Building a green ‘Flora’ Exposition Centre in Burgas

Burgas City (Bulgaria)

Background

Located on the Black Sea, Burgas is the fourth largest city in Bulgaria, and is an important centre for industry, transport and tourism. The city has the biggest port in Bulgaria and is the main hub of the Bulgarian fishing and fish processing industry.

Burgas was Bulgaria’s Greenest Capital in 2011 and for the last 30 years has hosted an international exhibition of flowers, which has become very popular. In 2012, Burgas has been awarded for sustainability of their urban policies in the field of transport management, for their work limiting the traffic of the city centre, using low emission buses and improving the urban surroundings in the framework of the global initiative EcoMobility SHIFT.

In 2013, the City of Burgas decided to replace the existing textile exposition pavilion with a modern building, which could be used year-round for a wider variety of events. The City was also supported in the project by the European Commission’s JESSICA initiative, which awarded € 1.7 million in Regional Urban Development Funds.

Procurement objectives

The overall concept for the new building was based on three pillars - functionality, aesthetics and economy - as well as being guided by the Municipality’s Strategy for Sustainable Energy Development, which focuses on reducing energy consumption and sourcing energy from renewable sources.

The contract for the construction of the new exhibition centre was awarded to the ‘most economically advantageous tender’, which also fulfilled extensive ‘green’ technical specifications covering the design and environmental performance requirements of the new building.

Subject matter of the contract:
Implementation of construction-installation works for the Flora Burgas Expo Centre.

Technical specifications:
Extensive technical specifications were set out in the tender relating to all aspects of the building and its systems. These fulfilled the requirements of the Bulgarian Energy Efficiency Act and correspond to the second highest energy class (“B”), according to regulations laid out in the Bulgarian Energy Efficiency and Energy Performance Indicators of Buildings.
Specifications also addressed the materials to be used in the construction of the building and the energy flow systems required, such as:

- Insulating materials in walls, such as extruded polystyrene with heat conductivity coefficient $l = 0.035 \, \text{W/mK}$ in walls;
- Glazing with low-emission glass (the heat transfer coefficient for all facades is $U \leq 1.9$ and for the other solid envelope elements (façade walls) $U \leq 0.335$);
- A domestic hot water system which uses a gravity-fed solar boiler located on the roof; (i.e. water is heated by capturing heat from the sun, which is then fed through the system with the pressure created from the elevation of the water tank on the roof);
- Two PV subsystems (21 panels with a combined installed electric peak power of 10500W and 12 panels with a combined installed electric peak power of 3000W) included on roofs;
- A rainwater collection and distribution system built in order to irrigate surrounding landscaping and elements of green architecture.

**Award criteria:**
The most economically advantageous tender was awarded the contract based on the following:

- Price (50 points)
- Technical Proposal (40 points)
- Proposed Deadline for finalization of the works (10 points)

Within the technical proposal, a section related to ‘protection of the environment’ was also included with a total value of 10 points, so that proposed measures for protecting air, water, soil, etc. during the construction process could be accounted for when comparing tenders.

**Results**
The design of the resulting Flora Exposition Centre building incorporates photovoltaic (PV) panels, a green roof (or living roof) and wall features, rain-fed irrigation, utilisation of natural and light-emitting diode (LED) lighting, and energy efficient building systems and materials. Its use of sustainable architecture principles has not just improved the building’s environmental impact, but also suits its surrounding landscape and complements its location in Burgas’ well-known park the ‘Sea Garden’.

The deadline for the submission of tenders was early May 2014, and three bids were submitted. All of them met the quality standards required by the City of Burgas, and all outlined the specific measures which would be undertaken for protection of the natural environment during the building process.

The winning bid offered the most comprehensive measures for protection of the environment during the building process, combined with a short time for completion of the building. The contract price was approximately 2,8 mio Bulgarian Lev (BGN), equivalent to 1,4 mio €. The duration of the contract was 268 days, and the building was completed and opened to visitors by May 2015.

**Environmental Impacts**
The most significant contributions to the primary energy used during a building’s lifetime are generally lighting, heating, cooling and ventilation. As such, the selection of materials and installation of resource-conserving systems during a building’s conception will have a significant impact on its environmental impact over its lifetime.

A total of 33 PV panels have been incorporated into the Flora Centre’s design, supplying 15,733 kilowatt hours (kwh) per year. In addition, the building has been designed to be energy efficient. Energy efficient LED lighting has been installed, and the building has also been oriented to maximise the use of natural light. The building’s air conditioning and ventilation system are also high-performance and make use of heat recovery. The building materials have been chosen with heating and cooling needs in mind. Low-emissivity glass has been used to prevent excessive heating in the summer months, while other parts of the façade use ceramic bricks which have been manufactured using a burning technique which increases the porous structure of the brick and significantly improves its insulation properties.
The ‘green’ elements of the building’s design also add further aesthetic and sustainability benefits. The green roof and green walls provide additional protection from overheating in summer, and the high quantities of water required to irrigate these green elements is sourced on-site through a storm water collection system, which stores rainwater in irrigation tanks.

Lessons learned

- Applying passive measures (building orientation, assuring natural lightning, good insulation, protecting building from overheating with appropriate landscaping etc.), led to energy savings, increased comfort for users, and created a more sustainable and economically viable building in the context of the whole building life cycle.
- During the use of the building, it was realised that planning an effective Building Management System (BMS) would increase the efficiency of implemented measures and ease the technical maintenance.
- Shading of facades is often neglected in the design stage of new buildings, but this building demonstrates that roof and wall landscaping is easily applied, and is an effective way to increase comfort of building users, especially during summer months.

Overall, this procurement demonstrates that the successful combination of energy efficient measures and attractive design is possible, without making compromises for any of them.

In future, similar tenders will include green criteria as award criteria instead of as part of the technical specifications, as this can ensure greater competition between bidders to offer more innovative methods, engage with more complexity, and propose the best solutions.

Recommendations offered to other authorities include:

- Ensure high visibility by publicising the call for tenders as broadly as possible to also make sure that enough bids/offers are presented.
- The construction tender should be preceded by a competition for the best design project if time permits.
- Do not set price as the only award criteria; this will stifle the quality of the end product or service.

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For related information, please see European GPP criteria for Office Building Design, Construction and Management, the Technical Background Report and the Procurement Practice Guidance document.