

# SC SOLAR ECO SYSTEM SRL Company Profie

#### Who are we?

Solar Eco Systems was founded in 2010. Our main activity is the design, installation and configuration of projects in the field of energy efficiency and renewable energy, both for the industrial area, the residential area and for territorial administrative units: renewable energy production systems, storage systems energy and Smart BMS energy monitoring, control and management systems and Smart City solutions.





#### **Our mission**

Our mission is to keep up with the latest technologies emerging in the field of renewable energies, sustainable technologies that do not have a negative impact on the environment, but on the contrary, use inexhaustible and free sources (wind, sun, earth's heat).

This is how we contribute to improving the quality of life.



Photovoltaic systems installed



Energy Efficiency Projects for Buildings



Energy Storage Systems with VRFB



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# Solar Eco Systems

#### Energy Efficiency and Energy Management Solutions Energy Production and Storage

In 2021, 22% of the energy consumed in the EU was generated from renewable sources, according to EEA early estimates. This is the same as the level observed in 2020, despite the two years being marked by different conditions and consumption patterns. Consumption of renewables increased in absolute terms in 2021, driven by their higher penetration in the heating sector, as well as increased electricity generation from solar power. However, this was eclipsed by slower wind speeds and a rapid rebound of non-renewables after the COVID-19 pandemic. The long-term prospects may still fall short of the current 32% renewable energy target set for 2030. Meeting the recently proposed, new target of 40% would require a deep transformation of the European energy system

An increase in the use of renewable energy has multiple benefits for society such as mitigating climate change, reducing the emission of air pollutants and improving energy security. The EU had set the goal of ensuring that 20% of its gross final energy consumption came from renewable sources by 2020, increasing to 32% by 2030<sup>1</sup>.

# To cover the entire context of energy efficiency Solar Eco Systems offers the following solutions and systems:

- Photovoltaic production systems
- High-performance lithium-ion storage system for residential and commercial applications
- CellCube electricity storage system based on VRFB (vanadium redox flow energy) technology
- BMS Systems Building Management Systems for monitoring, controlling and optimising a building
- Smart City solutions
- Urban mobility power stations
- Smart LED lighting solutions
- IT Solutions and Security Systems
- Heating of domestic water with the help of photovoltaic panels
- Modular and customized carbon fiber heating systems
- Heating covers for cylinders

#### **Consultancy on European Funds on Energy Efficiency**













# **Photovoltaic Systems**

The production of photovoltaic electricity is a competitive advantage, both because of the lifetime of over 20 years of equipment and the reduce of energy costs.

Currently, within Europe and Romania, the legislation promotes and supports the installation of photovoltaic systems through green certification and in the future perhaps by FeedIn Tariff.

#### Residential



Nationally, the highest consumption is made by the residential sector, with over 37% of all energy

consumed in Romania. This growth has led us to offer solutions for photovoltaic systems between 1 and 100 kW installed on terrace and pitched rooftops.

Using an **energy manager** the daily production can be monitored and controled.

Implementing a Micro Grid system or a Island system involves the installation of Lithium-Ion or gel, sized according to the customer profile to ensure autonomy in case of interruption of the grid.

#### Industrial

Producers who have high consumption of electricity can implement solutions that use photovoltaic panels / equipment with high efficiency and optimizing production. The main advantage of autoproducers is reducing spending or reducing the cost of production and technological process, using electricity from its own production, thus having an advantage over competitors who do not have such systems installed.

care nu au instalate astfel de sisteme.



#### **Public institutions**

Promoting the use of new renewable energy technologies for institutions, brings in addition to reducing energy costs, the contribution to a **sustainable development.** 

Public institutions have an obligation to achieving European and Romanian objectives in the implementation and use of energy from renewable sources.

### ENERGY STORAGE SYSTEMS



## **CellCube storage system**

# CellCube. Intelligent storage systems based on vanadium redox flow technology. (VRFB)

The CellCube energy storage system is regarded as a milestone in the history of regenerative energy management. Whether in combination with photovoltaic, wind power stations, biogas generators or in parallel grid operation – the vanadium redox flow energy storage system guarantees uninterrupted power supply. It is independent of weather fluctuations, temperatures and length of day or unstable grids

#### **Highlights CellCube**

- High safety, non-flammable, non-explosive
- Practically unlimited cycling
- Scalable up into the MW-range through simple parallel connection of multiple CellCubes
- CellCube is 100 % capable of deep discharge
- Turnkey energy storage in weatherproof and securely protected housing
- Up to 80 % efficiency
- Holistic system solution, including specially coordinated inverters, thereby allowing connection to different energy sources
- Remote or online maintenance is possible
- Central temperature management
- Optimal operational characteristics through intelligent battery management
- Standard freight containers allow simple and costeffective transport
- Vanadium is environmentally friendly and recyclable
- Spontaneous reaction to load demand









#### **CellCube application fields**

- **Grid support**: For the stabilization of low voltage and medium voltage grids; as energy reserve; for smoothing out peaks (compensation of load and generation peaks)
- Backup: Use as inline UPS with frequency and amplitude decoupling; leading edge system safety
- Wind and solar parks: As buffer to smooth energy output and to compensate for fluctuations; higher contract security due to energy reserves in times of reduced power
- **Re-powering**: Investment protection CellCube ensures constant supply, even after amortization of the wind or solar park

#### **Implemented project**

#### CellCube storage system and 26 kWp photovoltaic - Cluj Napoca

Complete solution to cover electricity consumption by a 26 kWp photovoltaic system and a CellCube storage system with integrated energy management system.

Electricity production consisted of a system of 26 kWp high-performance 250W polycrystalline panels produced in Germany. 25 kW inverter features an integrated Speedwire – a component for online production monitoring, production history and other data needed for efficiency analysis.

Positioned on a special aluminum structures system, with a 15 degrees tilt of the photovoltaic, positioned on the South-SouthWest, minimal shading, ensures efficient use of terrace surface of the building eliminating unused space for the 104 panels.

This is the second project implemented with this technology in Romania and the first project with the new class of liquid electrolyte batteries.





### LEGISLATION



# Legislation

According to European legislation by 2020, new buildings owned by public authorities have to be energy efficient and have to use renewable energy sources.

#### **EU Legislation**

EU Directive nr.31/2010 regarding the energy performance of buildings within the Union completed with Commission Recommendation nr.1318/29.07.2016

Art 9/ Directive nr 31/2010: by 31 December 2020, all new buildings are nearly zero energy buildings and after 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings.



**Art 3.2/ Recommendation:** Minimum primary energy requirements are foreseen at 100 kWh/m2/y in 2015 for Romania, but they will become between 30 kWh/m2/y and 50 kWh/m2/y in 2020. The percentage of renewable energy will pass from 20 % in 2015 to 40 % in 2020. CO2 emissions will pass from 8-10 kgCO2/m2/y to 3-7 kgCO2/m2/y in 2020.

#### **RO** Legislation

#### Law 121/2014 regarding Energy Efficiency

**Art 4 Alin. 36**. ... an efficient heating and cooling system is a heating or cooling system that uses at least 50% renewable energy

#### OG 13/2016, nr. 68/29/01/2016, modified L372/2005 regarding Energy performance of buildings

**Modified Art 3 /L372 alin 15** building whose energy consumption is nearly zero - building with a very high energy performance, in which power consumption is nearly zero or very low and is covered in a rate of minimum 10% energy from renewable sources including renewable energy produced on-site or nearby.



Law 121/2014 Energy Efficiency



# **BMS – Building Management Systems**

**BMS** has three functional levels: equipment field level, the controller level and the communication level. Main functions are:



• **tracking** the state or the values of all set parameters to obtain maximum comfort;

• **controlling** them with the possibility of changing parameters as desired by status or by their value;

- **registering** the evolution of the values at chosen intervals by the user with the possibility of creating intervals situations or to highlight values;
- **alarming** and acting on equipment in case of situations defined as damaged. The system can be configured to alert the building manager, service team, company security, fire, etc.
- the permanent **informing** in a single system that can be easily used without much knowledge and depending on the desired communication.

# The operating systems provide full and complex monitoring using dispatching systems. These systems performed:

- Monitoring consumption
- Monitor all parameters
- Monitoring events
- Functional control of the systems
- Evaluation and forecasts for energy consumption
- Managing by consumption and cost centers
- Automatic generation of reports on a schedule or on demand
- Complies with ISO 50001 standards
- Monitoring the energy consumption of industrial consumers -Reducing energy consumption at the level of industrial consumers





# **Smart City Solution**

#### Software implementation for monitoring, control

#### and energy management system

Smart management of a city can be achieved through a monitoring system, control and energy management system installed in a data center. The system is based on BMS elements of hardware and software, aimed at optimizing efficient energy management, with well-defined goal to reach a very high level of optimization. The system is designed to meet all the requirements of ISO 50001 Standard for Energy Efficiency and responds very well to Energy Efficiency Act requirements.

When building a smart management center you can use these facilities in a dispatch system where you can monitor, control and interfere with the functioning of all systems (heating, cooling, air conditioning, ventilation, water, electricity, etc.) of all buildings in the city, optimizing the energy efficiency. Data is collected via remote **BMS automation type systems** that are capable of taking over routine tasks in the form of commands that can generate significant savings.

By centralizing all the data, all the assessments, reports, analyzes and cost summaries, they are available for authorized users at any time and in any place in the world. Moreover, consumption, energy costs and specific performance indicators can be monitored automatically and problems can be immediately reported.

The systems of Smart City include: Smart street lighting, Smart dispatcher systems for energy generation Smart distribution systems, Energy Smart buildings, Smart homes, Smart traffic, Smart transport, Smart Water Supply, Smart health System, Smart educational systems, other systems.





# **Smart City project implemented**

# **Smart City Cluj-Napoca**

# Efficiency and optimization of thermal energy consumption from the public buildings of Cluj-Napoca



#### **Details of implemented project**

This year, the implementation works of thermal management and energy management solutions for efficiency and optimization were completed in 73 buildings (universities, high schools, gyms, dormitories, kindergartens, apartment blocks), which have their own thermal plants..

Through this project, centralized energy **monitoring-control and management is achieved, from a single dispatcher** (data center energy) **of over 200 gas-fired thermal plants and related heating installations** 

The energy management is done with the help of WEBENCON certified ISO 50001.

The **energy dispatcher** is located at the headquarters of the Cluj-Napoca Autonomous District Heating Authority, which is the user of the system and which aims to expand the project to all public buildings in the city.



# **Smart City Cluj-Napoca**

### Eficientizarea și Optimizarea consumurilor de energie termică din clădirile publice ale orașului Cluj-Napoca

#### Rezultatele Eficientizarii Energiei 10 obiective – Cluj Napoca create comfort. control energy.

OBIECTIVE	Consum gaz mc – inaite de implementare	Consum gaz mc – dupa implementare	Economii gaz mc – realizate pe 4 luni de referinta
UNITATI DE INVATAMANT PREUNIVERSITAR	ianuarie	ianuarie	lanuaria
Colegiul Tehnic Napoca	aprilie	aprilie	aprilie
Liceul cu program sportiv	93 533	77.413	48,400
Colegiul Tehnic Raluca Ripan	52.461	49 758	2 703
Colegiul Tehnic de Transporturi	80 302	64 373	15.020
Colegiul Tehnic "Anghel Saligny,,	115 168	102.766	12 402
Colegiul Al. Borza	47 285	102.766	3 735
Liceul Informatica	59.316	43.550	950
Colegiul Energetic	83 964	79.999	3.965
Gradinita "Mamaruta,	124 471	103,449	21.022
Liceul Arte Vizuale "Romulus Ladea"	12.983	10.178	2.805
	26.938	23.826	3.112
Sursa: Regia Autonama de Termoficare – Cluj Napoca	696.421	615.578	80.843

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#### **Results after implementation**

Considering the distribution of energy consumption in non-residential buildings (source: National Institute of Statistics), the project for the efficiency of thermal energy in public buildings of the city of Cluj Napoca achieved its goal of reducing gas consumption and substantial reductions in administrative expenses, of service and maintenance expenses in the area of buildings with the highest consumption.

The first results made public by the user of the management system for energy efficiency and optimization, the Cluj Napoca Autonomous District Heating Authority, have as a reference 10 objectives from the preuniversity education network that include schools, sports halls and the related dormitories.

Considering that the service and maintenance are 80% ensured by online monitoring and control from a dispatch center by a single operator/8 hours, and in the field for possible interventions by a single team of technicians, for all 73 of public buildings, we can estimate the reduction of general administration expenses by 1.2-1.3 million Euro/year. The reduction in gas consumption generates proportional savings in electrical energy, requiring a shorter operation of the pumps for the circulation of the thermal agent and ACM, reducing usage and increasing their operating period, etc.



### The benefits of applying SMART solutions



Performs continuous improvement of energy performance requirements to achieve ISO 50001 standad by implementing certificated software.



Studies have shown saving in energy costs and administration from 15% to 30%.



Viewing the actual situation of energy consumption determins a proper energy policy, planning and continuous improvement.



Detecting and understanding vulnerabilities.



A complete database for cost centers.



Check of investment performance.



Energy conservation and reducing CO<sub>2</sub> emissions.

### **CHARGING STATIONS**



# **E-Mobility – charging stations**



There are mobility solutions for public transport and charging stations for public transport, cars, bicycles, and mopeds in public and private sectors.

The grid design and location of the charging stations represents a critical factor in increasing the implementation of these technologies.

To create the suitable use of electrical power requires a realistic sizing for the development of transport, charging stations positioning to ensure correct loading of the power distribution network.

#### **Public Mobility Solutions:**

- electric charging stations in high potential tourism areas; it must provide charging for both bicycles and electric mopeds and electric car
- public transport using small buses and fast charging systems
- the grid design to cover the charging load can be difficult once the interest is in a tourist area, landscaped.



All these solutions depend on the power supply and their location.

Using a storage energy system from renewable sources covers consumption peaks when supplying Fast Charge stations, as it is a stable solution with a long life, not affected by the number of cycles of charge and discharge despite a conventional system.

Also, this solution is already implemented in other locations in Europe.

### **SMART LIGHTING**



# **Smart LED lighting solutions**

### SMART outdoor lighting

The modern light fittings are high performance in terms of energy, using a much longer lifetime LED technology (around 50.000 operating hours) than traditional lighting lamps, thereby reducing the number of replacements of lamps and costs. There are two types of outdoor luminaires with LED

technology: type 1 - **street luminaires** and type 2 - **pedestrian luminaires**. Their power is established after making lighting calculations for each profile type.

LED luminaires are equipped with wireless communication components and electronic ballasts that allow their programming to operate on different power levels, on different levels schedules, their power being chosen after the lighting calculations.

A SMART lighting system is designed to work in a dimming mode so after 12:00 (00:00) it reduces the brightness by 50% for a period of 6 hours (0:00 to 6:00), thus ensuring maximum efficiency for periods of reduced activity during the night, reducing consumption and overall costs by over 30% just in this application.





### **SMART** interior lighting

The SMART interior lighting is monitored and controlled by a dispatcher regarding the program and the events taking place in the building.

Looking at the architecture and type of building the software can be optimized through a special function so that the interior lighting matches ISO 50001.





# IT Solutions Security Systems



**Designing and implementing IT networks**: Design and implementation of LAN infrastructures and data networks. Effective realization of structured cabling, testing and certification.



**Security systems:** Design and implementation of video surveillance systems based on analog systems or IP technologies, burglary systems.



**Communications and Call Center**: We offer modern and advanced communications systems and call center solutions for small and medium business through Avaya platform.



**Personnel management systems**: We provide and install Personnel management systems, record keeping, based on magnetic cards, proximity cards or biometric



**Parking and Access Control Systems**: We provide and install access control systems for parking barriers or institutions, pay the cashier or automatic payment.



**Thin Client Systems**: We create and implement IT solutions, virtual servers, hosting, provide IT equipment, solutions-based equipment, Thin Client hardware.



Access Control Systems for Spa: We create and implement solutions to access the spa or fitness centers with loading virtual money access or services, cabinet management and consumption management.



# We offer european funds consulting services

#### We offer consulting services

- Consultancy for grant applications preparation
- Feasibility studies
- Technical execution projects
- Project management services





# **Implemented projects**

Currently we have projects implemented in the area of the counties

- Arad
- Satul Mare
- Cluj
- Sălaj
- Timiş
- Alba







## **Implemented** projects

Since 2010, our company has permanently participated over these years in the commissioning of several projects, accumulating know-how for different phases of the realization of photovoltaic systems, both with ground and roof mounting, collaborating with companies such as Dedralex Solar Energy, Kesz and General Meel Electric as follows:

### **Projects implemented before 2020**

2.5 MW Photovoltaic park at Sfantu Gheorghe, in partnership with DSE - 2016
600 KW Photovoltaic park at Oşorhei, in partnership with GME - 2016
5.5 MW Photovoltaic park at Braila/Maxineni, in partnership with DSE - 2015
1 MW Photovoltaic park at Turnu Magurele, in partnership with DSE - 2017
9 MW Photovoltaic park at Ploiesti-Lukoi, in partnership with DSE - 2015



### **IMPLEMENTED PROJECTS**



### 105 kWp Photovoltaic system și Energy Storage System 100 kWh

Location: Salonta Municipal Hospital, in partnership with Kesz



### **Project details**

- 105 kWp Photovoltaic system
- LED Lighting with Zhaga standard
- LED Lighting with DALI driver
- Automatic water tap for hospitale use
- 100 kWh Energy Storage System
- Electric boiler with automation 1000l

**105 kWp Photovoltaic system și Energy Storage System 100 kWh** Location: Beiuș Municipal Hospital, in partnership with Kesz



### **Project details**

- 105 kWp Photovoltaic System
- 100 kWh Energy Storage System
- LED Lighting with Zhaga standard



#### 63 kWp Photovoltaic system

Location: UAMS Popești



#### **Project details**

- 63 kWp Photovoltaic system
- Electric boiler with automation 2000 I 2pcs
- 21 kW Samsung Heat pump 4 pcs

#### 67 kWp Photovoltaic system

Location: Business Center of Renewable Energies, Osorhei



### **Project details**

- 67 kWp Photovoltaic system
- 5kW Vertical axis wind turbine
- 3kW Horizontal axis wind turbine



### 33 kWp Photovoltaic system

Location: Chișineu Criș sewage treatment plant



### **Project details**

- 33 kWp Photovoltaic system

### 5 kWp Photovoltaic system

**Location: Budureasa** 



### **Project details**

- 5 kWp Photovoltaic system

#### General information about Solar Eco Systems

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- > J05/1617/2010
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