

ENGINEERING
TOMORROW

Danfoss

Case Story – Hotel Bulwar

Advance technology and **exclusive interior in historical building**

35 years
of experience

means you can rely
on Danfoss



Bulwar hotel has been equipped with modern systems for central heating and air conditioning based on renewable energy sources.



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said Robert Zbierański



tula river, opening the famous panorama of Torun, which is inscribed on the World Heritage List of UNESCO. Standing next to the Lean Tower, medieval fortifications and imposing gothic buildings, it lets us breathe in the long history of Torun. Enjoy a stunning view of the magnificent monuments of the City, boulevard meandering along the Vistula river or city bridge bathed in light at night.

Friendly climate and unique atmosphere of the hotel had been reached through a range of innovative solutions in the area of heating and ventilation. Individual steering makes it possible to create comfort in every room, according to our

tion of the systems is extracted from eighteen boreholes sunk to a depth of 182 metres and situated around the building, also under access roads and driveways. The geothermal wells are operated as an energy buffer: in summer they accumulate the heat recovered from the building, and in winter they provide energy necessary for operation of internal heating systems.

Additional energy is produced by solar panels that support operation of the heating system, increase the temperature in geothermal wells and are used for preparation of domestic hot water. Such a configuration of energy sources can increase the temperature of geothermal water

are slightly higher than normal - approximately 14 °C. In consequence, operational costs of the system can be substantially reduced. The cooling system is based on passive solutions and is supported by compressors. It means that the comfort provided by air conditioning is based mainly on renewable energy and, only if necessary, is backed up by technical devices" said Robert Zbierański of Ro-Instal company.

Domestic hot water with a temperature of 55-60 °C is prepared by heat pumps operating at high COP in two double shell KBH containers. The initial heating is provided by condenser units, and the final temperature is obtained using hot



In 1819-1822, for Prussian infantry and artillery, a complex of military barracks was built, along the Vistula river. The object has been called "Barracks of Racławice" ever since, constituting a part of city fortifications. What was interesting in the aspect of its military functions, was a so called "bomb pillow". It was a "blind" storey of the building, ca. 2 m high, filled with a mixture of clay, sand and ashes, situated between the third and fourth floors of the building. It had defensive function, being supposed to keep bombs in itself, during eventual air raid. In 1921-1938 the first in Poland Navy's Officer School had its seat here, subsequently moved to Tczew, and at present with its seat in

Gdynia. After the second world war the building served as a dormitory of the technical college.

Since 1993, when the dormitory was moved away, it fell into ruin. In 2001 the City decided to sell the building, with the aim to adapt it to a hotel.

Teams of architects and conservation officers worked long on a project, that made it possible to combine history of the building with requirements of modern hotel of highest standard.

Hotel Bulwar**** of Torun is situated on the picturesque embankment of the Vis-

Fact box

- **Property:** Hotel Bulwar
- **Location:** Toruń, Poland
- **Energy source:** ground source heat pumps, solar panels, gas boiler (auxiliary heater)
- **Functions:** Heating, Hot Water and Cooling (Passive and Active)
- **Control:** Building Management System
- **Danfoss units:** DHP-R 42 kW x 5 and KBH water heaters x 2

Guests' expectations and requirements. Carefully developed systems ensure comfort not only while resting in our spacious hotel rooms. They also create an unforgettable atmosphere in the whole hotel. We know that it is important for our Guests to enjoy silent, fresh and comfortable rooms during various kinds of meetings and events.

Bulwar hotel has been equipped with modern systems for central heating and air conditioning based on renewable energy sources. For generation of heat, five Danfoss DHP-R heat pumps in cascade configuration are used, each with capacity of 42 kW. The energy necessary for opera-

beyond the level achieved in traditional systems. In consequence, the coefficient of performance of heat pumps (COP) and financial savings resulting from their application are significantly higher. Further reduction of operational costs has been achieved by recirculation of excess heat into geothermal wells. In comparison with traditional water-based cooling systems that release the extracted energy into the atmosphere, the financial savings can be as high as 30%.

„One of the most notable advantages of this system are relatively low process temperatures when the system is operated in heating mode. In case of cooling, the temperatures

cooling agent from compressor units. The temperature in second water tank is maintained by the master pump controller which also controls the operation of central heating and chilled water circuits. Because of cascade configuration, in which the heat pumps are operated, it is relatively easy to obtain hot water with different temperatures for heating, air conditioning and other domestic purposes. Proper adjustment of the system's thermal output based on the actual energy demand can be guaranteed only by a hydraulically balanced system that is insensitive to pressure fluctuations and is equipped with flow adjustment devices. To meet these requirements,



Because of modern technological solutions such as solar panels and heat pumps, the hotel will substantially reduce the amount of harmful atmospheric emissions of which the absence will improve the quality of air in the Old Town area. Additionally, the energy saving technologies will reduce the hotel's operating costs.



the system has been equipped with pressure drop insensitive, flow limiting ABQM valves with mechanical driving units. To maintain the comfortable temperature in all hotel rooms: floor heating systems, local air conditioning units and modern heating & cooling bars have been used. This equipment controlled by the central building management system allows for temperature adjustment in accordance with users of individual rooms. This unique and technologically advanced system has been designed by BJM office from Gliwice and installed by Ro-Instal company from Knurów. Because of modern technological solutions such as solar panels and heat pumps, the hotel will substantially reduce the amount of harmful atmospheric emissions of which the absence will improve the quality of air in the Old Town area. Additionally, the energy sav-

ing technologies will reduce the hotel's operating costs. „Since the beginning of the project we paid special attention to the preservation of historic climate of the site. The old building, which is now used as a hotel, has been restored taking into account all its architectural details. The new parts of the building have been designed so as not to disturb its unique environment. It was our idea to create a building that forms an integral element of the Old Town and, at the same time, can offer the highest level of comfort. In short: advanced technology, elegant interior and old architecture combined” - said Mr Ryszard Urbański, the investor. Hotel Bulwar is a prominent example of historical site revitalization and application of modern technologies that can guarantee the highest level of comfort and a minimum impact on the building's environment.

Danfoss Poland Sp. z o. o • ul. Chrzanowska 5 • 05-825 Grodzisk Mazowiecki

Tel.: + 48 (22) 755 09 00 • Fax: +48 (22) 755 07 01 • E-mail: pompociepla@danfoss.com • www.pompociepla.danfoss.pl

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