Energy Efficient Data Centre
City of Vienna (Austria)

Background

The City of Vienna’s Sustainable Procurement Programme (SPP), Ökokauf Wien, began as a project in 1998 involving the cooperation of various departments and services of the City administration. It is headed by a Programme Director and Steering Group and it continues to be one of the main drivers of Vienna’s Climate Protection Programme (KliP Wien), which was enacted in 1999 and updated at the end of 2009.

Over the last years, a number of detailed assessments have been undertaken to determine the achievements of Ökokauf Wien, the most recent of which was carried out in April 2014. In Green Public Procurement in the City of Vienna: Impact Analysis, a selection of the programme’s achievements are mentioned, including: saving 15,000 tonnes of CO$_2$ annually through efficient lighting, water saving sanitary devices, environmentally sound construction works and organic food, and avoiding more than 4,000 kg of harmful solvents each year through the use of environmentally friendly building products.

Procurement objectives

The City of Vienna recognised that the many, smaller data centres spread across Vienna, which were used by the City administration, were proving economically and ecologically inefficient and expensive to run.

With the goal of bundling staff, resources and infrastructure into a single location, the City of Vienna decided to launch a tender for a larger Data Centre, which would house all of the servers needed by the City administration and that would include the offices of Vienna’s ICT Department.

Instead of choosing a design and build procedure, the design of the Data Centre was conducted by a planning team designated by the city administration and detailed technical specifications were developed.

Following the principles of the Ökokauf Wien Programme, the aim was to build a highly energy-efficient building to house the Data Centre and several city council offices, which would have a lower impact on the environment. For this purpose, the building was designed with an innovative cooling/heating system and the use of energy-saving workplace technologies and products were encouraged.

General approach of the Vienna Data Centre

The Data Centre and its corresponding infrastructure had to fulfil the requirements of size and functionality from its present form, but would be flexible enough to handle and adapt to developments in the ICT sector over the next years. For this purpose, and to avoid the unnecessary use of resources due to an over-dimensioning of the installations to meet current needs, the City’s design team decided to create a modular concept for the building with reserve areas that could be fitted in the future.

The bundling of teams and the dissolution of the smaller centres could not only reduce costs of support and maintenance, but the new data centre could also benefit from more efficient technologies, which could highly contribute to reduce energy consumption.

“The replacement of the many, smaller data centres with a centralised green, Data Centre, has allowed the City of Vienna to reduce the carbon emissions of the work places by 100 tonnes a year, and thus reduced its energy consumption by 40%. A further 1,000 tonnes of CO$_2$ have been saved so far through the consolidation, virtualisation, and concentration of all central ICT resources.”
Procurement details

Subject matter of the contract:
Construction of the Data Centre for the City of Vienna including turnkey installation of infrastructure in 1220 Vienna, Location STAR22; including operational Facility Management general contractor.

Selection criteria:
Bidders were asked to provide references proving that similar projects with the specified minimum technical characteristics had been previously conducted and that the general contractor had the required experience.

Technical specifications:
A new unit within the city administration was created for the planning and the development of the Data Centre. This unit was in charge of preparing the detailed procurement documents, resulting in a complete document of 1,700 pages with about 5,000 positions in the tender specifications, which included the requirements regarding energy efficiency mentioned further above, such as the requirements for the use of outside air for cooling in winter or the preparatory measures to use a water cooling technology for computers to incorporate waste heat from computers in the building's heating system.

Award criteria:
The tender was awarded on the basis of the most economically advantageous tender. 65% of the points were allocated to price and the remainder of the points (35%) were allocated to the technical concept.

An evaluation of the technical concept was based on the details provided regarding the quality of the performance, the conditions of the building handover and its management (that is, facility management). For each of these aspects, it was evaluated the consistency and coherence of the proposal, the associated risks, the expertise of stakeholders and the capacity of reaction to problems.

Contract performance clauses:
In addition to the standard contractual clauses of the terms and conditions, penalties were foreseen for the case that the building was not completed on time. It was also agreed to aim for a certification of the Data Centre from the eco Data Centre Star Audit Certification.

Results

Following a year-long planning phase, the tender was published in April 2011. Three bids were received and the contract was awarded in December 2011.

The project budget, including all planning activities, external technical advisors, infrastructure and the first 36 months of facility management accounted for 16 million euro.

The construction phase began in February 2012 and the Data Centre was finished by May 2013, after a two months commissioning phase. The building comprises of nine levels which cover a total ground area of 14,500m². Seven of these levels are dedicated to office space with 600 workspaces, 22 meeting rooms, four training rooms, an output centre and one event centre. The two lowest levels of the building are dedicated to the Data Centre. These levels are located at a depth of -12m, with the ground water level beginning at -3.5m. The cool ground water provides the data centre, and the office levels above, with a free, natural cooling system, while the heat produced by the servers provides the above offices with free heating. In the colder seasons, the use of innovative technologies in the cooling system makes it possible to use external air and to provide “free cooling”.

Additional energy savings have been made by using energy-saving workplace technologies and products. For instance, by
Environmental impacts

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Lessons learned

Instead of choosing a design and build procedure, separating the design phase from the construction procurement proved to be the right choice for constructing the Data Centre. The coordination between the design team and the construction team required more time and resources than a traditional design and build procedure, but it lead to very good results.

In addition, investing enough time and resources during the design phase, lead to a smooth construction phase, which was finalised on time and achieved the desired quality standards.

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For more information, please see European GPP criteria for Buildings and the Procurement Guidance Document and European GPP criteria for Imaging Equipment. Updated/revised GPP criteria for Computers and Laptops are expected to be published later in 2016 by the European Commission.