EU 6th Framework Programme

ECO-Culture: Demonstration and dissemination of ECO-concepts for high-performing European cultural buildings

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www.cowiprojects.com/ecoculture

The ECO-Culture project addresses demonstration of energy-efficient technologies integrated into three new-build cultural ECO-buildings.

The overall objectives are to

- Reduce the energy consumption and CO_2 emission related to cooling by 75-80%;
- Reduce the heat consumption and related CO_2 emission by 35-50%;
- Reduce the energy for ventilation and related CO_2 emission by 35-50%;
- Use of renewable supply sources, i.e. seawater, ground water, air and solar energy;
- Use intelligent control for maximised utilisation of the use technologies;
- Disseminate the used ECO-concepts of the high-performing cultural buildings throughout Europe and beyond.

About 2,400,000 people will visit the three cultural buildings every year.

All buildings open in 2008.

Focusing…on thermoactive slabs

The Royal Playhouse Theatre will use thermoactive slabs in the foyer and office areas. Thermoactive slabs consist of tubes embedded in centre of the concrete construction.

In the summer the thermoactive slabs are used for cooling, and in the winter they are used for heating.

Due to the large surface area, the cooling is high-temperature cooling, and the heating is low-temperature heating. This makes it possible to supply with renewable energy; seawater.

The seawater is used for both heating (20%) and cooling (100%). The thermoactive slabs also function as energy storage.

The excess heat (stage light and audience) from the performed plays are stored in the slabs in order to heat the building the following day (winter only).

The buildings and the demonstrations

Opera House, Oslo

- Demand-controlled and energy-efficient distribution of ventilation, including humidity control;
- Control strategies for glass façade, light, ventilation, heating and cooling to improve use of daylight and passive heating and cooling;
- Glass façade with solar cells, 450 m².

Royal Danish Playhouse Theatre, Copenhagen

- Thermoactive slabs for energy storage, 3,000 m²;
- Seawater cooling and heating with heat pump;
- Hybrid ventilation systems;
- Environmental friendly concrete for the thermoactive slabs.

Amsterdam Library

- Energy storage in an aquifer for heating and cooling;
- Advanced ventilation system, incl. Building Energy Management System;
- Solar façade and roof, 400 m².

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