

T BOX METEO

The predictive weather system



T BOX METEO is the only integrated predictive **weather system for heating and cooling plants** that eliminates energy waste in real time, continuously, through a web connection with the control and management platform.

It is able to **reduce the energy consumption of air-conditioned buildings from 15% to over 30%** with the resulting economic savings and lower CO2 emissions into the atmosphere.

There are opportunities to benefit from public incentives for the use of the T BOX METEO system.

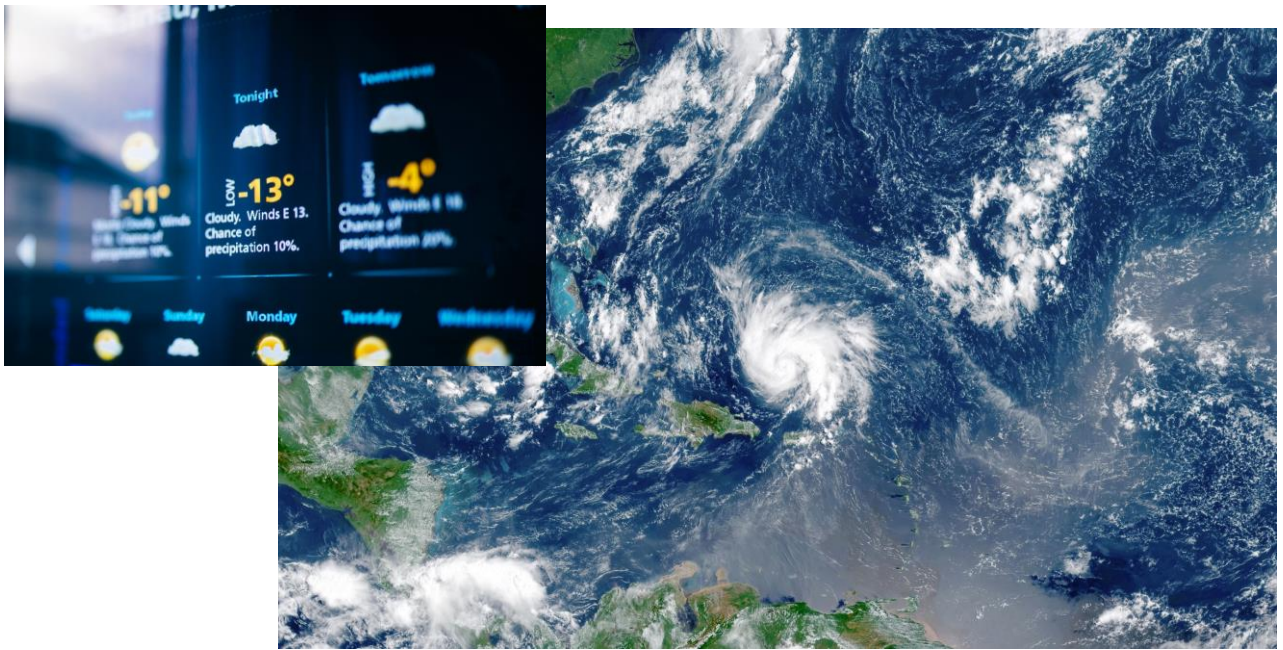
T BOX METEO: from the villa to the condominium to the large private, public, commercial or industrial building, exploiting real-time and continuous knowledge of weather variations, geo-localised guarantees automatic energy savings as well as constant indoor comfort temperatures.



TONALI E.A.
Energia & Ambiente

A unique patented system in the IoT sector

Energy wastage in power plants can be caused not only by incorrect plant sizing, but mainly by plant regulations that are often asynchronous with respect to external climatic dynamics, a common feature of all traditional regulation systems, even the latest generation. In fact, plant programming does not take into account external climatic phenomena, which are increasingly irregular and variable in the short term, and which must be foreseen in advance, before energy is wasted.



TONALI E.A. offers the T BOX METEO predictive weather system with immediate, controllable and quantifiable cost savings by automatically eliminating unnecessary hours of operation of air conditioning systems.

This system is based on a patent granted in Italy, Europe and the USA and makes it possible to guarantee constant comfort temperatures inside buildings while generating savings that can reach 15% to 30% of the bill from the day after activation.



Principles of operation and consequent reduction of energy consumption hours and CO2 emission savings

In collaboration with **Meteo Expert** (Epson Meteo), a leading company in applied research and forecasting in the field of meteorology and climatology among the most accredited in Europe, **T BOX METEO interactively and continuously exchanges geolocalised weather data useful for a correct and efficient management of air conditioning systems throughout the year, all with a consequent reduction of environmental impacts.** The weather data (mainly external air temperature) are transmitted from the T BOX METEO device to Meteo Expert in real time and continuously via a server in the cloud. The transmitted data is compared with the data processed by Meteo Expert's mathematical models, which are then **refined for the specific location concerned by projecting them into the next time period.** This continuous process of comparison and correction allows the device to use algorithms to determine the ideal time of day to turn on/off the energy-consuming systems, ensuring optimal conditions for indoor comfort. This procedure has proven to be extremely effective in limiting the operating time of the air-conditioning systems to the bare minimum, taking advantage of a factor that is normally considered a detrimental event, i.e. climate change. Operational tests confirm and improve upon Meteo Expert's theoretical assessments, which indicated an average of 15 per cent reduction in operating hours compared to standard systems operated by climate control units and electromechanical or digital clocks.

T BOX METEO, with its real-time analysis of weather data, calculates **Real Day Degrees continuously making decisions with ON/OFF or modulating controls, thus eliminating unnecessary plant operating hours.** All this guaranteeing constant programmed indoor temperatures according to UNI EN standards and DPR 74/2013 (ex DPR 412/1993), with total control on the TONALI E.A. web platform.

The efficiency of the proposed predictive weather system and the consequent economic savings realised are then demonstrated objectively through the comparison of the actual **Kwh/days** consumed with **T BOX METEO** operation on alternating days with the previously installed system, for a given period of time. This methodology is validated by the international IPMVP protocol issued by the **Efficiency Valuation Organisation (EVO).**



Connection: up to 100 wireless transmitters

Gateway communication:

- Non-point-to-point MESH network without repeaters
- Modbus RTU and Modbus TCP/IP
- Bacnet MSTP and Bacnet IP
- N.6 x 0-10Volt output
- Cloud connection



T BOX METEO
Master / Slave

Wireless Sensor

The structure consists of **master** apparatuses that interchange data through the network with both the platform and the **slave** apparatuses dedicated to measurements (**consumption**). The architecture is completed by **wireless sensors in the field that transmit the readings** necessary for correct operation. Through the platform, it is possible to supervise all the devices, system operation and savings.

Some T BOX METEO installations

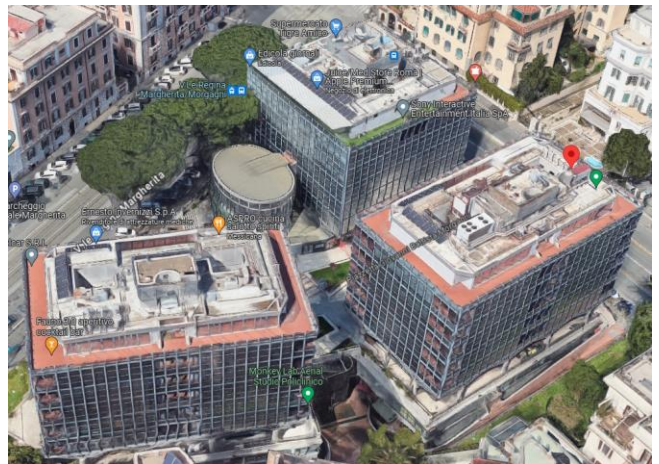


T BOX METEO system for energy saving and efficiency installed at a building complex, not of recent construction, located in Milan and consisting of **2 buildings without BMS**

Air-conditioned surface area approx. 5,850 m²

T BOX METEO system for energy saving and efficiency installed at a recently constructed building complex in Rome consisting of **3 buildings equipped with the latest generation BMS.**

Air-conditioned surface area approx. 10.800 m²



T BOX METEO system for energy saving and efficiency installed at 3 sites in Lombardy of a fast food chain, without BMS

Total air-conditioned area approx. 600 m² each. site.

Average annual savings across installations: 20% to 30%



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