

enel x



**EFFICIENT PUBLIC
BUILDINGS**



ENERGY OPTIMIZATION FOR PUBLIC BUILDINGS

A MORE SUSTAINABLE CITY, ONE BUILDING AT A TIME

The interventions we propose aim to simultaneously reduce the energy consumption of public buildings and the emissions of CO₂ in the urban area. Making public buildings energy efficient means **renovating the existing properties and making those newly built sustainable**, offering users and workers environments that are bigger on comfort yet have full respect for the ecosystem.

Enel X combines all its experience as leader in the energy sector with the dynamic drive of a startup, proposing **cutting edge energy optimization**

solutions capable of meeting a wide range of different requirements, reducing consumption of electricity and heat (and therefore the relative bills), reducing polluting emissions and enhancing the wellness of citizens and public workers.

Schools, universities, sports centers, hospitals and public offices are only a few examples of the kinds of public spaces in which the new energy optimization solutions can be applied.

A saving of up to 80% in energy consumption.

Our principles

Four guiding principles underlie our energy optimization offering:

Digitalization

Cutting edge technologies

Personalized solutions

Electrification and energy transition

Fields of application

The Enel X solutions can be adapted to suit all buildings used by the public:



Schools and Universities



Hospitals



Swimming pools (both indoor and outdoor)



Ports and Airports



Sports Centers and stadiums



Public transport deposits



Public Administration buildings



Warehouses and production facilities

The advantages

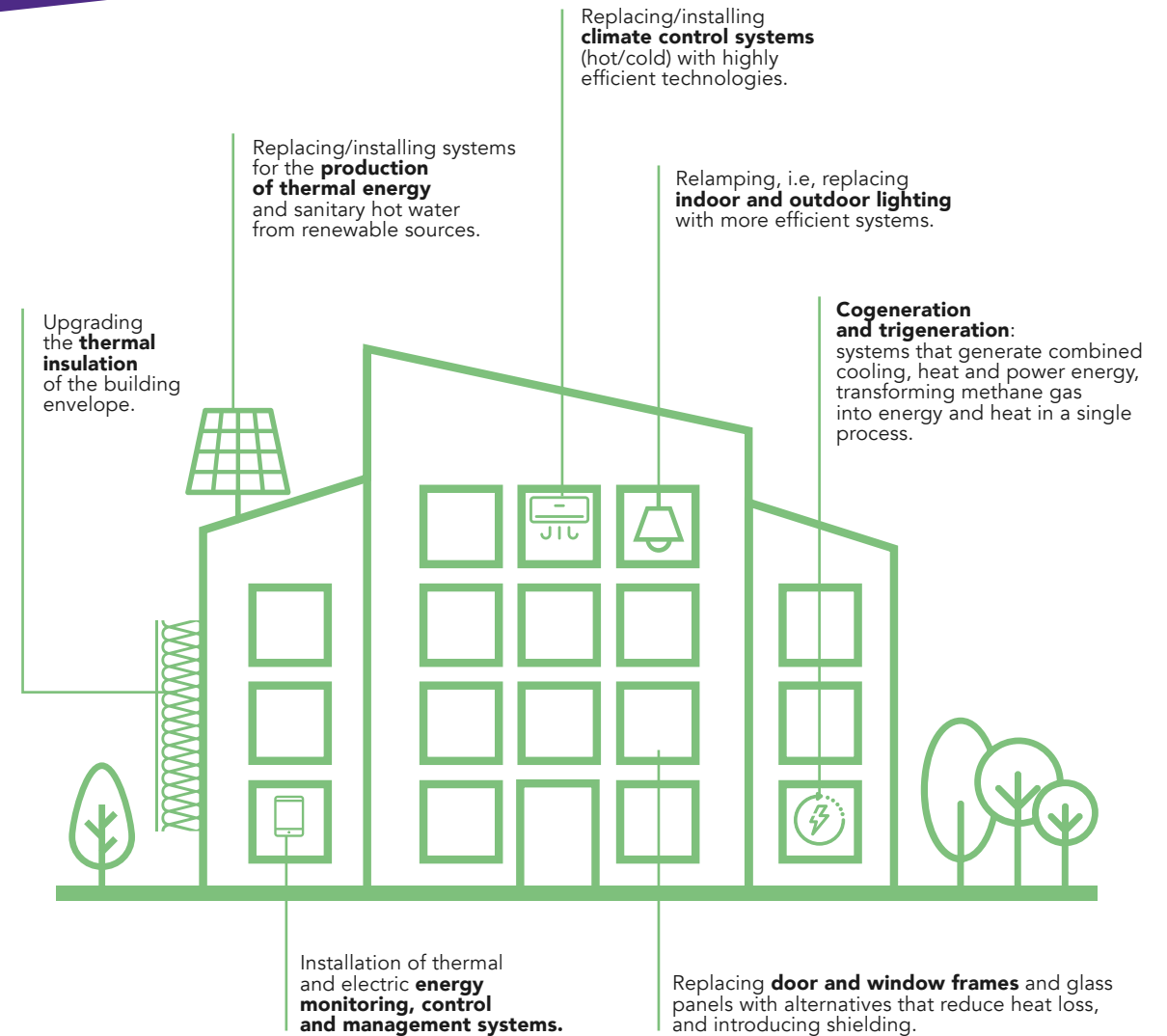
Our energy optimization intervention solutions enable us to:

- 1 reduce urban pollution**, which is often also worsened by the malfunctioning of obsolete systems;
- 2 monitor and optimize energy consumption** using computerized digital energy management systems;
- 3 offer a more functional environment** to citizens and employees and enable a series of value-added services for public use;
- 4 encourage citizens** to implement virtuous energy-saving measures;
- 5 benefit from incentives** and financing that significantly reduce the initial investment;
- 6 access**, when possible, **the new energy flexibility market** (so-called Demand-Response), by actively participating in the electric grid and generating extra revenues that can be invested in additional services to the benefit of the citizens.

Our offering

Our offering is divided into 3 main areas:

- **Digital monitoring systems, energy optimization and management.**
 - Energy audit tools
 - Energy Management Systems
 - Building Management Systems
- **Clean energy production systems.**
 - Solar Photovoltaic Systems
 - Solar Thermal Systems
 - Energy Storage Systems
- **Solutions for reducing consumption.**
 - Indoor and outdoor LED lighting
 - Heat pumps
 - Thermal wall, door and window insulation
 - Cogeneration and trigeneration



A FEW MORE DETAILS ABOUT OUR OFFERING

ENERGY DIAGNOSIS

Also known as energy audit, this is the main **analysis and benchmarking** tool that enables us to understand how energy is consumed inside the building and where intervention is required in order to optimize its use, through the adoption of innovative technical solutions that increase the energy performances.

The advantages

- **Identification of the consumption “centers”** (with the aid of any consumption monitoring data) and of the conditions in which inefficiency and dispersion occur, via a critical analysis and comparison with average consumption and cost parameters.
- **Definition of the energy optimization interventions** and the relative priority levels, depending on the investment costs, energy/economic savings and the intervention payback time.
- **Identification and assessment of the possible economic contributions available**, resulting for example from: Energy Savings Certificates, tax deductions or other types of incentive.

ENERGY MANAGEMENT SYSTEMS & BUILDING MANAGEMENT SYSTEMS

These are cloud-based platforms capable of offering **energy monitoring and management** services in “Software as a Service” mode. The information is accessed via a web interface (so accessible from PC, tablet and smartphone) that proposes different analyses to support the decision-making processes. The platform aggregates the different data flows (such as intervals, market benchmarks, weather and control data) and offers an overview of the entire public property portfolio, also comparing the individual buildings. In this way, viewing the trends of the portfolio or details of the various sites, meters or even single pieces of equipment in order to see and monitor their performances is possible and easy to accomplish.

The advantages

- **Instant data collection using** any IT protocol.
- Intuitive and versatile **personalized browsing dashboard**.
- **Customizable alarms and specific reports** for the various administrative departments.
- **Analytical measurements** compliant with the legislation in force (Italian Legislative Decree 102/14).
- **Continuous control over energy costs**.



SOLAR PHOTOVOLTAIC AND SOLAR THERMAL ENERGIES

Photovoltaic systems are devices composed of a series of cells capable of capturing **solar energy** and converting it into electricity. The electricity generated by the “photovoltaic generator”, formed by various photovoltaic module or panels, under the form of direct current, is then transformed into alternating current by the so-called inverter. In the case of solar thermal energy, the panels heat up a heat transfer fluid, and the energy generated can be put to various uses, such as producing sanitary hot water.

The advantages

- **Electricity consumption savings and financial advantages** (in the case of solar thermal energy up to 70% less than traditional systems for the production of hot water).
- **Distributed generation and a more independent supply** (and the possibility of selling the renewable energy).
- **Respect for the environment**, with lower emissions than normal generation systems.
- **Low maintenance costs and reliable technology.**

ENERGY STORAGE SYSTEMS

Energy storage systems are devices that store electricity, conserving it and making it available when the need arises. The possibility of storing energy can, for example, be very useful in the presence of a photovoltaic system that produces more energy than the amount consumed during the day by the building. In this way, the storage devices allow the maximum potential of the photovoltaic system to be exploited, as they **accumulate the energy produced** during the day and use it in the evening, without putting it into the grid.

The advantages

- Allows the production and use of **green energy**.
- **Maximizes** the photovoltaic plant **performances**.
- **Lowers the costs** in the bill.

HEATING AND COOLING HEAT PUMP

Electric heat pumps are an **innovative heating and cooling system** that replaces the gas/oil boiler for producing cold and warm air within a building. These systems are based on different technologies that combination air-air, air-water, water-water depending on the temperature outside and the current hot water distribution system. During use, the characteristics of the existing infrastructure that distributes the heating and the external temperatures are key factors that must be taken into consideration.

The advantages

- **The heat pump is generally much more efficient than a high-end gas boiler.**
- **Electric heat pumps can be used in many different kinds of buildings** to control the extent to which they are heated or cooled.
- **Heat pumps can be remotely controlled and set**, so simultaneously enabling the flexibility and optimization of the load to be established.

THERMAL INSULATION

Thermal insulation (or caulking) is a technical solution for insulating two different systems with different environmental conditions, so that they do not exchange heat or sound vibrations with one another. Caulking can therefore provide thermal, sound or combined thermal and sound insulation.

The advantages

- **Eliminates dispersion of heat**, reducing futile costs.
- **Enhances the energy efficiency of the building**, achieving significant savings in terms of resources and money.
- **Increases the life of the building.**

LIGHTING

Efficient lighting solutions optimize the building's lighting system, replacing the existing light bulbs both indoors and outdoors. The **LED technology** alone enables an energy consumption saving of over 60%. This saving could be further improved by integrating solutions for the **remote lighting control** of the installed system.

The advantages

- **Improved lighting** (the LED light bulb provides 5 times more light than a halogen one).
- **More comfort and security.**
- **Limited investment** with strong impact on the energy bill.
- **Possibility of integrating many services**, such as connectivity.

COGENERATION AND TRIGENERATION

With Cogeneration, one system simultaneously produces electricity and heat. This occurs by way of a cascade system that transforms the energy of the fuel into electricity and converts the heat released during the combustion process into thermal energy.

Trigeneration can be interpreted as an extension of cogeneration: as well as generating electricity and heat, it also produces cooling energy. The system works by way of a cogenerator paired with an absorption refrigerating unit that turns the thermal energy into cooling energy by changing the state of the coolant.

The advantages

- **A bill that costs 40% less**, allowing the user to offset the machine in two years, or slightly longer.
- **Production of electricity and heat where needed**, with an efficiency rate close to 100%.
- **Environmental protection:** emissions of polluting substances are reduced.

DIFFERENT DEGREES OF INTERVENTION, DIFFERENT LEVELS OF OPTIMIZATION

Renovation of technical systems (heating, cooling, lighting), expected optimization:

30-40%

Significant renovation, expected optimization:

>50%

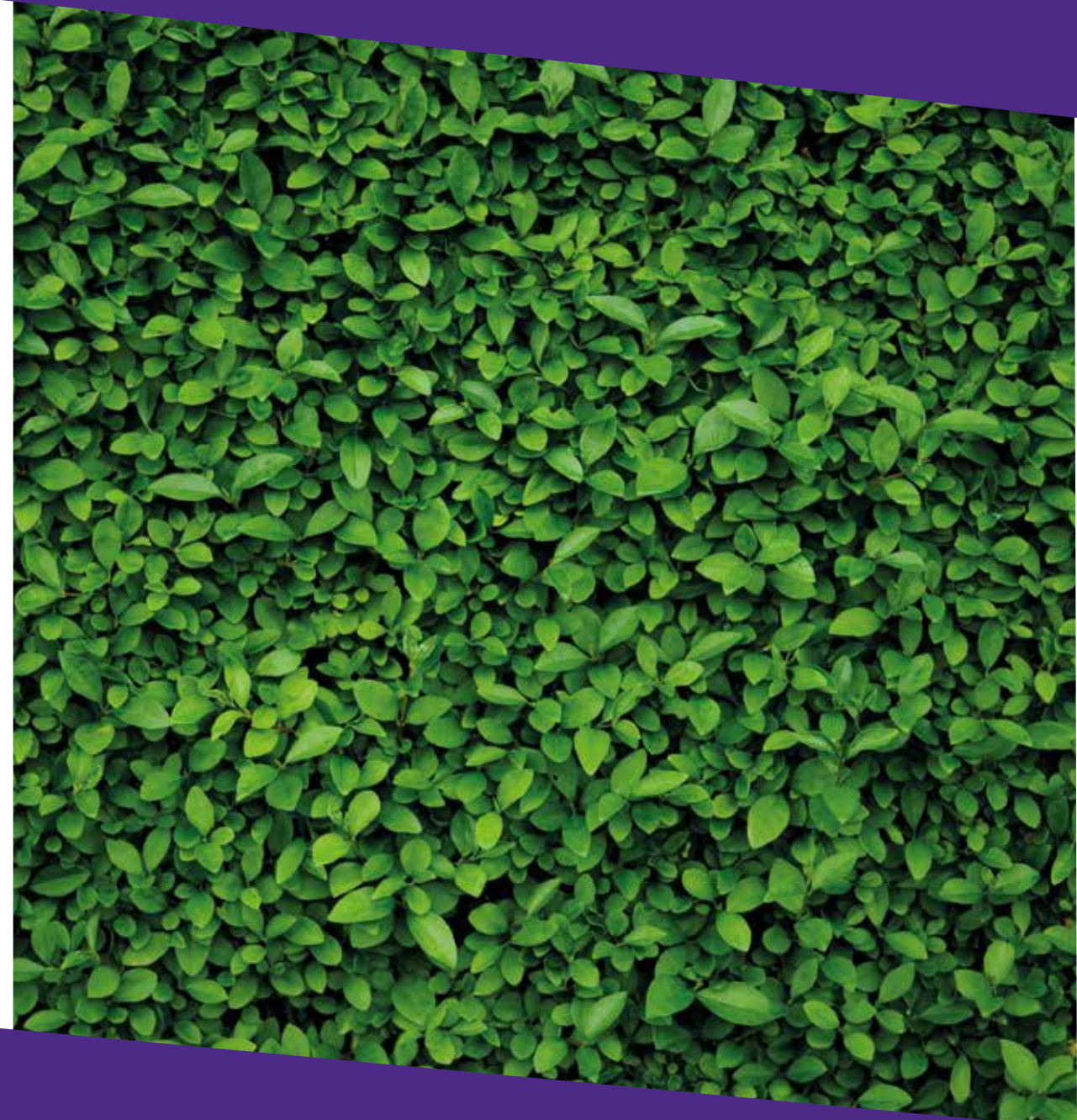
Renovation of technical systems + structural interventions, expected optimization:

40-50%

Our approach

Every energy optimization project is unique. Each one starts from an in-depth study of the specifications of the property under review and its systems, and from **a full understanding of the customer's needs**. This is followed by our integrated intervention proposal, which covers the entire project phase, from installation to dedicated training for the staff responsible for the monitoring and management of the control platforms and providing support the solutions.

Audit > Integrated offer > Installation > Management platform training > Support

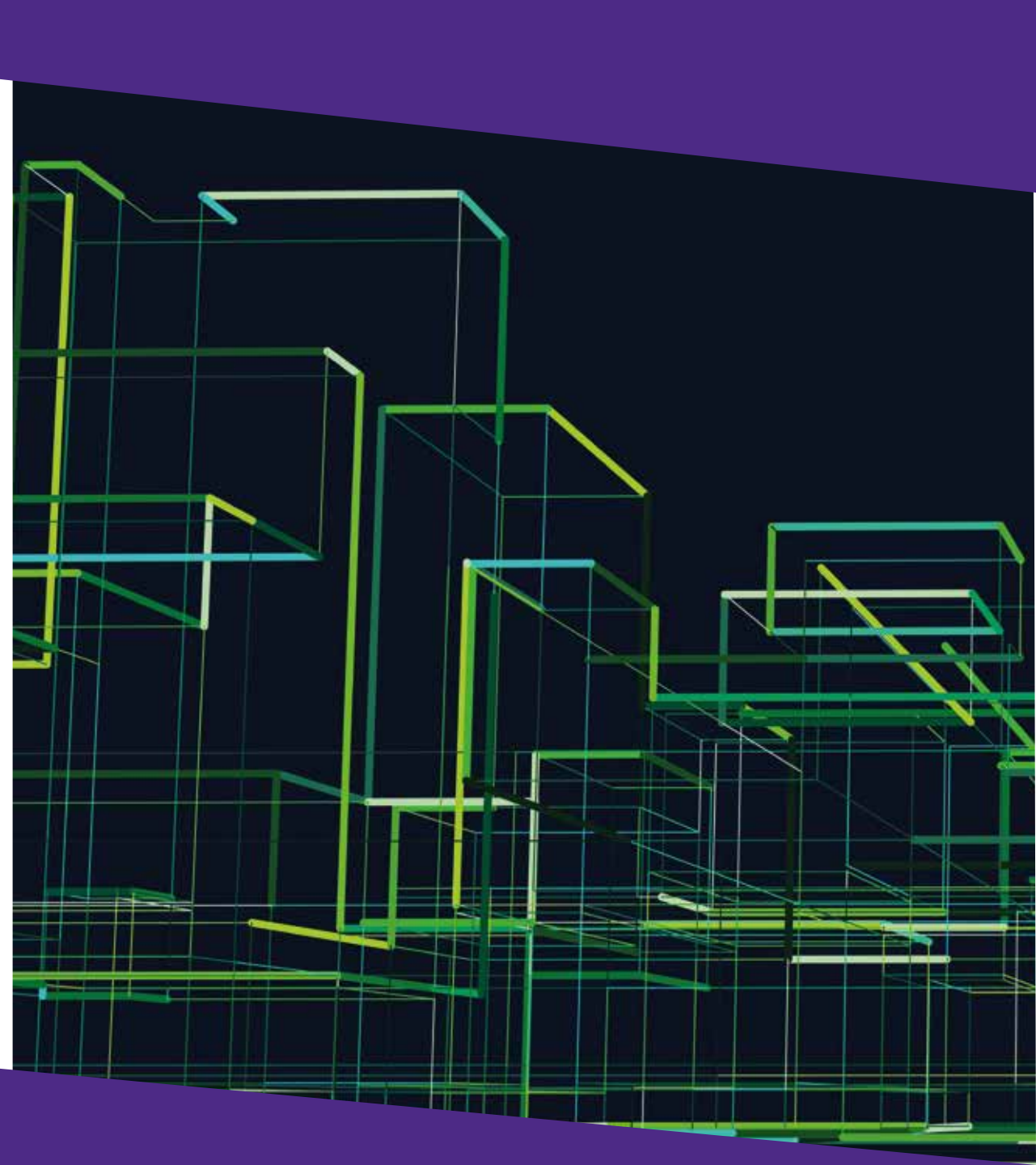


ENEL X: THE BEST PARTNER FOR MAKING YOUR CITY EFFICIENT, ONE BUILDING AT A TIME

- > The experience of a **leading company** in the energy sector.
- > The dynamic drive and **technological innovation of a startup**.
- > An **in-depth knowledge of the Public Administration**, accrued over the years, enabling us to support administrations in the full awareness of their challenges and problems, acting more as an operational partner than a mere product supplier.
- > Our **capillary presence** in the territory.

How much does it cost?

A lot, not much or nothing. The Public Administration will continue to pay the energy bill which already contains a discount on the current expenditure, and will do so for the number of years envisaged by the contract established. The energy saving generated by the renovation of the property will enable the Public Administration to recover its initial investment, as it is entirely covered by Enel X, and so entails no further expenditure on the part of the Public Administration. When the contract reaches its expiry date, the entire amount saved as a result of the energy optimization intervention remains in the account of the Administration, which can use it to provide **new services for citizens**.



USE CASES

CAPANNELLE RACECOURSE, ROME (ITALY)

Enel X developed a **Smart Energy Solution** based on **lighting services** to improve visibility in the structure, provide an efficient service by using cutting-edge technologies.

The situation

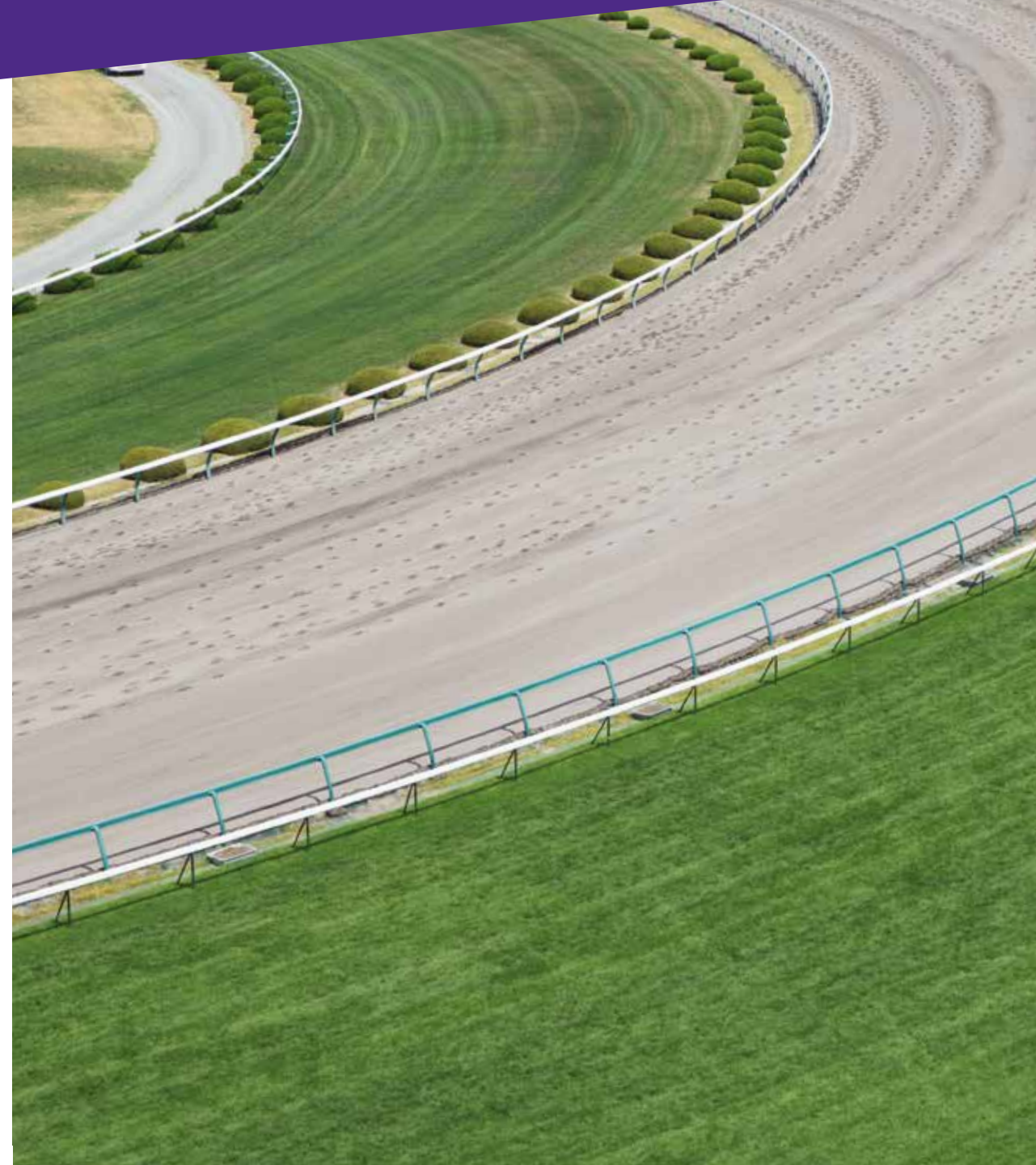
The project mainly addressed the horse boxes at Capannelle Racecourse in Rome. Here the original lighting system was equipped with traditional incandescent lamps with bayonet connection.

The project

The project involved the substitution of **LED lighting** sources and a general **restoration** of the system, given that many boxes presented lighting devices that were obsolete or damaged.

The result

The power installed ante-operam was **80kW** whereas post-operam **16kW**, with an energy saving of 80%. The minimum level of lighting has been granted in compliance with UNI EN 12464-1, which establishes the optimal standards for the specific activities.



PUBLIC BUILDINGS IN VITORIA-GASTEIZ (SPAIN)

The situation

The Municipality of Vitoria-Gasteiz in Spain chose Enel X for the supply of electricity, full optimization and maintenance of **42 public buildings**, such as civic centers, sport facilities, public offices and cultural centers.

The project

The activities included:

- optimization of management, intermediation and acquisition of electricity;
- Supply of standard internal lighting, replacing compact fluorescent lamps with new LED devices;
- revamping of the electric plant.

The result

Savings for the client are estimated at latest **20%**.



THE SCHOOLS IN DESENZANO DEL GARDA (ITALY)

The situation

The municipality of Desenzano del Garda chose Enel X to study and implement a plan of energy requalification of two elementary schools, a high school, the gym and Villa Manenti.

The project

After an accurate energy analysis, the following interventions have been executed:

- > installation of new condensing components powered by methane gas and capable of guaranteeing adequate temperatures;
- > installation of thermal energy meters. Static ultrasound components have been selected to minimize functional problems and consequently reduce maintenance and control activities;
- > installation of a new remote control and supervision system that will enable the accurate control of all the main parameters such as temperatures, positioning of valves, status and alarms;
- > particular attention has been paid to the treatment of water in all its phases.

The interventions have been realized respecting the landscape and the historical value of the buildings, and the activities executed only after specific authorizations.

The result

- > Six buildings made energy efficient
- > Co₂ emissions avoided: 390 tonnes/year
- > Trees planted 10,000
- > Tonnes of Oil Equivalent (TOE) avoided: 190



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For further information visit the section dedicated to City on our website www.enelx.com

