technology (silicon as cadmium tellurium) with a rated output of 75 W. Thin film photovoltaic panels are durable and flexible, being packed in isolation systems against infiltrations, also having self-cleaning polymers. These plates can be used even as roof shingles, or any other creative contexts that exploit flexibility.  
 Thin film photovoltaic panel provides high energy yields (high performance) regardless of season or weather conditions, with excellent response in low light or low temperatures. They are very strong, robust and resistant.  
 The panels used meet the standards of quality and environmental management ISO 9001/2000 and ISO 24001/2004.

**Operating costs**  
 Expenditure on staff required for current maintenance consisting of panel cleaning and vegetation removal - about 5200 euro/year  
 Expenditure on staff required for production management with two components  
 technical component - service and configuration of equipment - about 24,000 euro/year  
 economic component - record production, putting it in value, - about 6500 euro/year