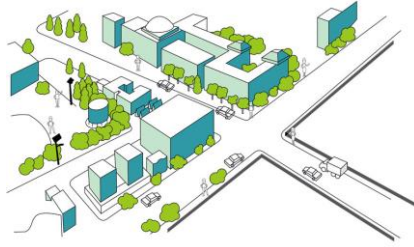


### Client Profile



The University Politehnica of Bucharest (UPB) is the largest and the oldest technical university in the country, founded in 1818. It is among the most prestigious universities in Romania with over 25,000 students served by 1,400 academics and 1,300 administrative staff.



### Project Background

UPB already had on-site power generation interconnected with the local distribution company in Bucharest (ENEL). UPB sought an opportunity to improve the operational efficiency of its internal energy infrastructure by deploying:

- ▶ Smart Campus power distribution
- ▶ Smart Grid and MicroGrid
- ▶ Smart Lighting
- ▶ Advanced SCADA system and network for energy controls and substation management
- ▶ Solar/EV technologies deployed throughout the campus
- ▶ Smart Building technologies throughout the campus
- ▶ Smart Transportation including parking and vehicular traffic signaling

Actionable Strategies was engaged to assess the feasibility of these technologies. Our selection was based upon past project experience in Europe including other work in Romania in addition to our technical qualifications with Smart Campus technologies.

### Potential Benefits

Benefits of the project were broad in scope and significant. Specific targets included:

- ◆ Increased energy efficiency
- ◆ Integration of renewable and distributed energy resources

- ◆ Electric transportation
- ◆ New customer-focused energy business models.

### Smart Technologies

Smart Grid and intelligent building technologies for UPB included:

- ▶ Distributed Generation assets
- ▶ Energy Storage
- ▶ Building Energy Efficiency Measures
- ▶ Energy Distribution System Monitoring and Control Systems
- ▶ Public Lighting Technologies
- ▶ Electric Vehicles

The technologies were defined for the optimum configuration and operation of these assets to minimize energy costs to UPB, and develop the scope for an implementation phase of the project.



### Project Approach

Actionable Strategies followed a structured project approach. The key elements of the project involved the following activities.

- ▶ **Stakeholder Workshops:** Facilitated session to ensure strategic alignment of the project to stakeholder expectations
- ▶ **Field Analysis:** Investigation of field conditions and analysis of existing systems: distribution network architecture and characteristics, substation types and design,

existing enterprise IT systems, existing telecommunication infrastructure

▶ **Customer Requirement Analysis:** Analysis of business objectives, work and process flows, organizational structure requirements and providing the customer a basis for educated decisions, carrying the customer to a higher knowledge level

▶ **State of the Art Analysis:** Modern technology assessment, independent from vendors; evaluation of solution approaches; and vendor assessment

▶ **Financial Analysis** of the proposed project including:

- ▶ Cash flow
- ▶ CapEx
- ▶ OpEx
- ▶ Long and short term modelling

▶ **Project Financing** strategy, including:

- ▶ Government of Romania
- ▶ Ministry of Education
- ▶ Export Import Bank of USA
- ▶ EBRD
- ▶ EU structural funds

▶ **Smart Campus Roadmap:** Long-term strategic roadmap included a portfolio of pilots, projects and major initiatives

▶ **Conceptual Design:** Design alternatives considering state of the art, field analysis findings and customer requirements, evaluation of design alternatives



## Results

The project was successfully completed and resulted in funding for UPB to continue with the design and development of a Smart Campus. The next stage of funding provided for a detailed feasibility study of the following areas:

- ▶ Expanding generation capacity
- ▶ Implementing tri-generation approaches
- ▶ Diversifying energy supply resources
- ▶ Adding thermal and electric power storage systems
- ▶ Maximizing the use of Smart Building technologies



Funding was provided for an energy audit baseline assessment, environmental analysis, a preliminary design of the smart micro grid and assessment of the economic, financial and development impacts.

The project will utilize numerous green and advanced technologies including:

- ▶ Gas engines
- ▶ Energy efficient lighting
- ▶ Distribution management technology
- ▶ Outage management system
- ▶ Advanced metering infrastructure
- ▶ Rooftop photovoltaic systems
- ▶ Thermal and battery storage systems