



PRODUCTS &  
SOLUTIONS FOR  
ENERGY EFFICIENCY  
AND INTELLIGENT  
CONSUMPTION



S U M M A R Y

Milestones	3
About Adrem Link	4
Industries	5
Services & Solutions	9
Projects	45
Vision, Mission, Values	49
ABBC HOLDING	50





# MILESTONES

3

1992



Adrem Invest is founded by Adrian Bodea, after identifying the need for innovative technologies in the Romanian industry.

1993



Corneliu Bodea joins Adrem Invest.

2013



The ABBC Group Holding is created, having Adrian Bodea and Corneliu Bodea as shareholders. The holding includes over 15 global coverage companies, operating in the energy and industry field.

2014



The previous divisions of Adrem Invest become self-standing companies: the Process Engineering Division becomes Adrem Industries; the Integrated Services Division retains the name Adrem Invest; the SCADA & Automation Division becomes Adrem Automation and the Green Energies Division becomes Adrem Green Power.

2016



The Adrem Companies, operating in the energy field, reposition themselves on the market, as follows: Adrem Automation becomes Adrem Engineering; Adrem Invest retains the name of the oldest company in the ABBC Group; A new company is established - Adrem Link, which joins the other Adrem Companies operating in the energy field.

# ABOUT ADREM

4

THE ADREM GROUP COMPRISES 3 COMPANIES SPECIALIZED IN PRODUCTS, SOLUTIONS AND SERVICES DEDICATED TO THE ENERGY FIELD. ITS PORTFOLIO IS STRUCTURED INTO 3 BUSINESS LINES:



the most recent company in the Group, established in May 2016, promotes solutions for energy efficiency, visibility & information, operational optimisation and automation & control, dedicated to energy intensive users but also to the residential sector.



(former Adrem Automation) develops and implements comprehensive energy infrastructure solutions, from complex general contracting to in-house equipment developing, aiming at increasing the safety of the energy infrastructure.



provides services for utility networks, such as meter reading, management of electricity meter groups, electric infrastructure maintenance and power distribution network operation, being centred on safe operation of utility networks and client satisfaction.

## ADREM LINK



THE NEWEST COMPANY OF THE GROUP - ADREM LINK - ADDRESSES BOTH ENERGY-INTENSIVE USERS, SUCH AS MUNICIPALITIES, INDUSTRIAL AND RETAIL CONSUMERS, AS WELL AS CONSUMERS IN THE RESIDENTIAL SECTOR AND SMALL-SIZED OFFICE BUILDINGS. THE COMPANY IS STRATEGICALLY FOCUSED ON THE INTERNET OF THINGS, CLOUD ARCHITECTURES AND "AS A SERVICE" MODELS, AND IT AIMS TO BECOME AN OPINION LEADER IN NEW TECHNOLOGY ASSIMILATION IN ROMANIA AND TO ENSURE EFFICIENT ENERGY CONSUMPTION FOR ITS CLIENTS, THROUGH OPTIMIZED OPERATIONS AND PROCESS VISIBILITY.





# INDUSTRIES



EACH FIELD OF ACTIVITY IS UNIQUE THROUGH THE CHALLENGES IT GENERATES. ADREM LINK UNDERSTANDS ITS CLIENTS' NEEDS AND PROPOSES PERSONALIZED SOLUTIONS FOR EACH INDUSTRY:

# INDUSTRIES

6

## ELECTRICITY

With the new regulations and the liberalization of the electricity market, it is becoming essential for electricity providers to be able to predict in a timely and correct manner the total consumption, but also the second day consumption. This is important first of all for own consumption management but it is also important as it provides relevant information for its consumers. This is why Adrem Link is offering providers an integrated energy management solution. Within our energy efficiency portfolio we have developed a real-time consumption monitoring solution – EnergyCast.

## OIL & GAS

The size and number of the fuel distribution stations are constantly growing, therefore managing consumption and observing new European standards in terms of energy efficiency can be challenging. The package of services provided by Adrem Link responds to these needs and includes an Integrated Energy Management System, Energy Audit and Energy Manager services. At the same time, fuel distribution is provided continuously and the gas station network must be adapted to respond as efficiently as possible to customer needs. We also provide smart lighting systems for transforming every customer visit in a pleasant experience and for increasing consumption efficiency.

## LOCAL ADMINISTRATION

Our smart energy efficiency solutions for municipalities have a twofold purpose: to sustain community development and to increase safety and comfort for inhabitants. We created a special platform for energy management – Energy HUB, which allows both monitoring and optimizing local consumption, while ensuring sustainable growth for the municipalities by interactive involvement of the population in using energy resources. The Smart Public Lighting Solutions or the Building Management System can be easily integrated into the municipal energy platform.

## RETAIL

In the context of a consumption based economy, each buying experience should become remarkable. Consequently, we have developed a series of solutions, as part of the energy efficiency portfolio, dedicated to the retail sector which contributes increasing comfort in commercial spaces and optimizing consumption. By implementing the Integrated Energy Management System, a smart lighting solution or a Building Management system we are not just boosting efficiency, we are creating suited ambiances.



# INDUSTRIES

7

## BUILDING MATERIALS

In the building materials industry energy related costs are amongst the highest. Therefore, Adrem Link's solution package could be the optimal investment in the long run, as it is designed to focus on energy efficiency. The Energy Management range of solutions (the Energy Audit services and Energy Manager services, and the EnergyCast platform) help to collect accurate information about consumption per product unit and to reduce costs, by optimizing energy consumption. In addition, the additional lighting solutions, BMS solutions and photovoltaic systems complete the range of solutions for energy efficiency.

## CHEMICAL, PHARMACEUTICAL AND COSMETICS INDUSTRY

Adrem Link's solutions for the Chemical, Pharmaceutical and Cosmetics industry enable control, automation, monitoring and displaying of processes and of energy consumption in great detail, which makes it easy to follow and manage the entire process. We provide a series of Energy Management solutions which contain Energy Audit and Energy Manager services and the EnergyCast platform. Adrem Link's portfolio includes design, configuration and installation of SCADA & Plant Information Systems, lighting solutions and photovoltaic systems.

## MACHINERY, TOOLS AND EQUIPMENT MANUFACTURING

The machinery, tools and equipment manufacturing industry is one of the most important industrial branches in the European Union, which has immense growth potential in Romania. By observing these estimates and the general market trend, Adrem Link provides services and solutions for achieving high energy efficiency, based on its expertise as an integrator in the field of energy optimization. Adrem Link offer a package which includes monitoring, management and optimization of existing processes: Energy Audit and Energy Manager services, the EnergyCast platform, SCADA & Plant Information System solutions, lighting solutions and photovoltaic systems, electrical vehicle charging stations and BMS solutions.

## LOGISTIC CENTERS

Logistic centers are also large energy consumers. Monitoring energy consumption per operational center is the optimal solution and a necessary first step in reducing energy consumption related costs.

The Adrem Link series of solutions for monitoring and optimizing consumption includes: the Energy Audit services and Energy Manager services, and the EnergyCast platform. The facilities provided by the logistic centers to clients are a key differentiator, and Adrem Link proposes a variety of Electrical Vehicle Charging Stations integrated in smart management platforms. Lighting solutions, BMS solutions and photovoltaic systems are also included in the range of services aimed at energy efficiency.

# INDUSTRIES

8

## REAL ESTATE

The current management of real estate of any kind has a major impact on resource preservation in the long run. Adrem Link's solutions contribute to fulfilling the requirements in terms of energy efficiency, and also to optimizing consumption. The integrated system of energy management (consumer metering, prognosis and consumption analysis, the Energy Audit services and Energy Manager services) enable real-time monitoring of consumption per area. Together with the photovoltaic systems, it helps to increase consumption efficiency and to reduce energy related costs. We can transform buildings into smart spaces, through the Building Management System solution which allows punctual control of all pieces of equipment. Comfort will increase with the implementation of an Adrem Link lighting solution. We also provide Electrical Vehicle Charging Stations.

## FOOD PRODUCTION

Food production companies must observe a series of complex requirements and regulations. In order to get a clear understanding of these challenges, we offer a full range of solutions to boost the visibility of energy processes in the production area. This visibility is supported by our integrated Energy Management platform (which features Energy Audit and Energy Manager services, as well as the EnergyCast platform), which contributes to decreasing operating costs by monitoring critical elements in the production process and by increasing the efficiency by monitoring and managing key performance indicators (KPIs) for these products. For total intuitive control of the production units, we also implement SCADA & Plant Information System solutions. We also deliver BMS solutions, Photovoltaic systems and Lighting solutions.

## METALLURGY AND IRONWORKS

Similar to the machinery, tools and equipment manufacturing industry, in the case of the metallurgy and ironworks industry energy consumption represents a significant percentage of the overall costs. Moreover, branches of the industry with consumptions exceeding 1000 toe/year are under the legal obligation to increase energy efficiency. Consequently, the Energy Management solutions package (the Energy Audit and Energy Manager services, the EnergyCast platform) meets the requirements of the European Directives and contributes to optimizing consumption and reducing energy costs. Adrem Link's portfolio also includes comprehensive SCADA & Plant Information System solutions for process automation and control, as well as industrial lighting solutions and photovoltaic systems.





# SERVICES & SOLUTIONS

ENERGY MANAGEMENT  
SOLUTIONS



### ENERGY AUDIT



Adrem Link helps meet the national standards concerning energy efficiency, transposed by Law 121/2014, providing energy audit services for companies falling under the scope of this legislation, but also for companies concerned with energy savings.

According to these regulations, commercial companies with a consumption exceeding 1000 toe (tones of oil equivalent) are under the following obligations:

- to undergo an energy audit every 4 years, which must be conducted by an entity authorized by ANRE
- to put together programs for the improvement of energy efficiency
- to appoint an energy manager (internal or external contractor) certified by ANRE

Our company is an authorized Class II complex energy auditor in compliance with Order 38/2013 by the National Energy Regulator. In addition, the 6 energy auditors authorized by ANRE to conduct thermal and electrical energy balances attest to our technical competence in delivering this service.

The energy audit is a natural component in our company's portfolio, considering our constant concern for energy efficiency and energy performance.

Through the proposed packages of measures, we ensure very good results in terms of energy saving and rapid return on investment.



# ENERGY MANAGEMENT SOLUTIONS

## ENERGY AUDIT

### INTEGRATED SERVICES IN COMPLEX ENERGY AUDIT:

- Defining the analyzed contour for the drafting of the complex energy audit
- Collecting and analyzing consumption data both from an electrical and from a thermal point of view
- Conducting qualitative and quantitative energy metering
- Carrying out the real energy balance
- Identifying optimization solutions
- Conducting the optimized energy balance
- Presenting the financial performance indicators used for the economic assessment of the proposed energy efficiency measures
- Conducting the economic analysis of the energy efficiency measures
- Determining the environmental impact of the proposed energy efficiency measures
- Creating a hierarchy, prioritizing and presenting the implementation plan of the proposed energy efficiency measures

### BENEFITS OF CONDUCTING THE ENERGY AUDIT

- Determining the energy strategy
- Generating savings, including recovering the investments carried out for this purpose
- Understanding technological and energetic processes
- Directing investments towards key priorities and, implicitly, cash flow management
- Modernizing the facilities for the purpose of optimizing equipment operation
- Optimizing costs per product unit
- Improving energy quality
- Increasing safety in operation
- Taking the first step in implementing standard ISO 50001

Reference: United Romanian Breweries Bereprod (URBB), ANCHOR Group – Anchor Office & Bucharest Mall & Plaza Mall, AVICOLA Focsani

# ENERGY MANAGEMENT SOLUTIONS

## ENERGY AUDIT

### ENERGY AUDIT FOR BUILDINGS

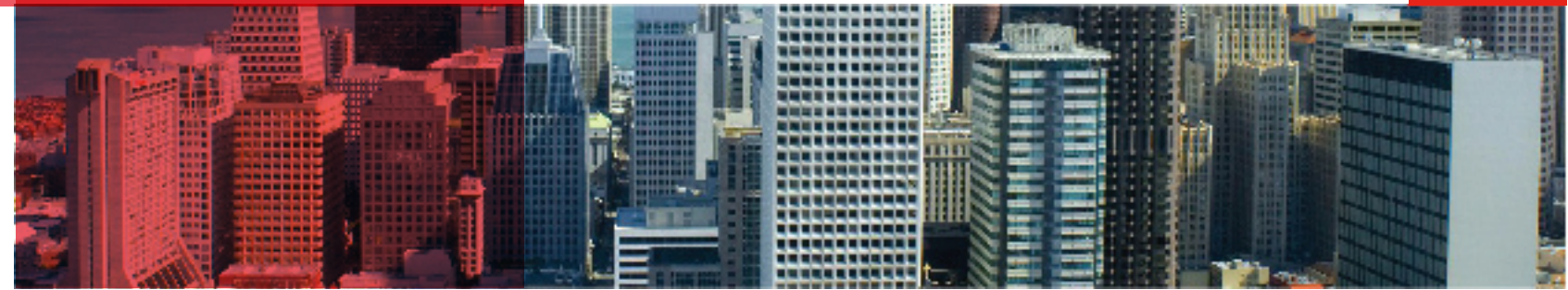
Adrem Link's energy audit for buildings services are a response to the legal requirements and European standards in this area, such as Law 372/2005 which is meant to increase awareness regarding energy efficiency and improving the energy performance of buildings. The main objective of these services is to determine the most feasible solutions to increase energy efficiency, including energy performance certification for buildings.

#### INTEGRATED SERVICES IN ENERGY AUDIT FOR BUILDINGS:

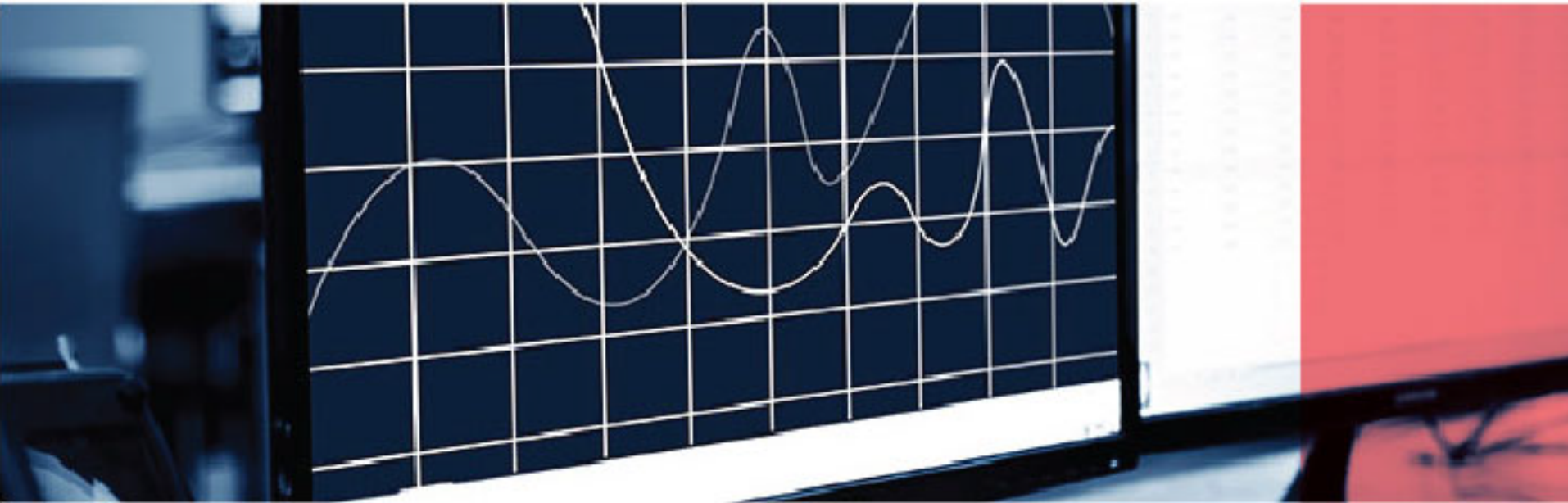
- Recording and analyzing consumption based on the building's operating history
- Conducting qualitative and quantitative energy measurements
- Examining the condition of the building, by analyzing both the geometric and the thermal characteristics
- Outlining modernization solutions
- Conducting an economic analysis of the required investments
- Proposing an action plan
- Energy performance certification and classification into performance classes

#### BENEFITS OF CONDUCTING THE ENERGY AUDIT:

- Reducing energy consumption costs
- Adopting the most suited solutions to increase energy performance and comfort
- Eliminating the low voltage distribution tariff
- Reducing building taxes with the reduction of the ecological footprint







### INTEGRATED ENERGY MANAGEMENT SYSTEM -ENERGYCAST-



Knowledge is fundamental for evolution. Energy efficiency – a much debated and sought after concept - can be arrived at only by knowing and understanding consumption. The Energy Management System provided by Adrem Link is the right tool for this first step towards energy efficiency. The solution integrates the EnergyCAST software platform, as well as equipment and services dedicated to implementing the system.

Aside from this major advantage, EnergyCAST is also required for the following purposes:

- Meeting the requirements stipulated in Law 121/2014 on energy efficiency. For economic operators, excluding SMEs, the law provides for a compulsory energy audit every 4 years with the proposal of measures to reduce consumption. The EnergyCAST tool is necessary for this audit, since it provides accurate consumption data.
- Implementing the ISO 50001 energy management standard. This standard contains specific technical aspects, such as continuous recording of energy data and conducting analysis to identify and assess operational energy consumption. EnergyCAST helps obtain this data.

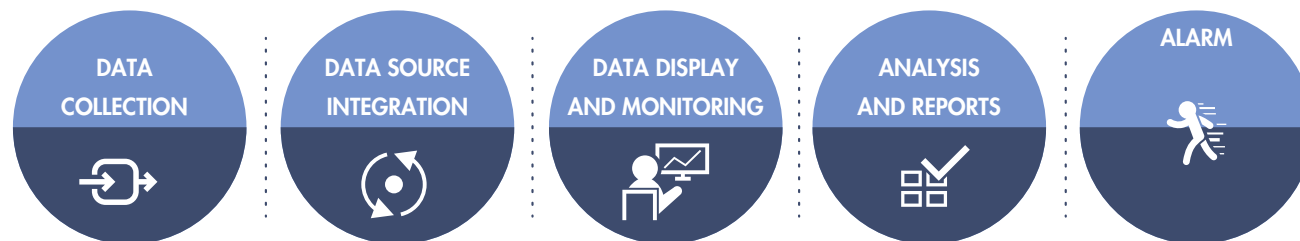
The core of the Integrated Energy Management System is the EnergyCAST software platform. It provides essential data necessary to take decisions for the purpose of optimizing utility consumption (electricity, thermal energy, natural gas, steam, etc.) which the beneficiary wants to measure. The information relies on measuring consumption and collecting, centralizing and analyzing data.

# ENERGY MANAGEMENT SOLUTIONS

## INTEGRATED ENERGY MANAGEMENT SYSTEM -ENERGYCAST-

14

### BASIC FUNCTIONALITIES OF ENERGYCAST



An important functionality of the EnergyCAST application is the possibility of collecting a large volume of data, such as:

- Measurements collected automatically from system equipment
- Measurements read and introduced manually in the application by field operators
- Data from the production process, collected automatically or imported
- Data collected from self-standing systems owned by the beneficiary - tariffs, lease contract details, sales prognosis, production prognosis, etc.
- Data from the management and control software platforms

The possibility of integrating various data sources on a single platform is one major advantage of this application. Here are some of the data sources it can integrate:

- Field metering equipment through standard communication protocols (Modbus TCP/RTU, M-Bus, DLMS, etc.)
- Data concentrators through an FTP connection to their internal memory
- Management and control platforms, such as SCADA, through OPC servers
- Self-standing systems, such as ERP CRM, BMS through database import - MS SQL Server, Oracle, MySQL, XML data sources, WEB services, Mail Servers, Excel files, CSV files, FTP data sources
- Systems from all lucrative facilities - national and international

## ENERGY MANAGEMENT SOLUTIONS

# INTEGRATED ENERGY MANAGEMENT SYSTEM -ENERGYCAST-

15



The data collected can be displayed in real-time, thus allowing monitoring and immediate decision-making. The data that can be viewed in real-time includes:

- Measurements
- Statuses
- Evolutions
- Notifications
- Alarms
- Event history
- Indicator calculations

The calculations and smart analyses carried out by the EnergyCAST application, as well as the reports it runs, bring additional benefits to the Energy Management System:

- Running reports and creating consumption and efficiency graphs
- Report export
- Allocating energy consumption and cost calculation per process, per production stage, per product unit, per area or per production center
- Allocating costs and automating invoicing per production unit, rented spaces, etc.
- Creating virtual values based on previously recorded data, to be used as reference in complex analyses and calculations
- Calculating the time of use of the equipment, in order to plan maintenance interventions and to ensure process continuity
- Creating prognoses concerning utilities consumption based on previous data, correlated with data specific to the activity of the company and integrating alarm thresholds in case the estimated consumption is exceeded
- Carrying out analyses and isolating the source of energy quality issues (EN50160)

The platform included an advanced alarm module, with the following functions:

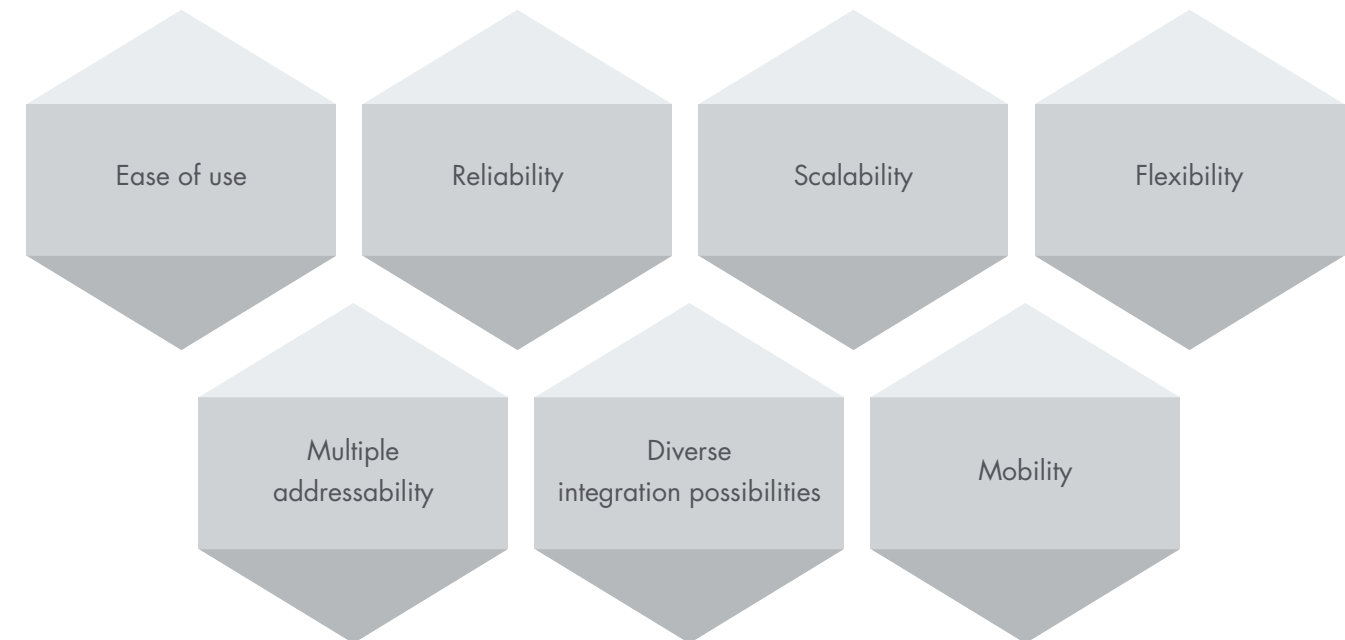
- Establishing alarm thresholds concerning the qualitative and quantitative energy consumption
- Alarm monitoring
- Automatic notification control
- Discrepancy detection and alarm triggering
- Submitting alarm notifications via email and/or text message



The EnergyCAST integrated energy management system provides a range of direct and indirect benefits for its users:

- Reduction of utility spending by exact knowledge of consumption, identification of losses and issues
- Identification of opportunities for the optimization of energy consumption through comparative smart analyses
- Calculation and reduction of the carbon footprint by diminishing consumption obtained following the implementation of the efficiency increase measures
- Understanding of the consumption per process and per production step
- Understanding of consumption per areas
- Allocation of energy costs per end product unit
- Allocation of energy costs per activity, tenants or area unit
- Calculation and analysis of performance indicators
- Elimination of penalties for non-compliance with the contracted energy consumption, thanks to the possibility of carrying out exact prognosis or process interventions when the threshold alarms are set off
- Extension of the lifetime of the equipment operating based on monitored energy

### ENERGYCAST FEATURES WHICH MAKE IT COMMENDABLE





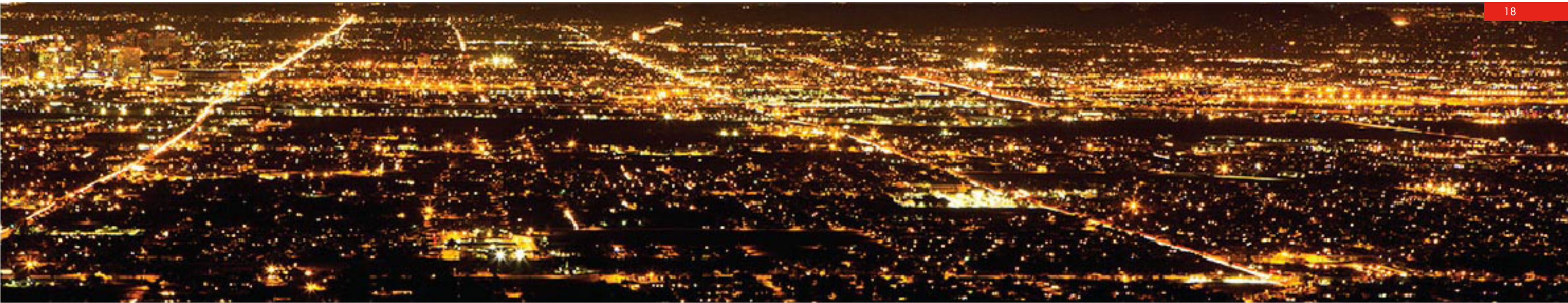
The equipment is an important component of the Integrated Energy Management System developed by Adrem Link. We provide our clients with the equipment required to operate the system at the highest standards:

- Metering equipment and data concentrators:
  - o electricity meters
  - o heating meters
  - o gas meters
  - o water meters
  - o optical character recognition equipment
  - o data converters
  - o pressure sensors
- IT and communication infrastructure equipment
- Data viewing equipment
- Assembly accessories

The process of developing the EnergyCAST Integrated Energy Management System is a cyclic one and it involves the following steps to be carried out by our team:

- Process analysis and analysis of the beneficiary's business model
- Determining metering points
- Designing the Energy Management System
- Implementing and operating the system
- Analyzing the results of the monitoring and identifying the energy saving opportunities
- Recommending measures to increase consumption efficiency
- Developing customized functions
- Assessing results
- Analyzing the situation and recommending new measures to increase efficiency





## ENERGY MANAGEMENT IN SMART CITIES -ENERGY HUB-



A smart city is an urban center providing a high standard of living for its inhabitants through optimal resource management. The biggest challenge in this effort is energy management, due to the complexity of the energy systems and the vital role they play. Here at Adrem Link, we develop energy efficiency solutions dedicated to urban centers to help transform them into smart cities.





We support the vision of integrated services. That is why we provide a comprehensive solution: Energy Management for Smart Cities, structured in two directions:

- a smart platform which meters and automates the entire urban energy consumption
- an interface module between the municipality and the regulating authorities in the energy field and between the municipality and the inhabitants

### FUNCTIONALITIES OF THE ENERGY HUB PLATFORM

Data centralization allows data analysis and submission of relevant information to the representatives of cities. The functionalities of the platform are:

- Consumption data collection from all services and public institutions in a single system
- Providing an overall image on consumption for the purpose of concluding integrated energy provision contract
- Data viewing on a single interface
- Data analysis and prognosis capacity
- Fast generation of customized reports and the possibility of programming report generation
- Alarms and alerts
- Accessing information through a web interface
- Managing multiple users and access levels
- Monitoring consumption and providing information to optimize the amount of energy indicated in the contract
- Monitoring and calculating energy performance

### COMPONENTS OF THE ENERGY MANAGEMENT FOR SMART CITIES SOLUTION

#### DATA MANAGEMENT PLATFORM

The first component of the system, the Energy Management for Smart Cities platform, manages energy consumption data. Through information collected from a series of services and providers, it counts:

- The energy consumption of buildings owned by the municipality (electricity, water, gas, heating), such as schools or hospitals
- Energy balance for public transport
- Energy consumption related to public lighting
- Urban energy production, both conventional and renewable
- Data from the energy distribution networks (local water distributor, local heating distribution operator, electricity providers)
- Data from the charging network for electrical vehicles
- Urban solutions for energy storage

#### A.N.R.E INTERFACE MODULE

The second component of the Energy Management for Smart Cities solution is the interface module which helps municipalities to communicate easier with the energy regulators, and with the inhabitants of the city.

With the passing of Law 121/2014, public local authorities must fill out the following documents and submit them to ANRE:

- The energy consumption statement
- Energy analysis questionnaire

We provide an intuitive easy-to-use interface to generate these predefined reports. The interface manages and validates this flow of documents.

The interface between the municipality and the inhabitants ensures transparency of the data and submission of relevant information to inhabitants and companies. The data is automatically collected from the platform. The information can be displayed on public displays or included in the news, debates or on social media networks for the purpose of raising awareness among citizens about the efforts made by municipalities to create energy efficiency in their community.

## ENERGY MANAGEMENT SOLUTIONS

# ENERGY MANAGEMENT IN SMART CITIES -ENERGY HUB-



### ADVANTAGES OF THE ENERGY MANAGEMENT IN SMART CITIES SOLUTION

The implementation of this solution developed by Adrem Link brings a series of major advantages both for the institution and for the community:

- Understanding energy consumption and reducing energy costs
- Better negotiating energy provisions contracts based on consumption graphs and detailed prognosis
- Improving reporting processes, through the interface and support function with ANRE
- Observing the compulsory legal framework in terms of energy efficiency
- Calculating and reducing the carbon footprint
- Positioning the municipality as a role model in terms of energy efficiency among other municipalities
- Permanent interaction with the citizens and involvement thereof in matters of energy efficiency

Aside from the central platform which carries out urban energy management, we also provide the services and equipment necessary to submit data to the platform in case there is no basis for metering and automation.

### EQUIPMENT:

- Metering equipment and data concentrators:
  - o electricity meters
  - o heating meters
  - o gas meters
  - o water meters
  - o optical character recognition equipment
  - o data converters
  - o pressure sensors
- IT and communication infrastructure equipment
- Data viewing equipment
- Assembly accessories

### SERVICES:

- Process and activity analysis
- Determining metering points
- Designing the Energy Management System
- Implementing and operating the system
- Analyzing the results of the monitoring and identifying the energy saving opportunities
- Recommending measures to increase consumption efficiency
- Developing customized functions and reports
- Assessing results
- Analyzing the situation and recommending new measures to increase efficiency



### ENERGY MANAGER SERVICES



Improving energy efficiency plays a central role in the national energy policy - a policy which is also promoted by Adrem Link. Law 121/2014 regulates the methods by which certain categories of consumers must observe this national objective.

# ENERGY MANAGEMENT SOLUTIONS

## ENERGY MANAGEMENT SERVICES

The categories of consumers defined by the law are:

- commercial companies with a consumption exceeding 1000 toe (tones of oil equivalent)
- local public administration authorities (localities with more than 20,000 inhabitants)
- commercial units with a fleet of over 25 vehicles

These consumers are under the following obligations:

- to put together programs to improve energy efficiency
- to appoint an energy manager (internal or external contractor) certified by ANRE
- to conduct an energy audit drafted by an ANRE-authorized institution every 4 years (compulsory only for consumptions exceeding 1000 toe)



# ENERGY MANAGEMENT SOLUTIONS

## ENERGY MANAGEMENT SERVICES

### CHARACTERISTICS OF ENERGY MANAGER SERVICE

Adrem Link helps meet the legal requirements through its Energy Manager Services, both for localities and for the industry, which include services such as:

- organizing, conducting and managing energy processes
- proposing the energy efficiency plan
- ensuring an interface between the institution and the National Energy Regulator (ANRE)

As an interface between your institution and ANRE, Adrem Link's energy managers provide the following services:

- They validate and manage the flow of documents for the purpose of reporting to ANRE
- They help fill out the Energy consumption statement and the Energy analysis questionnaire, which must be submitted yearly, until the 30th of April
- They develop and update the Program for the Improvement of Energy Efficiency and submit it to ANRE yearly, until the 30th of September

### BENEFITS

Aside from providing compliance with the legal obligations, the Energy Manager service provided by Adrem Link gives you a series of competitive advantages, such as:

- Improvement of energy efficiency and performance
  - Reduction of energy consumption
  - Optimal energy management
- Improvement of the organizational processes
  - Support and interface in relation to ANRE
  - Enhancement of the commitment to energy issues
- Improvement of technological processes
  - Increase of the energy efficiency of the plants
  - Increase of productivity on the production lines
- Environmental protection
  - Monitoring of pollutant emissions





### BUILDING MANAGEMENT SYSTEM (BMS)



Energy costs are constantly increasing, and 40% of the global energy consumption is generated by buildings. Adrem Link's smart building management solution is an integrated approach of the systems within the building, aimed at reducing consumption. In addition, we are adapting our Building Management System to each type of building, its destination and the profile of the occupants, providing comfort and safety at the same time.



# ENERGY MANAGEMENT SOLUTIONS

## BUILDING MANAGEMENT SYSTEM (BMS)

26

Through the benefits it provides both owners and residents, as well as the personnel in charge of equipment maintenance, the BMS solution is a compulsory requirement for buildings. Obtaining these benefits depends on the configuration of the solution, which is a service provided by Adrem Link to meet the highest standards.

### BENEFITS FOR THE OWNER

- It increases the value of the building
- It improves the administrative operations and reduces expenses related thereto
- It increases the lifetime of the equipment and reduces expenses related to maintenance and replacement thereof
- It provides the possibility of controlling the systems of the building, both from the dispatch and remotely
- It allows knowing the overall energy consumption and the consumption per occupant
- It reduces carbon emissions

### BENEFITS FOR OCCUPANTS

- It significantly reduces energy consumption and related costs
- It increases comfort and safety
- It increases staff productivity



# ENERGY MANAGEMENT SOLUTIONS

## BUILDING MANAGEMENT SYSTEM (BMS)

### BENEFITS FOR THE MAINTENANCE TEAM

- It improves the maintenance process through fast access to information concerning the status of the equipment and any potential failures that might occur
- It significantly reduces intervention time, in case of failure occurrence
- It enables efficient use of the personnel involved in the maintenance process

Whether it is a commercial center, a public institution, an office building, a residential building, a hotel or an industrial building, the BMS solution provides centralized control of all electrical and mechanical equipment in a building and in its immediate vicinity, using joint data infrastructure:

- HVAC and climatisation installations
- Lighting, shadowing and solar protection installations
- Electrical systems and installations
- Engine-generator groups
- Video surveillance, access control and intrusion detection systems
- Fire detection and fire fighting systems
- Utility metering systems - electricity, natural gas, water
- Audio-video systems
- Elevator systems

The BMS system allows a building to permanently respond to a change of conditions, as its main functions are control, monitoring, optimization and reporting.

### CONTROL

- Remote control of all parameters for all utility installations, using joint data infrastructure
- Automatic lighting control - automatic switch off with timer and with preset scenarios, depending on natural light intensity or preferences, timing of the lighting sources based on presence or in other scenarios
- Automatic control of the HVAC system - heat is turned on when desired or at a preset time, and it can be controlled based on presence and turned off when opening a window or in other scenarios
- Smart control of the lighting system, the audio-video system, the security and safety system, the electrical installations and of the other systems

### MONITORING

- Metering energy consumption per consumer group or individually
- Real time monitoring of the parameters, the loads, the operating curves or the temperature
- Triggering alarms in case of failures in the operation of monitored subsystems

### OPTIMIZATION

- Easy access to the technological system of the building through PDA, PC or touchscreen
- Effortless adjustment of the building functionalities depending on purpose of use - in case of reorganization or moving
- Possibility of extending the system by interfacing and easy configuration with various external services

### REPORTING

- Real time display of the operating parameters in an intuitive, easy-to-use management software
- Recording of the parameters in the system database at preset time intervals, with the possibility of creating reports both with the current data and with the data in the archive





# SERVICES & SOLUTIONS

SMART LIGHTING  
SOLUTIONS

Lighting is an essential component of a community and of an economy, as it reflects the level of development. Moreover, lighting makes up for 19% of the global electricity consumption, which makes it a major concern due to the spending it generates.

At Adrem Link we are constantly up to date with the regulations, strategies and trends in the energy field at global and national level, building solutions focused on energy efficiency. We propose comprehensive lighting solutions which integrate reliable and efficient equipment and technologies, smart software applications and a full service package.

THROUGH OUR SOLUTIONS WE COVER A GREAT VARIETY OF LIGHTING TYPES:





In terms of lighting solutions, we provide a full range of services and technologies:

- Indoor, outdoor or industrial luminaires
- Luminaires for traffic lights and traffic signs
- Luminaire support pillars
- Fluorescent tubes and compact economic light bulbs
- LEDs in power applications, which can be enclosed in overhead platforms, projectors, tubes or strips
- Cold cathode tubes
- Control equipment
- Assembly accessories
- Communication and IT infrastructure

Through our team of specialists and the field personnel, we provide comprehensive lighting services:

- Energy audit services
- Energy manager services
- Feasibility studies
- Technical and financial consultancy
- Design and engineering services
- Developing applications and software platforms for management and control
- Operational management and project management
- Commissioning services
- Maintenance services
- Modernization and expansion of the lighting networks



### PUBLIC LIGHTING



Being aware of the challenges faced by local public authorities in their efforts to observe the European and national legislation in this field, to reduce energy spending, but also to provide comfort and safety for the population, Adrem Link has developed a broad portfolio of lighting solutions dedicated to the public sector.

# SMART LIGHTING SOLUTIONS

## PUBLIC LIGHTING

An important role in this portfolio is played by Adrem Light, an integrated tele-management system for the lighting network. With its help, we are able to transform the lighting network into a smart infrastructure, through management, control and modernization of all luminaires.

### THE FUNCTIONS OF ADREM LIGHT:

- It controls all individual lighting sources in the network - switch on, switch off, change of light intensity
- It controls the luminous flow by maintaining a constant or necessary level, or by dynamically changing it depending on the changes in the area
- It monitors the entire lighting network, it identifies failures and failure places
- It allows installing surveillance systems throughout the lighting network
- It ensures a link between the ignition points and the distributions boxes through power lines or WiFi

### ADVANTAGES OF USING THE ADREM LIGHT SOLUTION:

- Budget savings
  - possibility of ESCO financing
  - savings of up to 35% through efficiency consumption management
  - operational costs reduced by up to 42% by increasing the efficiency of the repair and maintenance works, alongside preventive maintenance carried out based on system-generated reports
- Alignment with the EU requirements in terms of Energy Efficiency
  - reducing CO2 emissions and transforming the city in a greener space, by diminishing lighting and energy waste
- Comfort and safety for inhabitants
- Effortless investment, easy to implement



## ARCHITECTURAL LIGHTING



Thanks to its capacity to redefine the surrounding space, light is a differentiating factor. From this perspective, architectural lighting generates added value. Artesian fountains, public roads, parks, buildings and commercial centers can all be enhanced when using the appropriate lighting. Through our architectural lighting solutions, we can create ambiance, and at the same time, we provide safety and comfort.



# SMART LIGHTING SOLUTIONS

## ARCHITECTURAL LIGHTING

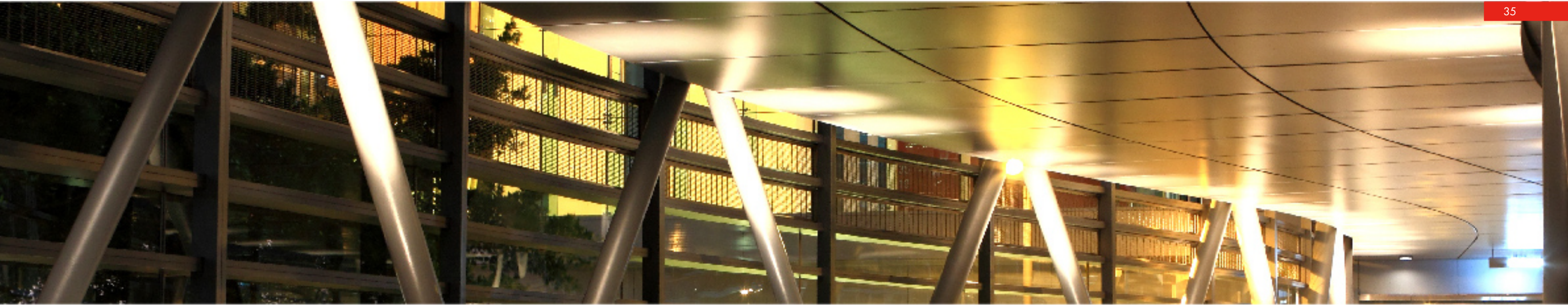
There are three fundamental aspects in terms of architectural lighting, which we acknowledge and abide by:

- Aesthetics. Through our architectural lighting projects, we transform buildings and spaces into stories, we create emotions, we conceal defects, we delight viewers
- Ergonomics. Our solutions are carefully designed to ensure the highest level functionality
- Energy efficiency. We dedicate special attention to consumption and we make sure there are no losses or inefficiencies through this type of lighting

In designing lighting solutions, we are both creative and pragmatic. We tell the story with no interruptions and with minimum consumption of resources.

In our solutions we integrate various equipment depending on the type of project, using everything from RGB LEDs or high power full-color LEDs, to spot lights or LED light bars. All lighting installations can be integrated, managed and controlled using dedicated software applications.





## INTERIOR LIGHTING FOR BUILDINGS



The purpose of Adrem Link's interior lighting solutions is to create an environment suited for activities carried out indoors, with optimum consumption of electricity.



# SMART LIGHTING SOLUTIONS

## INTERIOR LIGHTING FOR BUILDINGS

Our solutions are adapted to the destination of the building:

- Office buildings
- Residential buildings
- Malls and commercial spaces
- Entertainment areas
- Hotels
- Public institutions
- Education institutions
- Hospitals

We provide modern lighting control solutions for all these types of buildings through a dedicated configuration software. The result is a maximum capitalization of electricity through precise lighting control depending on the occupation rate, traffic and use of natural light.

The functionalities of the Adrem Link smart indoor lighting solutions:

- Lighting control, with predefined scenarios per area or per lighting group, depending on preferences and requirements
- Flexibility, with the access through wireless buttons, remote controls or mobile devices
- Adaptation based on the occupation rate, interruption or dimming of light in parts of the building that in use or transit. The analysis of the occupation rate is done using motion sensors
- Exploiting natural light. The level of artificial lighting is set depending on the intensity of the natural light, which is determined using light sensors
- Effortless integration with other building control systems, such as alarm & security systems, multimedia, HVAC, etc.

Our smart lighting control solutions for commercial spaces or building reduce installation and operation costs, increase energy efficiency and boost comfort and safety.







## INDUSTRIAL LIGHTING



Choosing the right lighting is essential, since it has a major influence on performance and on the efficiency of industry workers, but also on safety at work.

Lighting for industrial spaces is regulated under the standard for the design and execution of artificial lighting systems for buildings – NP 061-02, in order to ensure comfort in the production processes and avoidance of work accidents.

# SMART LIGHTING SOLUTIONS

## INDUSTRIAL LIGHTING

In designing the optimum industrial lighting solutions, our team considers several parameters, such as:

- The intensity of natural light
- The type of structure and the dimensions of the building
- The type of areas, the working plan or the neighboring areas
- The type of surfaces and the composition of the materials to determine the level of reflection of light
- Location of the machinery and production lines depending on area type (high or low risk)
- The operation of machinery and installations, including the level of spark triggering
- Vibration level
- Temperature

With wide applicability, especially for industrial lighting solutions, LED lights are one of the most modern and efficient lighting solutions with notable performances in terms of heat management, optics and use time.

Industrial lighting solutions with LED light are superior to traditional solutions and have a series of key advantages:

- Energy efficiency – they reduce up to 50% of the electricity consumption
- Control – LED light can be used with light and motion sensors for efficient electricity consumption management
- Reduced maintenance – industrial LED light lamps do not require maintenance
- Safety – they provide resilience and stability, safe operation, fire safety, noise protection

LED light systems can be used for the following purposes:

- Industrial buildings
- Production buildings
- Refrigerated storage buildings
- Storage spaces





# SERVICES & SOLUTIONS

PHOTOVOLTAIC SOLAR PANELS  
AND ENERGY STORAGE



## PHOTOVOLTAIC SOLAR PANELS AND ENERGY STORAGE

40



Environmental protection is one of our concerns, which is why our company's portfolio includes comprehensive solutions for photovoltaic energy production, energy storage and recovery and energy efficiency. Our solutions are designed for the industrial sector, the commercial and the public sector, as well as for small consumers. Through our technology partners, we cover various applications and we promote both traditional solutions as well as innovative technologies.

Our systems are designed for office buildings, commercial spaces, logistics centres, industrial production spaces, but also residential buildings, both collective and individual. In principle, any building has the potential of becoming a source of green energy. The energy thus obtained can be used for lighting, powering equipment inside and outside the building, powering the charging stations for electric vehicles, or it can be stored and used later on, when the solar radiation is below the required level.

We are devoted to transforming any idea into a project with rapid return on investment, by providing services in consultancy, authorisation, designing and obtaining of financing.

## EQUIPMENT

The photovoltaic panels integrated by Adrem Link in its solutions are flexible and are available either transparent or in a broad range of colours. This allows creating original design concepts, thus boosting the value of the buildings.

The types of equipment included in our solar panel and energy storage projects:

- Classic photovoltaic panels, glass structure
- Flexible and light photovoltaic panels, suitable for any existing support structure
- Grid invertors for on-grid applications
- Autonomous invertors for off-grid applications
- Batteries for energy storage featuring various technologies, depending on each application
- Distribution panels and power supply solutions

## SERVICES

Adrem's experience of over 15 years in energy infrastructure makes us market leaders in providing services which lead to successful renewable energy projects:

- Consultancy
- Technical support
- Design
- Obtaining permits and authorisations
- Financing
- Electrical services
- Turnkey implementation
- Dispatch
- Commissioning
- Warranty
- Service and project maintenance
- Energy infrastructure maintenance

## INTEGRATION

We integrate photovoltaic solar panels and power storage solutions with:

- Electric vehicle charging stations
- Smart lighting solutions
- Automation solutions (BMS)
- Automation solutions for residential applications (Smart Home)

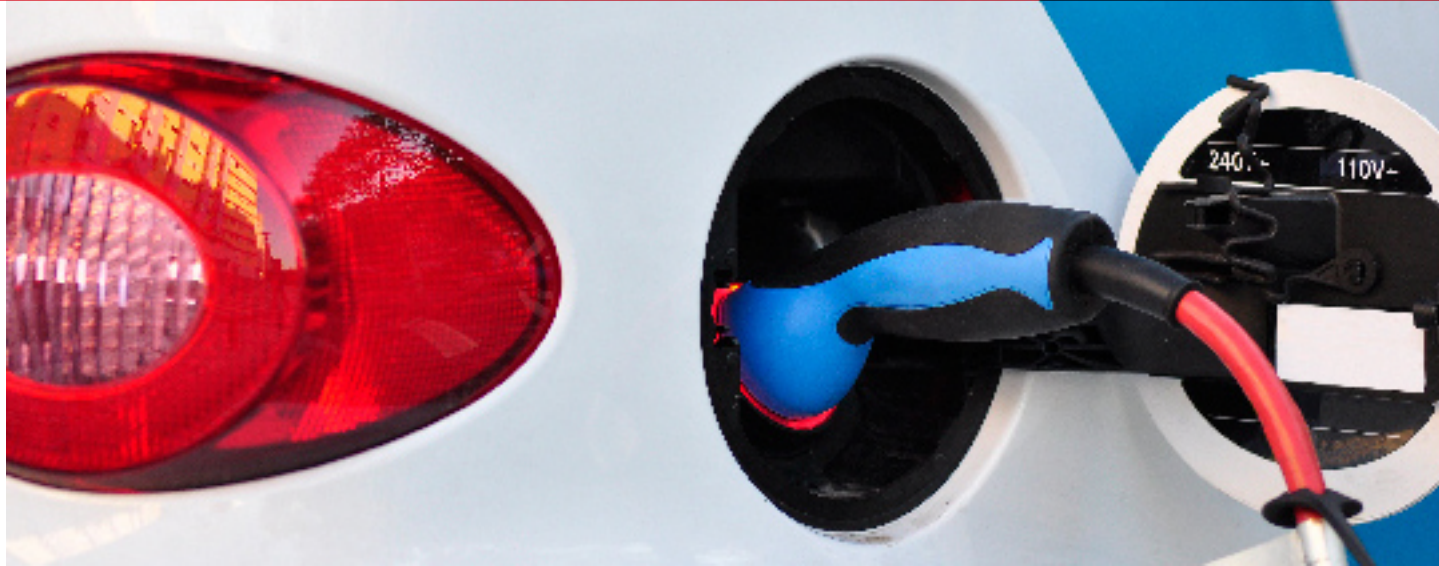


# SERVICES & SOLUTIONS

ELECTRIC VEHICLE CHARGING STATIONS



# ELECTRIC VEHICLE CHARGING STATIONS



Vehicle emissions are a major source of pollution. Adrem Link is a promoter of clean air and its offer includes charging and management solutions for electric vehicles. It is our way of supporting electric mobility.

With the help of our technology partners, we provide integrated, turnkey solutions, which rely on electric vehicle charging stations. These are integrated in smart management, monitoring and remote control platforms.

## SERVICES

With an experience of over 15 years in energy infrastructure, Adrem Link covers the entire range of services required for such projects, such as:

- Electrical services
- Consultancy
- Obtaining permits and authorisations
- Design
- Configuration and implementation
- Commissioning
- Service and maintenance

# ELECTRIC VEHICLE CHARGING STATIONS



## EQUIPMENT

We propose robust charging stations, featuring a corrosion-resistant aluminium base, equipped with an anti-theft system. In addition, we value aesthetics therefore we allow customisation using the logos and colours of the beneficiary.

Some of the models in our offer include:

- Compact wall-mounted EV charging station
- On-street EV charging stations
- Fast charging stations
- Portable charging stations
- Accessories

## BENEFITS

The stations may serve a company's car fleet, they may be made available for electric vehicle holders and they may be included in municipal or national projects.

The benefits of using electric vehicles include:

- Reducing fuel costs
- Reducing emissions
- Contributing to a clean and healthy environment



# PROJECTS



We design integrated business and technology solutions, and innovation is the DNA of our work. What motivates us and guides us to performance are the dynamic nature of the market and the professionalism and magnitude of our clients. We bring our ambition, our energy and know-how into all of our partnerships.





# PROJECT

REHABILITATION, MODERNISATION AND  
INCREASE OF EFFICIENCY OF THE PUBLIC LIGHTING SYSTEM  
IN CORABIA, COUNTY OF OLT

## PROJECT TYPE

Design and execution works

## SHORT DESCRIPTION

Rehabilitation and partial modernization consisting of installing on the existing pillars 1500 LED street luminaires, 3 street luminaires with surveillance camera, 20 LED projectors and 28 interior luminaires

## IMPLEMENTATION

- Total use of the current networks
- Dismounting old non-compliant luminaires
- Mounting 500 new LED street luminaires, IP66, IK10 with a nominal power of 50-70 W on the main roads
- Mounting 1000 new LED street luminaires, IP66, IK10 with a nominal power of 50-70 W on the main roads
- Mounting 3 new LED street luminaires, IP66, IK10 with a nominal power of 50-70 W with surveillance cameras - in risk areas
- Mounting 20 LED RGB projectors with a nominal power of 15-25 W (10 enclosed units and 10 apparent units) for facade lighting
- Mounting 28 LED interior luminaires, IP20, with a nominal power of 20-40 W in buildings of public interest
- Mounting of an online "switch on/switch off" monitoring system and consumption reading based on the time intervals submitted through GSM/GPRS and the energy consumption recording system with submission on the online software platform



# PROJECT

BUILDING MANAGEMENT SYSTEM (BMS SYSTEM)  
FOR VOLKSBANK BUCHAREST

## PROJECT TYPE

Design and execution works

## SHORT DESCRIPTION

A BMS solution (HVAC installations, normal low voltage and lighting consumers) for the head office of Volksbank Romania – the Nusco Centre Building, in Bucharest

The solution allows controlling and monitoring each floor, for the purpose of optimizing consumption and extending the operating life of the equipment.

## IMPLEMENTATION

The implemented BMS system controls the following circuits:

- lighting pertaining to office spaces, traffic hallways and restrooms
- low voltage for general use (kitchens, restrooms, multifunctional, water equipment, paper shredders, etc.)
- fan coils serving these spaces

It runs control scenarios concerning certain consumers (for example: if it detects movement in an area outside the service window, then the BMS turns on the light in the area for "x" minutes).



# PROJECT

COMPREHENSIVE ENERGY AUDIT SERVICES

## CLIENTS

United Romanian Breweries Bereprod (URBB)

ANCHOR Grup – Anchor Office & Bucuresti Mall & Plaza Mall

AVICOLA Focsani

## SHORT DESCRIPTION

Monitoring, recording and analyzing energy flows

## IMPLEMENTATION

- The outline of the comprehensive energy audit was determined
- Input data specific to the analyzed outlines was collected
- A description and an analysis of the current situation were carried out
- Energy consumption (historical and current) was analyzed and calculated
- Measures to increase energy efficiency were determined and suggested
- Potential financing resources were proposed
- General conclusions and recommendations were arrived at



# THE ADREM VISION

A WORLD OF BALANCED WELFARE ATTAINED THROUGH WORK AND TECHNOLOGICAL ADVANCEMENT, A WORLD OF PEOPLE WITH FAITH AND COMMITMENT TO THE IDEALS OF MANKIND, UNCHANGED FOR CENTURIES, ALWAYS CLOSER.

## MISSION

Adrem Link's main objective is to provide safety and comfort to end consumers, by developing products and solutions to increase efficiency and to ensure smart energy consumption.

## THE VALUES

### RESPECT

Respect is a fundamental value in a competitive business environment. Here at Adrem Link, you will find respect inside the company, in its interactions with the public, but also in every achievement with our partners.

### RESPONSIBILITY

Adrem Link's projects are a confirmation that our actions are responsible. Ethics is an important part of our business.

### INVOLVEMENT

Each project is designed with commitment and involvement - from consultancy to implementation and maintenance.

### AMBITION

Perseverance and ambition both define Adrem Link's work. We are persistent in reaching our goals, we set ambitious objectives and we believe this is one of the reasons behind our success.

### RIGOR

We respond "to the point" to our clients' needs – in keeping with the meaning of our name in Latin "ad-rem" – by providing turnkey services and solutions.

The success of a project depends on attention to details, and every step we take undergoes thorough scrutiny.

# About ABBC, the holding which comprises the ADREM companies in the energy field

## Group Main Companies (100% ownership)

ADREM - Adrem Invest, Adrem Link & Adrem Engineering  
 Adrem Industries  
 MTAG Romania  
 MTAG Technology Switzerland  
 MTAG Technology USA  
 MTAG China

## Group Main Companies (less than 100% ownership)

ADREM Technology China ( 49%)  
 Bioenergy Suceava ( 49%)  
 Ivy Grid  
 SEA Complet  
 Thermonet

## Secondary Group Companies

Adrem Construct  
 CORAD Engineering  
 Helios Buzau  
 Biomass for power

## Global presence

Romania, China, South Korea,  
 Germany, Mexico, Brazil,  
 Uzbekistan, Venezuela, Algeria,  
 Australia, Austria, Belgium,  
 Bulgaria, Chile, Czech Republic,  
 Finland, France, Great Britain,  
 India, Iran, Iraq, Italy, Kazakhstan,  
 Luxembourg, Netherland, Russia,  
 New Zealand, Portugal, Scotland,  
 South Africa, Spain, Sweden,  
 Switzerland, Taiwan, Turkey,  
 Ukraine, USA



## C O N T A C T

### ADREM HEADQUARTER

20-22 Alexandrina Street,  
District 1, Bucharest, Romania

TELEPHONE: +40(21) 233 59 20 / 21

FAX +40(21) 233 59 82

[www.adrem.ro](http://www.adrem.ro)

C O N N E C T E D   E X P E R I E N C E

