



Educational solutions

Renewable energy & energy management

Schneider
Electric™

Presentation

Context

Energy saving and using renewable energies is a fast-growing trend. As consequence, most companies and communities must respond to demands requiring new skills such as designing new facilities and renovating individual housing and service buildings. Although, there is currently few or no staff trained for.

From designing to operation, the new skills are needed in the whole field of energy saving and renewable energies.

Professions involved

Design offices, architectural firms, local authorities in charge of buildings, retailers, distributors, producers, operators, installers...

Target skills

- Project Management
- To justify and technically argue the choice of green technology solutions over classical ones in the spirit of eco-design and sustainable development
- To advise craftsmen, installers and communities in implementing solutions meeting environmental standards
- To develop energy forecasting and analyse energy use assessments
- To assess the energy efficiency of a system and propose solutions to improve and optimize its performance
- To lead teams of advanced energy solutions installers
- To determine the size and manage installations through the implementation of renewable and remotely-controlled energy sources
- To guarantee results of operations and energy saving

Renewable Energy Laboratory

This laboratory uses multiple energy sources including the electrical grid, solar, wind and hydro powers.

An inverter is provided to operate with the grid in two ways:

- Connected: produced energy is re-injected in the grid
- Not connected: stand-alone functioning

The teaching objectives of this installation are:

- To study different energy sources
- To implement several types of installations
- To carry out qualifications necessary for photovoltaic and wind power management
- To use centralised data from a computer

This set allows installing solar panels and wind turbine taking into account all assembly instructions:

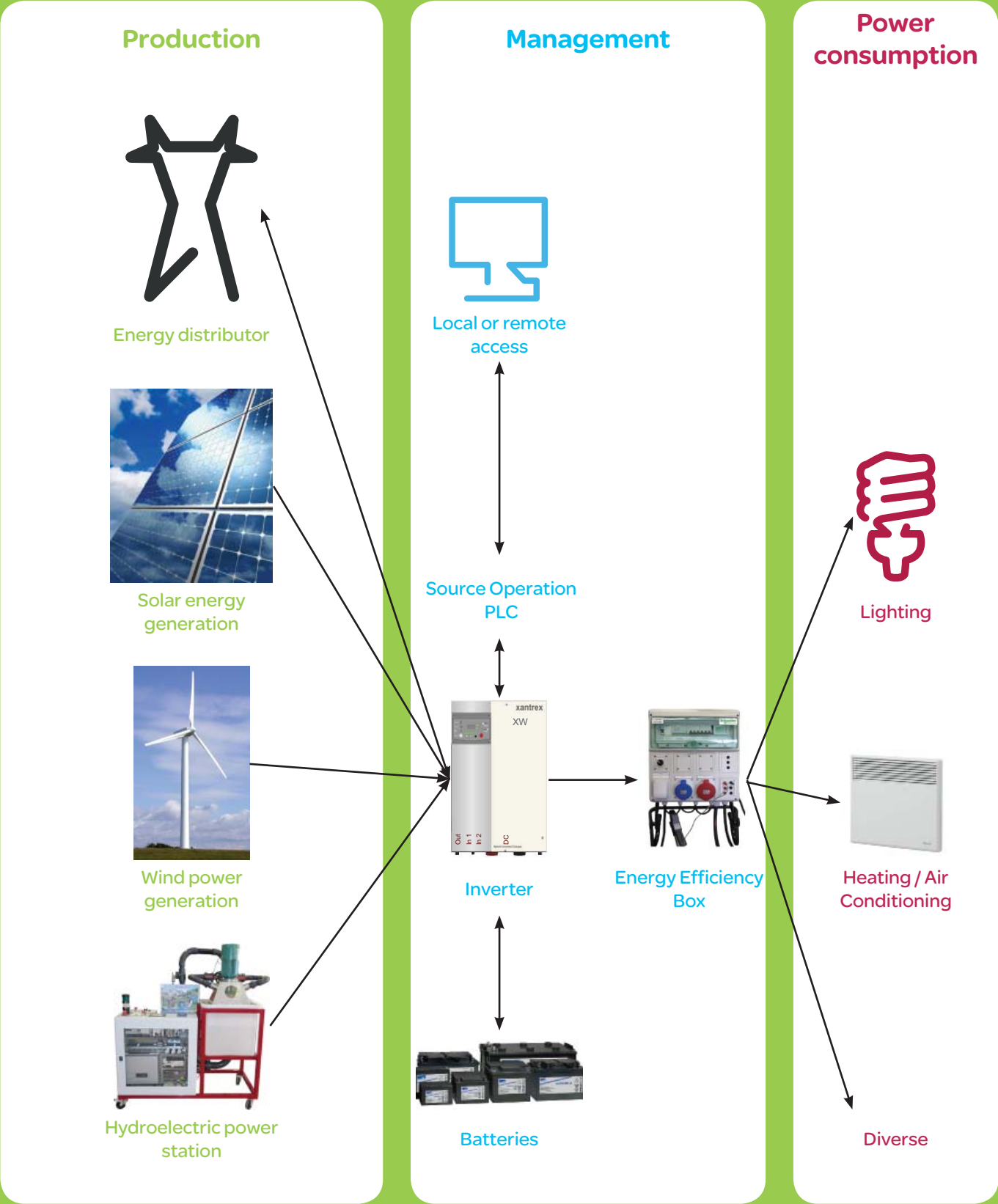
- Optimization of the direction and the slope of panels
- Global sunlight
- Speed and direction of wind

A Programmable Logic Controller (PLC) is provided to control the installation from distance.

Renewable energy



Multiple sources generation laboratory



Renewable energy

In this laboratory, we also offer advanced teaching technologies of several subsystems. These subsystems enable to study various solar panels, a photovoltaic inverter, a wind turbine and their power management as well as to control re-injection in the electrical grid.



Photovoltaic panels training bench (MD1AAPPV)

This bench enables to study the transformation of the solar power into electricity by means of polycrystalline (60 W) and monocrystalline (75 W) panels. An artificial luminous source of 3000 W allows using this bench with reproducible measures in a laboratory room at any time of the day.



Photovoltaic panels training bench (MDG99225)

The training bench simulates a full system. The SunEzy inverter is provided for photovoltaic applications which are connected to the grid. It allows observing restrictions and solutions of the system: the pre- and post-protection, inverter settings, operating restrictions and data mining on the PC as well as understanding and controlling phenomena to ensure a reliable and productive photovoltaic system.



Solar modular offer (MD1AMLSOL)

The different subjects that can be approached are the identification of the equipment, the study, design and implementation of solar panels, the features of these latter depending on the temperature, the slope and sunlight; using an inverter and a regulator as well as different ways of charging and discharging the battery.



Wind turbine training bench (Consult us)

It allows understanding the functioning, analysing solutions and explaining performance of a wind turbine connected with electricity of the grid. Its robust design enables carrying out studying, commissioning and maintenance activities.



Wind turbine analysis bench (Contact us)

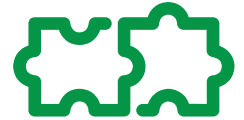
It allows the study of different stages of the energy conversion chain and its control. Students can identify the components, analyse and characterize their functioning as well as measure electrical quantities to validate their performance. Thanks to its original design, this analysis bench enables the wind turbine to operate whether charged or not.



Wind turbine case (Consult us)

It is represented as a case with an exploded wind turbine to understand its operation mode. There are also a scientific folder about the wind turbine, its translation in different technologies and more detailed technical data.

Energy management



In this energy management laboratory, we propose to study the solutions of optimization of energy consumption:

- To **analyse** the energy losses generated by harmonics and reactive power
- To **implement** solutions for compensation
- To **optimize** the operation of public lighting and the air treatment power station as well as the consumption of heating and lighting



Reactive energy compensation (MDG99160)

Teaching objectives:

- To modify, identify and correct the phase difference factors on an electrical installation
- To highlight and study the influence of harmonics phenomena on the capacitor and the inrush currents related to the commissioning of the capacitors
- To implement suitable solutions



Harmocem: Electromagnetic interference bench (MD1AG150H + MDG99198)

Teaching objectives:

- To identify the harmonics generated by different receivers
- To detect interference due to the cohabitation of low and intense currents
- To implement suitable solutions fulfilling wiring requirements



Didalub: Public lighting management bench (MDG99300 + MDG99309)

Teaching objectives:

- To identify and implement management and saving of energy
- To explore the quality of an electrical network
- To study the protection of life and property



Air treatment power station bench (MD1ERM...Contact us)

Teaching objectives:

- To explore the functions of an air treatment power station as well as the PLC and the telecommunication network of a building
- To commission, configure and maintain the bench
- To analyse energy balance and calculate the performance coefficients



KNX energy efficiency modular offer (MD1AM3BA)

Teaching objectives:

- To understand the concepts of energy efficiency through the KNX bus
- To optimize energy consumption by using the most suitable products
- To control lighting and heating automatically

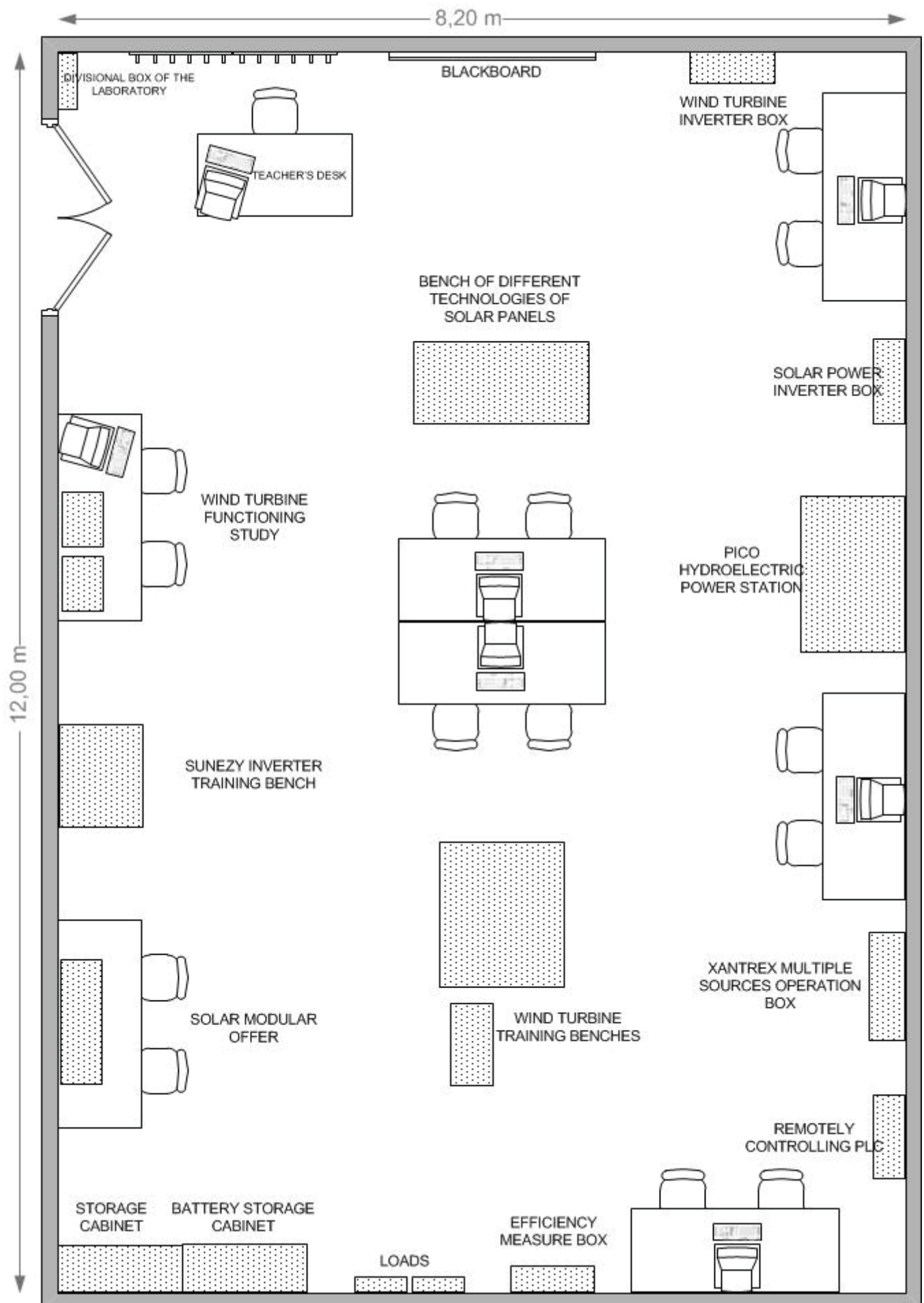


Heating control bench (MD1AE895PR)

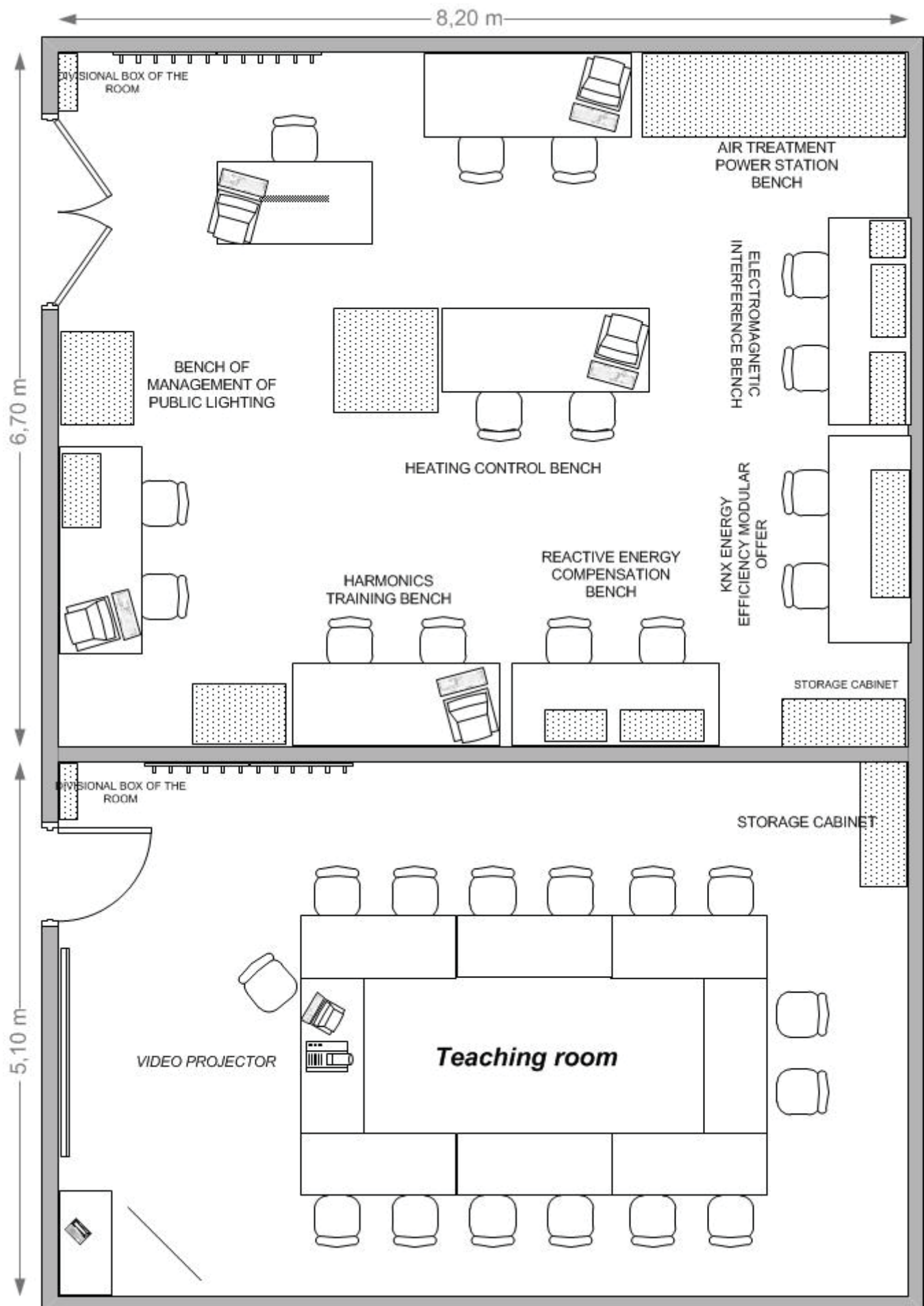
Teaching objectives:

- To use and program the control functions of a Premium PLC
- To understand and configure the operation of a control loop

Laboratory study of renewable energy



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