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QUESTIONNAIRE GOOD PRACTICE SUSTAINABLE BUILDINGS

ARCHIVE AND ADMINISTRATION BUILDING
VADUZ, LIECHTENSTEIN

CATEGORY: MODEL PROJECTS BUILDINGS

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Region / local area considered:	Good practice submitted by CIPRA
Alps, Liechtenstein	

1) Short description of the action / strategy / project

The archive and administration building of the Land Liechtenstein is the first public building in Liechtenstein certified “Minergie P”.
Despite special thermic and humidity needs for the magazines of the archive, the building has a very low energy consumption.

2) Background / targets

The country of Liechtenstein needed a new archive and administration building. Archives are the memory of the Principality: they need a long term protection from natural external climate condition.
Stability of the inside climate is the central element of the building. Artificial installations or machines are reduced to the minimum: the condition should stay stable even in case of crisis or war. In this context, the owners wanted the global energy consumption of the building to be reduced, and also sustainable material to be used.

3) Detailed project / program description

The archive and administration building is the first public building in Liechtenstein with the Label “Minergie – P”. It is divided in 3 different spaces in terms of function, climate requirement, accessibility and security:

- Public area with library
- Administration area with offices
- Archive area with “magazines”, not open to the public and with special characteristics.

The building is attached to the new parliament building and is the key to the re-designed government area of Liechtenstein. The back of the building is integrated into the slope. Thanks to its massive shape and its thick walls, the insulation is efficient in any season and no air-conditioning is required. The low needs in heating and cooling are covered by a ground water heat pump. The temperature of the archives, regulated thanks to the inertia of the concrete walls, stays between 16 and 20°C. When the outdoor conditions are better than the conditions in the magazine, fresh air is supplied from the outside, otherwise, there is only an air circulation in the interior. The slogan is ”natural air-conditioning with intelligent ventilation”.

To the stabilization of the air humidity different materials have been tested in series of experiments for their ability of the damp storage and damp delivery. The material “Prosorb” (see bottom picture) has been chosen. This granulated material is integrated into the cardboard boxes inside the shelves.

The outside wall is made a facade of clinker bricks of 115 mm thickness in front of a 40 mm air layer, 180 mm mineral wool, and finally a 250 mm tick reinforced concrete wall. All in all 32 500 clinker bricks were necessary for the visible facade. The roof is planted with grass.

4) Funding / financing / costs

The total cost of the building is 13,89 Mio €, equivalent to 4.435 €/m2. It was financed completely by the government and administration of Liechtenstein.

In comparison to conventional archives the building uses 60-80 % less energy, although it is not completely self-sustainable. There are no revenues generated from its function as a closed archive, so a continuing financial input is needed. This input is minimized by the small amount of energy required for all processes in the building. For heating, warm-water, lighting, air-conditioning and ventilation 32kWH are used per m² and year.
The prospect of this public building was a long-lasting, resistant construction which needs minimal input over the time.

5) Main results

In comparison to the earlier archive, the energy consumption has been reduced by 80 %. Indicator is the overall energy consumption (kWH/a) for heating, warm-water, lighting, air-conditioning and ventilation.
The use of the humidity-absorbing material “Prosorb”, thick concrete walls and clay-panels require only a minimal ventilation and air-conditioning. The system as a whole is also keeping its qualities during short-term technical breakdowns. All together it is an economically efficient strategy for new and reconstruction of archives.

6) Analysis – lessons learnt and success factors

The Archive and administration building in Vaduz, Liechtenstein, implements the Minenergie-P Standard for a special kind of public building. It shows that there is no contradiction between energy-efficient-building and special needs like constant humidity and temperature.

Lessons learned concern mainly practical knowledge about new and special requirements. New materials (Prosorb) proved to be useful for regulating humidity. On the other hand massive concrete walls (up to 40 cm) contribute as a temperature and humidity buffer, but need special ventilation during the drying process. This process lasts 10 years and requires additional ventilation and thus increased energy input. Because of the long drying process, energy-saving ways of ventilation have been tested. Now “monoblocks” are used. They are set up to ventilate one room after the other, so only one monoblock for about 4 rooms is enough.
An important success factor was the determination of the building owner to create a resistant, long-lasting building even at increased costs. This was also possible because the function of the building, as keeper of a nation’s history, is a concern to the whole society. The additional cost, caused by the use of new materials and benefits to regional craftsmanship and supply chains, was not a crucial criterion.
One strength of the building project is that it is transferable to other locations, as archives are needed in several places. The methods of regulating humidity and temperature, while the building is still much more energy-efficient and resilient than the old building, can be applied to any new archive being built.

Several factors added up to make the project a success:

- An important promoter of the project was the former head of the archive (Paul Vogt),
- The building administration “Hochbauamt Liechtenstein” had the instruction to implement energy-efficiency in all public buildings
- The special situation of the archive (in the slope) made it easy to build energy-efficient (low temperatures in Archives, up to 1m thick Concrete-Walls, few windows, ventilation system required anyway).

Difficulties encountered were few. The building-structure is widely accepted in the public.

Collecting all data required for the Minergie-Standard was difficult and did cost much time.

7) Time frame

Construction: Februar 2005 - October 2009

8) Contact project owner

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- http://www.minergie.ch/buildings/de/details.php?gid=FL-002-P (de, fr)

9) Add Logo and 2-3 pictures or diagrams if appropriate!

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