SMART BUILDING SOLUTIONS

by Duemmegi

Make Your Facility Smart

SMART BUILDING SOLUTIONS

by Duemmegi

1992 - 2022

30 YEARS ANNIVERSARY

Smart Building Solutions from Duemmegi

Building automation solutions for sustainable infrastructures maximize the efficiency of buildings, optimize the use of resources, improve security, and reduce operating costs.

A "smart" solution allows you to **control**, including remotely from your PC/Laptop smartphone or tablet:

- **Lighting and Temperature Control Systems**.
- **Safety & Security Systems**.
- **Access Control Systems**.

A smart building basically helps you monitor, manage, maintain, and support systems, ensuring maximum comfort, energy efficiency, safety, and environmental sustainability.

Choose the Control from the Specialists in Building Automation

We apply all our dedication and knowledge to developing automation solutions for buildings and infrastructures that meet the needs of the market.
Over the last 30 years, we have gained significant expertise in automation to satisfy the growing need to design smart buildings.

GUARANTEED RELIABILITY

Duemmegi stands for reliability and quality: **only 0.1%** of our products have been repaired under warranty in the past 6 years.

Malls

Tertiary

Infrastructures

Industrial

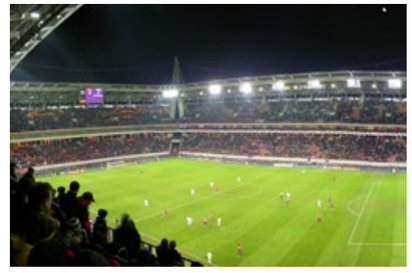
Banks

Monuments

Hospitals and Nursing Homes

Hotels and B&Bs

School Buildings



Sports Facilities

Make Your Building a Smart One

A smart building is a cost-effective option because it minimizes energy consumption and operating costs. It's also safer and more efficient since you can control all available assets through the information required to respond reactively and proactively.

Automation that services your building
to manage it remotely, reduce waste, have greater control

100% **Italian Product**
Designed and manufactured in Italy

100% **Italian Company**
ISO-9001 Certified

SERVICES

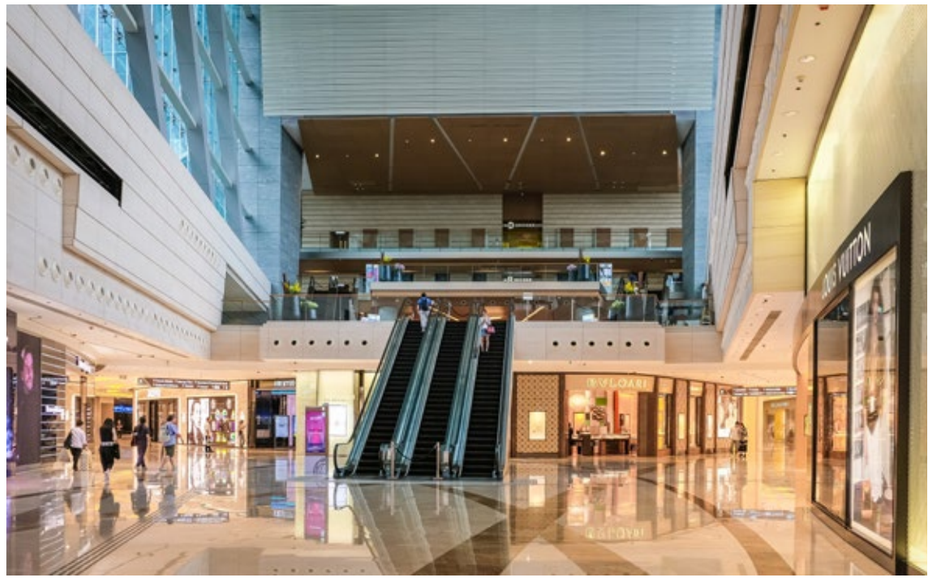
01. Building Automation: Malls

Duemmegi building automation systems can address all the needs of a Mall to minimize energy consumption and operating costs. As a result, the building will be safer, more efficient, and more comfortable.

Duemmegi's **BMS** (Building Management System) allows you to **monitor any installed equipment** through a dedicated graphic interface accessible via PC and mobile devices, such as tablets and smartphones. You're can also integrate third-party equipment into the BMS, in addition to **components manufactured by Duemmegi**. This results in an all-in-one smart building at your fingertips.

So, you'll be able to monitor your facility to achieve:

- **In-depth analysis of power consumption (temperature, lighting, fuel, lamp lifetime)**.
- **Smart lighting management (for greater energy savings and predictive maintenance).**
- **Increased security (access control, integration with video surveillance and theft-invasion systems)**.
- **Optimal management of renewable energy (electric charging stations, photovoltaic systems, geothermal energy, etc.)**.



Building Automation for Malls: Focus on Lighting

Optimizing and controlling the **lighting** system are paramount for a **smart building**. This is even more important when it comes to a shopping mall.

Specifically, a building automation system for shopping centers allows you to:

- Adjust the lighting system by installing dimmable lighting sources using the **DALI** (*Digital Addressable Lighting Interface*) BUS technology, which enables digital control of lighting. Since each lighting unit has its own specific address, you can create flexible, robust, and scalable lighting systems. A solution that is perfectly suited to the needs of a shopping center.

- Program the lighting system with the preferred light type, **color temperature**, and so on. The entire system can be **configured according to the time of use** and the function being performed (for example, shopping gallery during operating hours, cleaning service only, or nighttime security service only). This solution boosts the smart building's energy efficiency ("savings" function). The installation of **presence/brightness sensors** and a **weather station** on the roof of the building allows for the control of ambient brightness. The ability to control and adjust shades in order to eliminate any excessive light also provides energy savings.

- Create special lighting effects with the **DMX 512** (*Digital MultipleX*) communication protocol. You can create **lighting effects**, in cooperation with the mall's marketing department, for an enhanced customer shopping experience.

- **Monitor the power supply distribution system**. This includes regulating and balancing power and **protecting the system** and applications from both power surges and overvoltage that could damage the connected equipment.

Building Automation for Malls: The Best Solution for Keeping Everything Under Control and Saving Money

- Supervision of **technical alarms** and technological equipment such as power generators, UPS devices etc.
- **HVAC management**. Duemmegi's BMS system can interface with HVAC equipment, enabling parameter settings and proper operation control.
- Control and management of **anti-theft** and **video surveillance** systems. Both can be integrated into the BMS.
- Control and management of **fire** and **smoke detection** units. The system allows even inexperienced users to immediately report a fire outbreak or other anomalies, protecting the safety of customers and employees in the building.
- **Controlling access** to the facility and to specific areas for authorized personnel only.
- **Monitoring of energy consumption** in order to optimize lighting, water, and gas systems through a set of meters. The Duemmegi system uses its own meters for the electricity distribution network and third-party meters that can be integrated for the water and gas supply network.
- Lamp control. **Scheduled lamp maintenance** provides the optimal level of lighting while saving unexpected service costs and optimizing the purchase of spare parts (so-called predictive maintenance).
- **Fuel level monitoring**, a useful solution for shopping centers equipped with power generators and self-powered fire-fighting systems. Using dedicated level switches and/or gauges controlled directly by the BMS, the supervisory system is able to send warnings and push notifications to maintenance staff to ensure complete machine efficiency. Similarly, it's possible to control storage tank levels for the fire-fighting system, allowing the reuse of water for other purposes and avoiding unnecessary excessive accumulation. Automating these procedures (required by law) makes it possible to immediately improve the efficiency and safety of the building.
- **Air quality** control. Through the BMS and the use of dedicated sensors, you can implement an air-quality treatment and monitoring system for proper air-exchange control throughout the commercial area, offices, and any underground parking lots.

Building Automation for Malls: The Value of Optimization

Today even shopping malls have the option of using renewable sources such as photovoltaic or geothermal energy. However, without the ability to optimize it, these resources do not reach their full potential in terms of building efficiency, waste reduction, and **energy savings**. Building automation not only allows the optimization of these resources but also provides the ability to check the health status of alternative systems, usually installed in locations that are not easily accessible.

Choosing a building automation system for a shopping mall ensures:

- The comfort of customers and employees, the beating heart of the business.
- Consumption awareness in a large-scale facility.
- Building safety.
- Waste reduction.

The **Duemmegi BUS system** for building management and control provides for the optimization of a wide range of functions. For a shopping center this translates into:

- Significant **reduction in operating costs of up to 50%** (according to data from EN 15232) for lighting and temperature control systems.
- System scalability by easily adding additional features as new needs arise in the building.
- Reduced installation and wiring costs.

A properly optimized, correctly configured, and remotely controlled smart building immediately ensures greater efficiency and safety.

02. Building Automation: Tertiary

A building automation system helps make large buildings - such as offices, educational institutions, and universities - smart. Through its modular systems, Duemmegi can provide the ideal solution for automating your facility.
With Duemmegi's building automation systems you'll have the effective solutions to make your building more efficient, safer, and more comfortable. You'll be able to automatically manage:

- **Artificial lighting systems to achieve greater visual comfort and energy savings**.
- **Solar shading to achieve optimal winter/summer temperature, reducing power consumption and waste of energy.**
- **The temperature control system**.
- **Workstations and work areas through a network of presence detection and outdoor climate sensors.**

Building automation for the tertiary sector includes all automation processes specifically implemented for **office buildings, high-rise buildings**, and small, medium, and large **non-residential buildings**.

Comfort, Safety, Waste Reduction: All the Benefits of the Duemmegi Smart Building Automation Solution

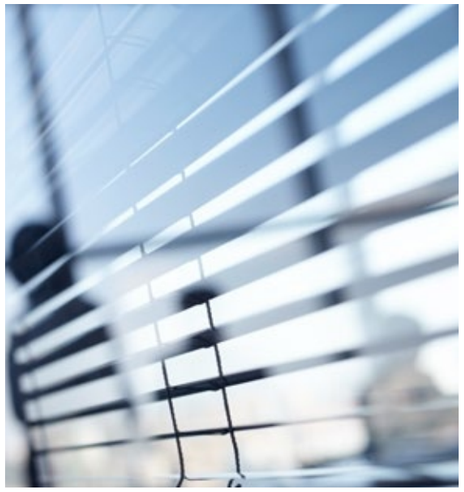
In the service industry, building automation plays a key role in ensuring the comfort and safety of users, workers, and all stakeholders. It also helps to **reduce waste** through increased consumption awareness and decreased building operating costs. With Duemmegi's building automation system, you have the ability to turn any building into a true **smart building**.

This solution allows you to:

- Adjust artificial **lighting**. In non-residential buildings, this provides significant savings. Compared to a non-automated system, it's possible to achieve **electrical energy savings of up to 50%** (estimated data based on EN 15232).

- Adjust **sunscreens** (both indoor and outdoor) to allow the right amount of natural light in. This ensures greater visual comfort for people inside a building while reducing glare. In addition, the automatic solar-shading control system works **in concert with the HVAC** - the indoor climate control system - to **avoid overheating** due to excessive solar radiation. This results in energy savings on heating and air conditioning.

- Optimize workstations thanks to the **presence sensing** system, which provides greater workstation comfort. The system controls a number of sensors that **activate/deactivate** the **air-conditioning** and **lighting** system for greater energy and economic savings. Since the occupancy inside offices may be sporadic or unpredictable, Duemmegi installs combined sensors capable of detecting both the brightness level of the environment and the possible presence of personnel. This ensures proper optimization of the workstation, which increases comfort and reduces waste at all time. The lighting management system offered by Duemmegi also allows the artificial light source to be adjusted according to the **circadian cycle**. This feature has known effects on improving the mood and work performance of people in the environment. It simulates natural light, so that the user is always exposed to the proper level of lighting (warm light and cold light) depending on the time of day.



Control of Technological Systems and Energy Monitoring for Environmentally Friendly Buildings.

Two other key features that are perfectly managed by the Duemmegi building automation system are the **technological equipment control** and **energy-monitoring** capabilities. This creates a highly efficient building with a low environmental impact and reduced operating costs.
More specifically, users can:

1. Control **multiple types of equipment** such as UPSs, generators, CPSSs, AHUs, chillers, boilers, heat pumps, rooftops, transformers and electrical cabintes, water recirculation pumps, and **monitoring of fuel levels**, tank levels, and water storage tanks, etc. You can control all the systems in a facility - even remotely – using the **BMS control dashboard**.

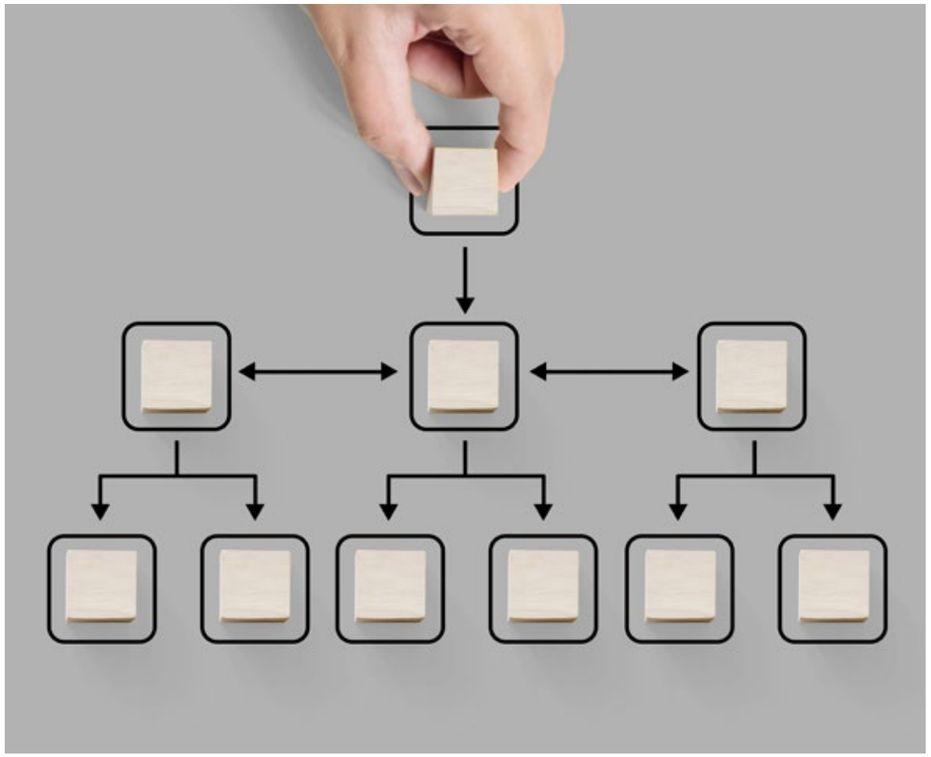
2. **Monitor power consumption**. This is a very useful feature in high demand for office buildings and coworking environments because it allows energy **consumption trends** to be monitored easily and automatically. Constant monitoring of energy consumption trends lets energy managers to take action to optimize energy usage, which results in significant savings, for example, in shared spaces with high turnover. The consumption of **electricity, thermal energy, gas**, and **water** is tracked through special meters. By leveraging this data, you have the ability to automatically intervene, taking advantage of the **Energy Manager**'s analysis to implement any possible corrective actions. The purpose of this functionality is to better control and manage the building, minimizing anomalies, waste, and costs while improving efficiency.

Building Automation: A Modular System That Perfectly Fits the Needs of Any Building

Building automation systems are electronic control systems that allow you to automate electrical systems, heating systems, solar shading, while also monitoring building power performance.

Duemmegi's building automation system is scalable and can handle buildings of different sizes, from small businesses to high-rise office buildings. It is also fully customizable to satisfy customer needs.

A modular system provides two distinctive features: **scalability** and **flexibility**. This means not only the possibility of seamless integration into various building types, but also the potential of reconfiguration or deployment to suit different building life cycles and any **future technological developments**. In addition, the system integrates seamlessly with third-party products enabling the design of a truly smart building.



03. Building Automation: Infrastructures

Building automation for **infrastructures** allows a range of functions to be **managed** and **controlled**, achieving a high degree of automation, **full customization**, and seamless integration with third-party systems. The result will be a manageable, secure, and low-impact infrastructure.

The Duemmegi BMS for building automation systems allows you to:

- **Manage the lighting and temperature control systems**
- **Monitor electrical systems such as electrical cabinets**
- **Manage alarms and anomalies of all connected equipment and devices.**
- **Manage employee access, including access to restricted areas.**
- **Monitor power consumption to reduce energy waste.**

Infrastructures where building automation systems can be implemented include railway stations, airports, marinas, conference centers, highway interchanges, tunnels, bridges, and interports.

Building Automation for Agile Infrastructure

Duemmegi building automation systems for infrastructure allow you to manage:

- Indoor and outdoor **lighting** systems to automatically provide artificial light in compliance with light pollution regulations, while ensuring the proper level of lighting in working environments.
- **Electric distribution**: electrical cabinets, etc.
- **Alarms and malfunctions** of all connected equipment and devices.
- Monitoring of the lighting system, both in the event of failure and for predictive maintenance. This ensures the system is always at peak efficiency, helping to deliver a safe and waste-free environment.
- **Access control** to enable access to the infrastructure and restricted areas for authorized personnel only.
- Heating and **air-conditioning system** control, which can be activated automatically when the facility is opened. This helps create a comfortable working environment no matter the season.
- Consumption monitoring in order to **optimize power** use and management of lighting, water, and gas systems. The Duemmegi system uses its own meters for the electric network and integrated third-party meters in the water and gas network.
- Continuity **control of power distribution** to avoid data loss in highly automated work processes.

Building Automation for Infrastructure: A Winning Choice

Equipping an infrastructure with a building automation system provides the advantage of creating a safe, comfortable, and environmentally friendly work atmosphere while reducing energy waste and operating costs. This applies both to infrastructures **operating 24 hours a day** such as ports, railway stations, interports, and airports, but also infrastructures used on a non-continuative basis such as exhibition facilities. In the latter cases, building automation systems have a significant impact in **reducing operating** costs and saving energy, because all systems can be activated only when needed and adjusted/deactivated when appropriate.

Sustainability is the next goal for all types of infrastructure from an environmental and economic point of view. This is even more true for older buildings requiring substantial efficiency upgrades. It applies, of course, to newly built facilities as well. Building automation is a winning choice for optimizing all power consumption, creating a comfortable and safe working environment, and reducing waste and operating costs. Plus, a **smart infrastructure** can provide optimal levels of efficiency and productivity.

The Benefits of Building Automation in Smart Infrastructure

There are many benefits of a building automation system deployed on infrastructure. Of course, they do not only involve the reduction of operating costs and the improvement of energy efficiency. They also include **continuous monitoring** of the **interiors of the facility** and the **condition of its materials**. Even today and in the not-too-distant future, smart infrastructure can provide information about:

- The condition of structural deterioration to maintenance personnel.
- Safe areas in case of accidents, fires, and human error.
- Safe routes with no obstacles or traffic for rescue vehicles.
- The activation of protection systems in the event of tides (e.g., in longshore city like Venice) or floods.
- Crowding at major tourist sites and immediate alternative options.

A smart infrastructure equipped with a building automation system will increasingly be able to use both its resources and processes efficiently, improving sustainability and citizen relationships. The result will be a **smart city** that can provide users with an experience that serves their needs.

04. Building Automation: Industrial

Building automation systems for the industrial sector have two main objectives: ensuring building safety and improving energy efficiency. A recent ECA (European Court of Auditors) report based on Eurostat 2020 data indicated that manufacturing is responsible for 25% of total energy consumption. Residential and nonresidential buildings, on the other hand, are responsible for 40% of all energy consumption and 36% of all CO_2 emissions in Europe as many of the buildings are old and/or carbon footprint intensive. However, **efficiency** enhancements can also be financed through **governmental and European grants**.
A building automation system managed through BMS and a user-friendly graphic user interface can optimize the entire facility (excluding production).

You can operate and control:

- **Lighting systems**.
- **Safety & Security systems**.
- **Access Control systems**.
- **Control of Temperature and Renewable Energy systems**.

In the industrial sector, the ROI of a building automation system is high as it translates into greater efficiency, significant energy waste reduction, and lower operating costs.

Five Key Benefits of a Building Automation System in an Industrial Facility

In the industrial sector, a building automation system can help optimize the entire facility (with the exception of production), which allows users to control:

1. Lighting – The **regulation of lighting levels**, based on a specific algorithm, to optimize the supply of electrical power and minimize energy waste. It ensures compliance with lighting requirements as defined by the relevant UNI EN ISO standards.

2. **Safety and Security** – Duemmegi's BMS can integrate fault and malfunction control as well as control of the smoke detection and fire alarm systems. A **building management system** can also control the anti-intrusion system and the video surveillance system. By communicating with security devices, for example, the user can use installed terminals to check the area in which an invasion attempt is taking place. The GUI (Graphic User Interface) can also be controlled remotely.

3. **Access Control** – Allows optimization of staff entry and exit procedures and access to restricted areas.

4. Temperature – In an industrial facility where different areas are managed by different equipment dedicated to temperature control, the automated management of the entire system easily allows the **optimization of heating/cooling** of warehouses, locker rooms, and administrative offices. This guarantees appropriate comfort in each environment, while reducing waste and operating costs.

5. Renewable Energy – Using clean and affordable energy is one of the goals of EU Agenda 2030, which also encompasses the implementation of **photovoltaic** systems and **geothermal** plants to supply energy to industries. A building automation solution and a BMS enable the communication and management of various systems in order to **optimize** the available **energy resources**.

Building Automation for Industries: An Essential and Winning Opportunity

The majority of industrial buildings are outdated and inefficient. About one-third of the buildings in Europe are over 50 years old, and approximately 75 percent are not energy-efficient. Building automation can do a lot in this context. It makes it possible to refurbish and modernize an industrial building with the highest possible energy efficiency.

Specifically, European standard EN 15232 defines the impact of building automation intervention on the energy performance of these buildings. It's a valuable guide for customers and designers, as it indicates the improvements that can be made and the efficiency/savings goals that can be achieved.

In the industrial sector, the return on investment for a building automation system fully pays for itself over time through:

- A simple system for **controlling all automation**. Operations can also be managed via mobile devices and remotely thanks to user-friendly interfaces on **PC/Laptop, smartphones** and **tablets**. This translates into maximum usability of plants and the whole infrastructure due to ease of use in terms of simplicity of command and control.

- **Optimal integration of different systems** and installations to ensure the highest possible efficiency, with a positive impact on safety, security, comfort, and energy savings.

- **Quick recovery** in case of failures, anomalies, or other emergency events.

- Ability to **collect operating data** for implementing more sustainable and efficient solutions.

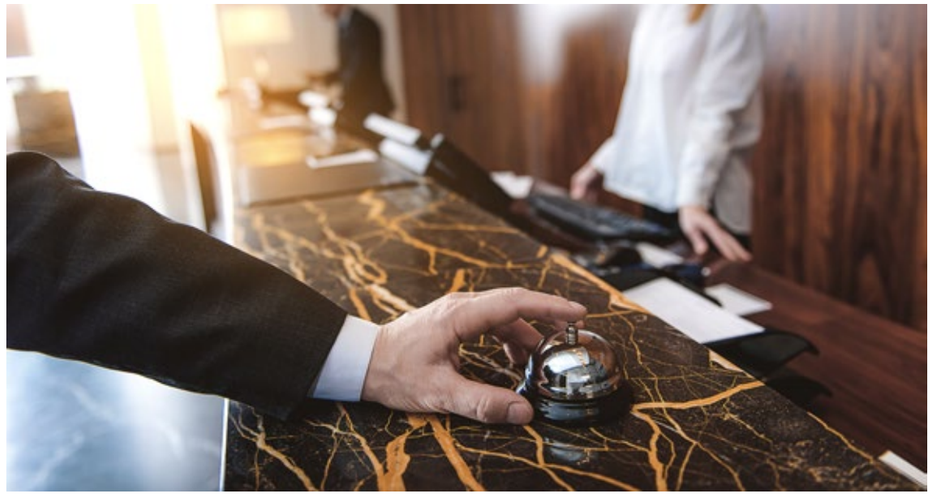
05. Building Automation: Hotels and B&Bs

Duemmegi's **hotel automation system** offers a complete card-based solution for hotels that combines both flexibility and style. You can operate with a fully customizable design to manage:

- **Temperature control systems (Duemmegi's BMS can communicate with every type of system, from rooftops to VRFs and VRVs). The result is optimal energy savings in the facility, ensuring the comfort in each room**.
- **Lighting systems - Adjusting and optimizing the intensity and color of the light source, and system maintenance**.
- **Automated air diffusion of fragrances or aromatic essences, which can also be activated by the presence sensor in all rooms**.
- **Access management**.

A building automation system for large hotel and accomodation facilities enables the management of any installed technology, resulting in considerable energy savings and improved guest comfort. All room services can be automated using sensors detecting the presence in each room to adjust internal **temperature, lighting**, the opening/closing of shutters, and much more. When a guest leaves a room, even for a short time, the automation system will switch to **"Eco" mode**. That means the lights, or the air-conditioning system will turn off automatically, for example when a guest leaves a window open before leaving, thus **reducing any energy waste**. All of these functions can also be applied to the common areas and the hotel reception lounge.

Another advantage is the **added value** that a hotel equipped with building automation offers customers. Comfortable rooms, reserved spa access, assigned parking, and presence sensors are all additional services provided in a simple and discreet way. They combine to create an extremely positive guest experience that makes **guests want to return** or recommend your facility to their friends. Today, customer experience can't be underestimated. Whether you run a 5-star hotel or a bed-and-breakfast, it's one of the factors by which **competitiveness** among facilities is measured.



Building Automation for Hotels. A Simple and Comprehensive Management System

For large-scale hotels, Duemmegi can provide comprehensive solutions that include not only room automation and the **management** of room services, but also the control of automation systems for:

- Hallways.
- Restaurants and bars.
- Common areas.
- Spas and swimming pools.

If the hotel runs a congress center, regardless of its capacity, it's possible to **automate the management of room reservations** for even more simplified, efficient, and professional use.

Duemmegi's hotel automation offers a **complete solution**, which can be operated with proximity badges, combining both flexibility and aesthetics. You can create fully customizable applications to manage:

- **Temperature** control systems (Duemmegi's BMS can communicate with all types of equipment, from rooftops to VRFs and VRVs). The result will be optimal in terms of energy savings, as well as improving the comfort of each room.

- **Lighting** systems, using lighting intensity and color adjustment and optimization, as well as system maintenance.

- Automated diffusion of **fragrances** or **aromatic essences**, which can also be activated by presence sensors installed in every room.

- **Access control** systems.

Hotel Access Control: 3 Solutions for Maximum Flexibility of Choice

Choosing an access automation system is very important. It allows **guests** to **move around the facility independently**, and **employees** and **suppliers** can **optimize their access time**. Duemmegi's building automation system offers three solutions for automated access management.

1. A **classic badge system**, which grants each guest access to the facility and their room, while enabling and controlling all room services (temperature control, VRF and VRV air-conditioning systems, lighting, electrical system, etc.). Guests can access their room and any additional services by simply swiping the appropriate badge across the reader in the facility.

2. A **remote front-desk system**, which will provide facility and room access and management without the need for an onsite physical front desk. Access is provided via **smartphone**, or a **QR code**. With a remote reception system, you can easily manage not only the check-in and check-out procedures of the guests, but also the entire booking process thanks to a dedicated management system called PMS (*Property Management System*). The PMS can also integrate booking engines and OTA (*Online Travel Agencies*) services.

3. A simple access system with **numeric keypad** or QR code, which is ideal for smaller facilities such as B&Bs.

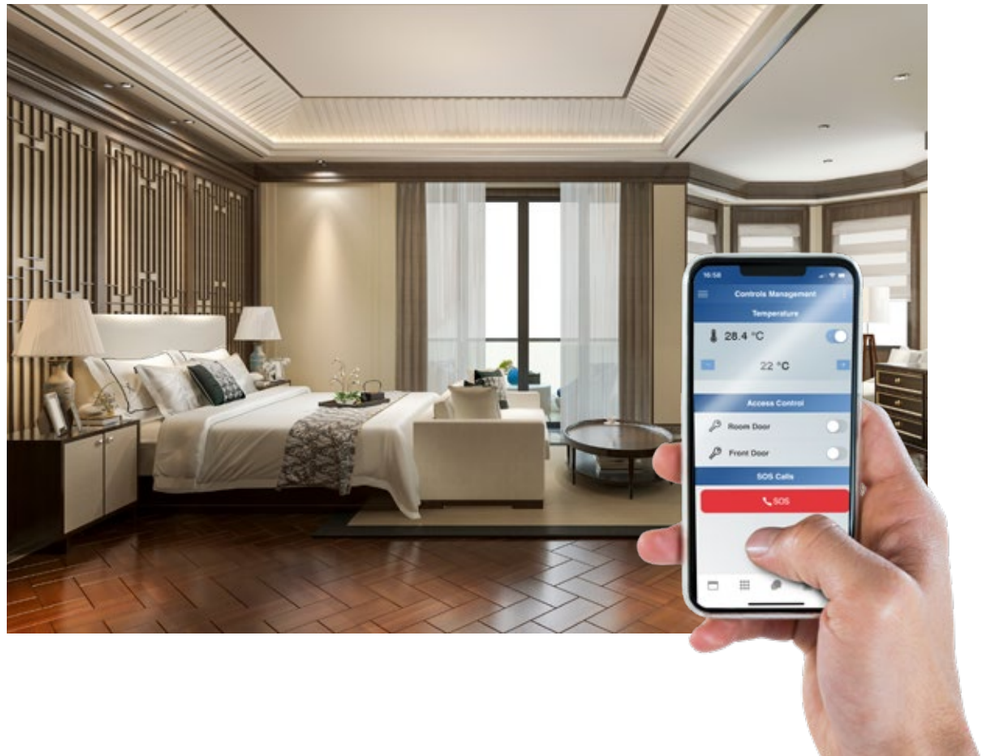
Building Automation for Hotels and B&Bs: Guaranteed Savings

Creating a smart hotel is a winning choice in many ways. We have mentioned comfort and user **customization** of spaces, guest experience (which is also a great marketing leverage), and **optimized costs and energy management**. Depending on the energy-efficiency rating of the facility, a building automation system for hotels allows you to save:

- **Up to 35%** on power costs.
- **Up to 48%** on thermoregulation costs.

Savings percentages are based on the EN 15232 standard, that defines the improvements of building automation initiatives for the energy performance of a building. In addition, the ability to **generate energy reports** for the **facility's energy manager** enables further optimization of electrical and heating energy consumption.

There is no doubt that a renovation that includes the implementation of a building automation system is a winning choice, both in terms of space customization as well as energy savings and **maintenance** operations.



06. Building Automation: Museums, Historic Sites and Monuments

Museums, historic buildings, and monuments of artistic interest cannot be subject to invasive procedures in order to be properly controlled. However, now a day it is possible to implement a building automation system capable of managing these artistic or historical sites, safeguarding their great value with minimal impact.
Duemmegi, backed by 30 years of experience in the field, can implement a building automation system with BUS technology for these special sites. With this technology, which does not have an invasive impact on the walls and is suitable for implementing and modifying an almost unlimited number of functions, you can manage:

- **Lighting (on/off and scenery)**.
- **Temperature**.
- **Equipment monitoring**.
- **Window automation (often difficult to access or heavy)**.
- **Museum installations, temporary and stable**.
- **Access doors/gates (restricted areas, employees, suppliers, and visitors)**.
- **Energy consumption monitoring**.

This group includes all those buildings that are valuable for their artistic or historical relevance, such as **churches, cathedrals, monumental squares, artistic sites, historical buildings,** and **museums**. Duemmegi has already implemented building automation systems for well-known sites such as the Square of Miracles in Pisa, the Cathedral of Montecarlo, the Vittoriano monumental building - also known as Altare della Patria - in Rome, the Sforza Castle in Milan, the Duomo in Florence, and many others.

The 7 Benefits of a Building Automation System to Optimize Sites of Artistic Relevance

Museums, historic buildings, and monuments of artistic interest cannot be subject to invasive procedures in order to be properly controlled. Nevertheless, it's possible to optimize their daily use. Duemmegi, backed by 30 years of experience in the field, can implement a building automation system for these special sites in order to manage:

1. **Lighting** - An automated on/off system of the existing installed equipment. Using the graphic interface, you can call up any lighting and scenic scenarios, depending on the intended use (including temporary) of the site.

2. **Temperature** control, if available, to ensure maximum comfort within rooms while they're in use or open to the public. This optimizes heating/cooling costs by reducing waste and misuse.

3. **Infrastructure monitoring**, which includes both control of the electrical system as well as air-conditioning equipment.

4. **Automation of windows** to control the amount of natural light. This has a positive impact on energy savings, as it allows optimization of the heating and cooling system. It also allows for greater ease of use and simplification when windows are difficult to access or particularly heavy to operate.

5. Changing exhibits. In museums and exhibition spaces, a building automation system can be perfectly adapted to **temporary set-ups**/changing scenarios due to its high flexibility. For example, you can adjust the indoor lighting (mix of warm/cool light) to emphasize displayed artwork or recall specific scenarios to enhance the visitors' experience. The possibilities for customization are endless.

6. **Access control** to manage and differentiate entry (employees, suppliers, visitors). Automated access control is also important to allow access to restricted areas for security reasons, or to enable access to authorized personnel only.

7. **Monitoring of energy consumption** in order to optimize energy supply and management of lighting, water, and gas systems (where available). The Duemmegi system uses its own meters for the electric network and third-party (integrated) meters for the water and gas distribution network.

Perfect Management and “Invisible” Technology through BUS Systems

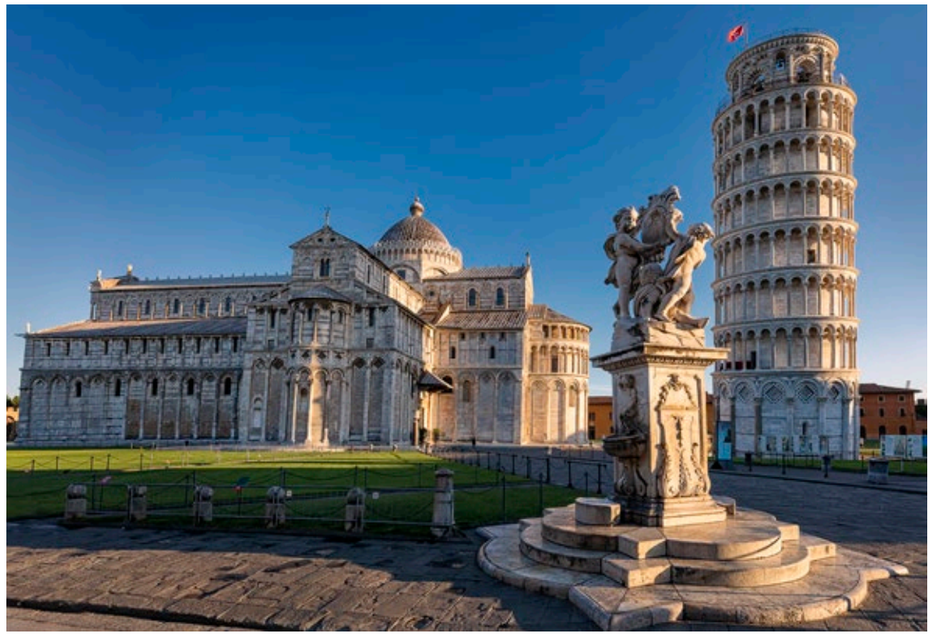
In buildings of a historical or artistic relevance such as churches, monuments, and palaces, the use of an automation system with BUS is in many cases the only possible solution. The electrical systems are often antiquated or subject to constraints. The BUS system enables the implementation and modification of a virtually **unlimited number of functions**, without any physical changes to circuits: the connectivity is implemented at the programming level only.

Once the building automation system has been installed, just press a button to have the system processing the information, that runs on the BUS cable and, in accordance with the configured programming, operate the actuators (output) distributed in the field.

In addition, a building automation system for historic sites with BUS technology provides:

- Ease of wiring
- Reduced cost and installation time
- **Low-voltage** control points
- Disconnectable power circuits
- Reduced EMF (electromagnetic fields)

So, as new needs arise, a building automation **system can be implemented or reconfigured** without physical intervention. In a traditional automation system, on the other hand, any change in operation also involves a change of connections and sometimes structural work. In addition to the invasive nature of this method, there is a rather significant amount of time and money to be considered as well. With a traditional approach you also lose the advantage of simple wiring with low-voltage control points and, thus, reduced electromagnetic fields. These are all aspects that should never be underestimated today. As a result, a BUS automation system represents the **best possible solution available**.



07. Building Automation: Hospitals and Nursing Homes for Elderly

Health care centers, hospitals, and nursing homes can maximize their potential by installing a building automation system with a professional BMS supervisor. Automation technology makes possible to minimize energy use, ensure residents’ comfort, and manage in complete safety:

- Inpatient wards.
- Surgeries.
- Laboratories.
- Hallways.
- Common areas.

Duemmegi can implement an automated building control system to ensure an efficient and safe healthcare facility that will allow users to:

- **Manage lighting and temperature control**.
- **Ensure all technological systems operate properly**.
- **Check the efficiency of electrical circuits**.
- **Check the medical gases plant**.
- **Manage emergency calls, and much more**.

The result is a healthcare facility that is more efficient, sustainable in both operating costs and the environment, and which provides a high level of living/working comfort **without unnecessary waste**.

Rapid and Efficient Implementation of a Wide set of Functions for a Safe and Optimized Healthcare Facility

In a healthcare facility, it's critical that everything works properly, that all functions are automated as much as possible (especially when there is a shortage of trained personnel), and that the building meets the highest standards of **safety & security**. All this is achieved with Duemmegi's building automation system. Through a user-friendly interface, the system provides:

- Smart management of artificial lighting with **presence and brightness sensors** (night/day dimming, inpatient ward, laboratories, offices, and surgeries. Also, with voice control).
- **Temperature** control management (including integrated systems).
- Automation of all indoor and outdoor **sunscreens, shutters, and blinds**. This ensures the proper comfort for residents while increasing the building's energy efficiency and reducing waste.
- Maximum **reliability** of technical systems.
- **Control and management of all calls** (including emergency calls).
- **Medical gas** control.
- **Electrical distribution** system control and insulation control in surgeries, laboratories, and medical facilities with IT systems.
- Integrated **surgery unit management** (control of mechanical, electrical, and specialized technical equipment for the safe and proper operation of the unit).
- Air treatment system management and automatic management of **air exchange**. This is a very useful function in all environments and specifically in in-patient wards and surgeries to keep **VOCs** (*Volatile Organic Compounds*) and **CO_2** levels in the air under control and ensure healthier environments.
- Communication with **fire and smoke detection** systems.
- Renewable energy management (**photovoltaics** and **geothermal** systems, etc.).
- Personnel **access management** (locker rooms, pharmacy, laboratories). The BMS can limit access to restricted areas using badges, numeric keypads or QR codes.
- Management of **color therapy** environments (for example delivery rooms).
- Management of flood alarms and sensors in restrooms and utility rooms.
- Doorway access control system (e.g., in facilities that accommodate Alzheimer's patients, disabled or dependent persons, **alarmed doors** ensure everyone's safety).

Installing a building automation system in a hospital or nursing home: some Reasons Why

Investing in a high-level and innovative system that can optimize all the functions of a building is a winning choice in terms of **competitiveness**. An automated healthcare facility certainly stands out from its competitors and, indeed, it can provide financial savings that can be appreciated by all stakeholders.

A healthcare structure with state-of-the-art facilities means investing in personnel and user **safety**. It helps automatically and systematically avoid potential malfunctions, shortages of primary and life-saving materials, and unmanaged **emergency calls**. This allows for easier and more optimized management of the entire complex.

The watchword in a building automation system for hospitals and nursing homes is "**ease of use**". Duemmegi provides this with its modular and scalable systems that allow the installation of the strictly necessary automation only, so optimizing the project and saving costs. At the same time, all new functions can be implemented as needed, without the complexity of invasive physical intervention, high electromagnetic fields, or excessive costs.

The **result** is:

- An **energy-efficient facility**, that can optimize the use, for example, of a photovoltaic system.
- A building with optimized resource use. This can be achieved thanks to data from the **energy monitoring system**.
- Reduced operating costs.
- **Low environmental impact**.

08. Building Automation: School Buildings

The implementation of a building automation system to create smart, efficient, comfortable, and waste-free buildings is becoming increasingly popular in schools. In this type of facility, a building automation system managed by BMS offers many advantages. The **MIUR** – Italian Ministry of Education, University and Research - highlighted the great potential of automation for school buildings several years ago (2013), where in the document "**Guidelines for Indoor School Architectures**", special attention is paid to domotics and automation to make school facilities more modern and efficient.

Solutions to create smart school buildings mainly involve the control of:

- **Lighting systems**.
- **Temperature control systems**.
- **Solar shades**.

Solutions can also be implemented that allow for remote automation and management of janitor calls, restroom control (anti-flooding and anti-vandalization sensors), air quality control, and more.

Building Automation in Schools: An Efficient, Comfortable and Waste-Free Building

The solutions for creating **smart school buildings** primarily mean control of:

- **Lighting** systems.
- **Temperature** control systems.
- **Sunscreens**.

These three functions can be managed, even remotely with PC/Laptops, smartphones and tablets, with a user-friendly graphic interface to deliver high value for the school building when it comes to **comfort** and **waste reduction**.

Students and personnel can be exposed to the **appropriate lighting** throughout the day and may depend on the level of **natural light** coming from outside. Classrooms will be warm in winter first thing in the morning since the system will turn on the heat control set to the correct temperature before students arrive. Cool classrooms during the summer are also possible, even in those schools that are not equipped with an air-conditioning system. This because the automatic management of both indoor and outdoor sunscreens helps to reduce **solar radiation**, prevent glare, and ensure proper visual comfort and natural shading of classrooms.

Building Automation for School Buildings: Safety First

A building automation system for schools does more than just manage the three functions listed above, as it can **coordinate all equipment and technology** installed in the building. This results in the ability to control various functions and increase globally the safety. The **BMS** in the school environment also offers the following:

- The ability to **call a janitor** via a push-button located in the classrooms. This prevents the teacher from leaving the classroom unattended.
- **Restroom safety** – these can be equipped with anti-flooding sensors, smoke detectors, and **anti-vandalization** systems.
- Control of **lighting**, **temperature** and **locker rooms** in the gym. It allows proper use of school spaces used for sports, optimizing the building's energy consumption, and **reducing unnecessary waste**, without affecting the comfort of users.
- Control of **heating equipment**, such as water boilers. Administrators can remotely control the fault and anomaly detection system, so that maintenance personnel can intervene in a timely manner even when the school is closed, thus **avoiding inconvenience** for students.
- Control of the **video surveillance** system.
- If the building is equipped with **renewable energy sources**, the management of these systems, for an environmentally friendly, comfortable, and efficient school.

A Performance-Driven Approach for Schools: the winning choice

The new 2013 guidelines developed by MIUR (Italian Ministry of Education, University and Research) have not the prescriptive style of the previous guidelines, which date back to 1975. Today, the performance approach prevails because **buildings must adapt** as best as possible to the "educational and organizational needs of an ever-changing school" (Source: New MIUR Guidelines, 2013). This is a modern and smart approach adopted in all the most advanced countries, not only in Italy. And building automation makes all this possible.

Flexibility and **remote control** are the two cornerstones on which the new concept of technological systems in schools pivots. Systems can be controlled, adjusted, and turned off, even in sections, to optimize resources and reduce waste, account for consumption, and operate remotely from PC/Laptops, smartphones and tablets.

Basic parameters such as **humidity** and CO_2 must also be measured and controlled.

For example, the automatic management of air exchange is a very useful function to control **VOCs** (*Volatile Organic Compounds*) and **CO_2 levels** in the air and ensure a healthier environment as a result.
In fact, to maintain satisfactory learning conditions, the level of **carbon dioxide** in classrooms should never exceed specific thresholds.

Opening windows is fine. However, **forced air exchange** to ensure a healthy environment should be the standard in all school buildings. With building automation, this solution can be implemented immediately.

09. Building Automation: Banks

A **Bank** facility features a variety of spaces - open-space lounges, enclosed offices, coworking areas, meeting rooms, and self-service areas open 24 hours a day. For these work environments, Duemmegi is able to automate the following:

- **Lighting**.
- **Temperature**.
- **Preset lighting scenarios**.
- **Fragrance diffusion**.

The first three solutions relate to the proper functioning of the facility, while the last one is a powerful marketing tool, which can **improve the user experience** in a bank. In any case, all four solutions contribute to improving **work comfort**, maximizing available resources, and reducing unnecessary waste.

Building Automation for Banks: Comfort for Customers and Employees

Building automation systems automate the control of many key features and can provide an extremely comfortable environment while minimizing waste and optimizing energy use. This results in offices that are sustainable and pleasant to be in.

The automation enabled by Duemmegi systems allows you to control and manage the following, even remotely using PC/Laptop, smartphones and tablets:

- Lighting system.
- Air-conditioning system.
- **Lighting scenarios**.
- **Fragrance diffusion**.

While the first two solutions refer to the proper functioning of office facilities, the last two are also a **powerful marketing leverage** that can improve the user experience and the **brand reputation**.

Improving Lighting and Air Conditioning in Every Space without Waste: this is possible with a building automation system

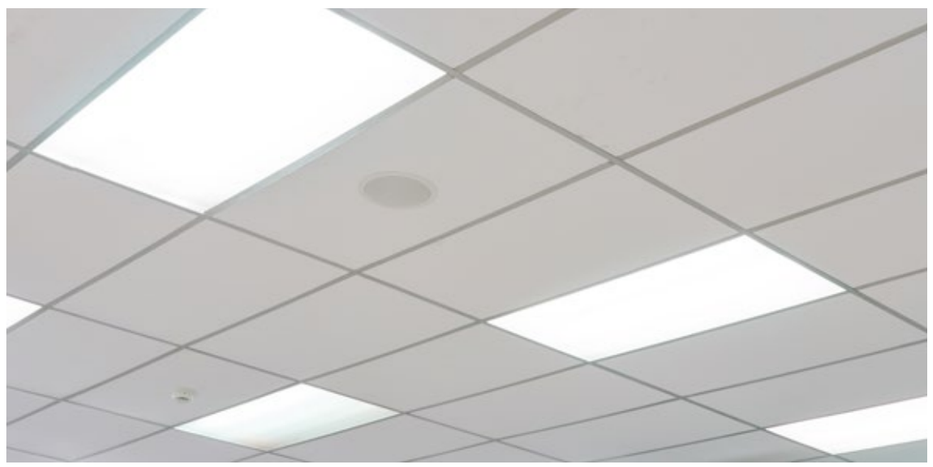
With the Duemmegi automation system specifically designed for banks, every space can be properly illuminated and air conditioned. You can program different lighting modes, depending on the **specific use** of each room. Power use is thus optimized, avoiding any waste. For example:

- In the **open area** where tellers work, **lighting** can be adjusted according to the desired level throughout opening hours. During closing hours, a night lighting level (soft light) can be set to avoid leaving the facility completely in the dark.

- In the **offices** lighting is provided by combined **light and presence sensors**. Therefore, it's possible to adjust power according to both the presence of employees in the office and external brightness. After the rooms have been unoccupied for 5-10 minutes, the **lights are automatically turned off**. The automation system also ensures that the circadian cycle can be followed. Similarly, dedicated coworking and meeting rooms that have even more occasional use can be configured. This ensures the highest possible efficiency of power use.

- In banks with **self-service areas that are open 24/7**, in order to reduce energy consumption, a minimum level of lighting is guaranteed and is intensified when a customer enters to perform self-service transactions. The lighting is reduced when the user exits. Thus, **unnecessary waste** is avoided and ensures and optimal lighting level at all times.

For **temperature** control, the automation system allows the correct temperature levels to be set without the need for manual intervention. When the branch is open, a temperature setpoint is maintained. When the building is closed, it enters in "**economy mode**". The next working morning the system sets up fully automatically to heat or cool the room before the arrival of personnel.



Optimal User Experience through Lighting Scenarios and Fragrances

A definite benefit of building automation for banks is the ability to improve the user experience. It is a powerful marketing leverage available for banks, easily implemented with a building automation system, and also remotely controlled using a PC/Laptop, a smartphone or a tablet.

Duemmegi offers solutions to **enhance** so-called visual and olfactory **branding** to improve **the users and employees experience** inside the office.

The visual and olfactory impact is something that should not be underestimated, as these are extremely important sensory detections which are also linked to **purchase intent and process**. The marketing sector has been studying their connection for years. Entering an environment with a pleasant smell, for example, immediately conveys a pleasurable feeling of well-being and puts the user in a positive mood. Using an automated fragrance diffuser in bank branches means emphasizing olfactory branding, that imparts a sense of order, cleanliness, elegance and... **reliability**.

A pleasant environment where attention to detail is perceived promotes relaxation and **a positive welcoming feeling** for customers. Even for those still waiting to be served.

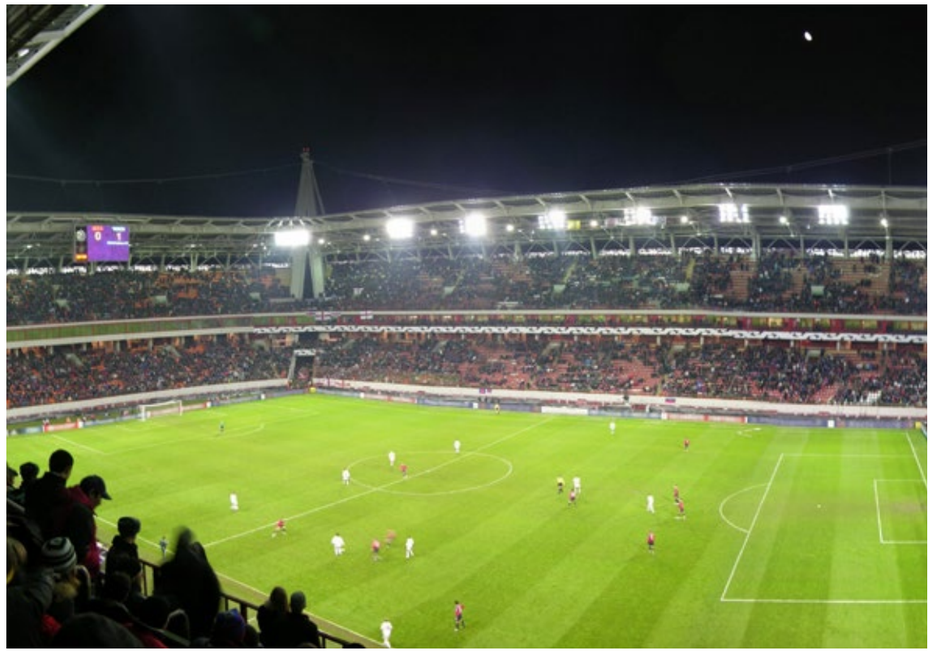
10. Building Automation: Sports Facilities

In large sports facilities such as **stadiums**, **arenas**, **racetracks**, **spas** and **swimming pools**, **padel** and **tennis courts**, building automation can automate and remotely manage - with PC/Laptop, smartphones and tablets - a number of key functions, ensuring optimal comfort for athletes and spectators, maximizing consumption and significantly reducing waste. This is very useful especially for those facilities occasionally used or available by reservation. **Sports facilities are energy-intensive buildings**, for which energy cost containment is a critical goal.

With a single control dashboard, the BMS from Duemmegi suited for sports facilities can provide:

- **Management of lighting system, including lighting scenarios and choreography**.
- **Monitoring of electrical distribution and UPS devices**.
- **Temperature control of playing fields, stands, and locker rooms**.
- **Control of anti-flooding and anti-vandalization systems for restrooms**.
- **Control of access and turnstiles**.

By leveraging automation, a **reduction in consumption of up to 30% can be achieved, which can rise to as high as 50%** for swimming facilities (*according to report RT/2017/40/ENEA*).



All Key Functions in a Single Dashboard

Through its **single control dashboard**, Duemmegi's building automation system allows you to manage the following sports centers functions:

- The **lighting** level of the playing field, stands, and locker rooms.
- **Lighting scenarios** and **special effects**. Lighting scenarios are preset scenarios that can be activated depending on the intended use of the facility. For example, you can create a lighting scenario called "**match**" that is also suitable for television filming, and a scenario called "**training**" in which fewer lighting units are activated. This ensures power savings, without compromising the appropriate lighting of the playing field. Special effects are lighting effects and stage sets that can be used during major sporting events or competitions to entertain guests during pre-game or halftime.
- **Power distribution** and **generator efficiency** monitoring for emergency lighting if necessary. These safety functions guarantee full functionality of all sporting events.
- Facility **temperature** control (locker rooms, playground, restrooms). Switching all functions on/off is remotely and centrally controlled by the **BMS** supervisor, without the need to engage personnel to manually activate thermoregulation for each area.
- **Safety** in restrooms through the installation of anti-flooding and anti-vandalism detectors, as well as remote management and centralization of emergency calls in restrooms for the disabled. During sporting events, it's mandatory to join these systems into a specific attended point of surveillance.
- **Access and turnstile control** to ensure the authorized entrance of athletes, and public and service personnel.

The Flexibility of a Building Automation System for Efficient and Comfortable Sports Facilities

Duemmegi building automation systems provide a large number of flexible solutions. These solutions simplify the management of the facility, optimizing costs and minimizing waste. The result is a **smart sports facility** with a high level of comfort for all users and that is highly efficient from a power consumption standpoint.

The following is possible thanks to building automation:

- In **large sports centers** with padel courts, tennis courts, indoor and outdoor soccer fields, etc., the facility can be configured according to **reserved playing areas**. For example, based on reservations, the BMS can **turn on** temperature control and lighting 15 minutes before players arrive and **turn off** the system (inside the locker rooms also) at the end of the game or training session.
- At **racetracks** and golf courses, the **irrigation system** can be automated.
- In **swimming pools**, spas, and aquatic entertainment facilities, all the technological equipment can be controlled through automation. This allows for the management of **water temperature**, **water pH monitoring**, and control of devices responsible for water chlorination. It is possible to activate countercurrent swimming, showerheads, water pH measurement, and management of light therapy and fragrance diffusers. Room **temperature and humidity** (outside the water) can also be measured and calibrated automatically and regularly, and the proper functioning of devices such as **heat exchangers** can also be controlled.
- On **ski runs**, lighting can be activated for nighttime skiing using twilight detectors.

Duemmegi's Building Automation Solutions

Duemmegi's solutions allow for very complex installations in a **very simple** way with **full remote-management** capabilities with an intuitive interface that can easily be used by all users. The complexity of new facilities made up by several systems has generated a need for a full integration that must provide an **easy and intuitive** overview. The Duemmegi solution consists of two interconnected components: A state-of-the-art supervisory platform called WEBCON, and Duemmegi Bus systems. All higher-level changes to a project can be made while the system is running.

Duemmegi Benefits

Ease of Use

A building automation system is aimed at a broad consumer base without specialized expertise in home automation systems, so it must be easy to use with a **user-friendly interface**. It also has to be safe and pose no danger to those who do not know or understand its capabilities.

Flexibility

An affordable building automation system must be **flexible** enough to meet every need, from the simplest to the most complex. Duemmegi technology helps the user by **simplifying** and **speeding** up many of the most common everyday tasks.

Reliability

The system **operates 24/7** and requires no special care. Even in the event of a failure, it is capable of providing the service for which it was designed or a similar one in the case of reduced operation. It's also capable of reporting failures and generating a report of any anomalies.

Long Life

The system is built keeping in mind that it will have to provide continuous **service over time**. It must be virtually fail-safe and easy to repair, even by unskilled personnel. In all cases, it should be possible to quickly return the system to operation.

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DUEMMEGI

HOME AND BUILDING AUTOMATION

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