BANK OF PIRAEUS – THELCON LTD

- Operational Programme "Competitiveness

Demonstration Project Brochure

Innovative application

Heat Recovery

Cooling Towers

Power factor correction

Window shades

BMS

General information:

- Title of demonstration project: Renovation of Piraeus Bank main office building
- Project developer: Bank of Piraeus - Thelcon LTD
- Location (address, Country of technology developer): 87 Syggrou Ave., Athens, Greece
- Project starting date (year): 2006
- Project status: Ongoing

Summary of project:

Piraeus Bank is one of the largest private banks in Greece, expected to have 800 branch offices in operation in Greece and the Balkans by end 2008. It is participating in several energy related projects.

In 2006, Piraeus Bank started to renovate one of its main office buildings in central Athens. This building with 7 floors above the ground and 5 underground garage floors has a total area of 19.250 m2. For the renovation, an energy design study was realized, which included the examination of energy saving potentials for the complete refurbishment of its systems - cooling, lighting, shading, control, ventilation and electricity compensation systems. Through the study, the following seven interventions, with the equivalent energy saving, were decided to be realized.

1. ***Heat Recovery:*** Heat recovery from conditioned air stream mechanically exhausted from the building
2. ***Window shades:*** Installation of regulated venetian blinds in the internal space. Control of lighting conditions
3. ***Artificial lighting level control:*** Utilization of natural lighting using dimmable ballasts. Sensors used to measure local lighting level
4. ***Building Management System:*** Installation of BEMS. Monitoring the indoor temperature, humidity etc., and controlling relevant subsystems (heating, cooling, lighting etc.)
5. ***Ventilation:*** System for measuring the quality of air in the underground parking. It will control fans operation based on the level of pollutant gases (as CO)
6. ***Cooling Towers:*** Increase cooling tower capacity
7. ***Power factor correction:*** Add capacitor systems at the main electricity supply board

All interventions have been realised and the building has been awarded the GREENBUILDING status

European Project "Eco-Building International Club for advanced European sustainable energy technology dissemination in Europe and China"

Project partners:

ENEA (IT), ISNOVA (IT), FINCO (IT), ADEME (FR), AIMCC (FR), DTI (DK), DI (DK), CRES (GR), EBHE(GR), GPREC (GR), SEC(B), ZERI (CN), CBEEA (CN)

Description of project (2 – 3 pages, including):

Aims/background

The project aims to the reduction of energy consumption of the building in order to reduce the operational cost and to contribute to the environment protection.

- Situation/opportunity for project implementation
  The renovation of the building has already started.
- Technical description (technical principle, including picture and/or technique scheme)

A heat recovery ventilator (HRV) will be used to recover heat from conditioned air stream which mechanically exhausted from the building. The HRV captures heat from the exhaust air from the building and transfers it to the fresh air entering the building to preheat the air and increase overall heating efficiency.

HRV uses two fans, one to extract air from the building and the other to bring fresh air in. The key feature of an HRV is its heat-exchange core, which transfers heat from the outgoing stream to the incoming stream. The heat-exchange core is usually made up of multiple plates of aluminum or plastic separated by narrow passages through which incoming and outgoing airstreams flow. As the streams move through, heat is transferred from the warm side of each passage to the cold, without the airstreams coming into direct contact. After passing through the heat exchanger, the warmed or cooled fresh air goes through the HVAC air handler, or may be sent directly to various rooms. Stale air from return ducts pre-conditions the incoming flow before exiting.

HRV can recovers approximately 45% of the heat in the outgoing air stream, making them far more energy efficient than letting air in and out through windows. In addition, an HRV filters the incoming air to trap particulates such as pollen or dust.

Moreover, regulated Venetian blinds have been installed in the internal space, in order to control the lighting conditions and to regulate daylight within the building.
The electric lighting control system which consists of controllable window shades and provides glare control benefits, reduce the cooling load and protect interior surfaces from UV and near UV wavelengths.

The daylighting control systems will also consist of controllable fluorescent dimming systems and photo sensors that measure the available daylight in order to control electric light levels and position of window covers. Quite simply the lighting fitting output will automatically adjust up or down in accordance with the available ambient light and will switch on and off in accordance with the area usage.

A computer based control system, Building (Energy) Management System (BEMS) will be installed in building in order to control and monitor the building's mechanical and electrical equipment such as air handling and cooling plant systems, lighting, power systems, fire systems, and security systems. BMS is a critical component to managing energy demand

The BEMS consists of software and hardware. Its core function is to manage the environment temperature, CO2 level and humidity within a building. As a core function in most BMS systems, it controls the production of heating and cooling, manages the systems that distribute this air throughout the building, and then locally controls the mixture of heating and cooling to achieve the desired room temperature.

A Ventilation System for measuring the quality of air in the underground parking will be installed. Sensors will measure the level of pollutant gases and will control fans operation based on the concentration of these gases.

Finally, the capacity of cooling towers will increase from 170 to 220 RT and a power factor correction will be succeed by adding capacitor system at the main electricity board with storage capability 30% of the max demand.

Performance:

- Energy data

The total energy savings, by the implementation of these measures are estimated to be 476.8 MWh/yr

- Economic data

The total cost of investment is estimated to be 330,000 Euro, since the energy benefits are estimated to be 55,000 Euro annually. Therefore, the simple payback time of the investment is 6 years. Taking into account that the discount rate is 6% the Net Present Value (NPV) is 330,437 Euro and the Internal Rate of return (IRR) is 15.78%

- Environmental data
- Carbon Dioxide emission reduced

Further information:

Name of project developer	Mrs Lia Baloglou, Technical Director, Bank of Piraeus
Address	Panepistimiou 18
City	Athens
Postcode	GR 106 72
Country	Greece
Telephone	+30 210 333 5074
E-mail	baloglouLE@piraeusbank.gr
website	www.piraeusbank.gr