An energy sufficient hospital
Galician Public Healthcare Services, Santiago de Compostela (Spain)

Background

The Galician Public Healthcare Services or Servizo Galego de Saúde (SERGAS) is the healthcare organisation that provides medical services to more than 95% of the population of Galicia (the north-western region of Spain). SERGAS runs 14 hospitals and more than 450 primary care centres, providing healthcare services to more than 2.7 million people.

In 2011, as part of an agreement between the Spanish Ministry of Economy and Competitiveness, SERGAS received 72 million euro in funding from the European Regional Development Fund (ERDF), to establish two innovation programmes: Innova Saúde (IS) and Hospital 2050 (H2050).

The IS programme aims to foster a safe, fast and intelligent patient-centred healthcare system. Meanwhile, H2050 seeks to develop the infrastructure and scenarios in order to evaluate and validate new healthcare products and services resulting from healthcare innovation projects, and improve intra-hospital processes and services to enable the development of a “hospital of the future”. H2050 is composed of nine sub-projects including one aimed at building a self-sustaining hospital, in terms of its energy needs. The total budget of both programmes is 90 million euro, with public procurement of innovation (PPI) a requirement of both programmes.

Procurement objectives

Project H2050-4 (a sub-project of H2050) aims to create a self-sustaining hospital energy centre. This sub-project was launched in 2012, for the new Ourense University Hospital (CHUO). The primary challenge was to optimise the energy consumption of the hospital, which was approached by launching two complementary tenders, focused on both improving the energy installations and the software controlling the energy management system.

To improve the overall energy efficiency rates of the hospital, new technologies were acquired which could obtain a high performance mix of energy sources.

It was important that the software solution chosen could also be used in other SERGAS health centres and that it served to manage and reduce energy inefficiency through monitoring the system’s generation and consumption of energy, analysing and intelligently managing energy sources according to hospital activity cycles, providing automatic warnings and allowing the user and managers to exploit all data.

The new solution also required improvements to the overall efficiency of the building, by integrating renewable energy sources, instigating storage systems and optimising the automatic management of resources.

Criteria used

Subject matter of the contract: Procurement, installation and commissioning of energy installations/equipment and management software.

Selection criteria:

The supplier should provide proof of executing at least two similar supply contracts and/or installations during the last three years for an amount exceeding 50% of the estimated amount for the new installations.
Technical specifications:

SERGAS opted for functional specifications and requested among others the following functionalities:

- Continual monitoring of energy use and generation, by monitoring in real time the energy produced by each source, the total consumption of each different use of energy on an hourly basis, and the minimum comfort level of all rooms.
- Intelligent management and analysis of the energy consumption system. The system will have an intelligent module which uses monitored data to optimise results and analyse, among others, data correlation (e.g. consumption related to temperature), energy consumption costs, defined key performance indicators and optimise energy generation and use.
- Integration with third party systems.
- Warning management to advise of any abnormalities regarding energy consumption.
- Exploitation and reports of all monitored data.
- Allow notifications by including a graphic interface which informs professionals and patients of energy consumed and produced savings in terms of CO₂ emissions, etc.

In addition, SERGAS established the following environmental goals:

- To generate 100% of the energy demand for sanitary water and heating (11,000Mwh per year) from a biomass boiler and heat motor recovery, resulting in zero CO₂ emissions.
- To generate 50% of the energy demand for air conditioning (7,600Mwh per year) from an absorption machine, fuelled by heat recovery from other processes.
- To generate 70% electricity from an Otto engine (a co-generation engine with an electrical generator and exhaust gas heat recovery for pre-heating water) and Organic Rankine Cycle (ORC).

Furthermore, all equipment should have high efficiency rates (as outlined in the contract performance clauses below).

Award criteria:

The main award criteria used related to the performance of the proposed energy equipment (electrical and thermal) and the CO₂ emissions produced by the installations, as well as the electrical efficiency of the cogeneration engine, the thermal efficiency of the biomass boiler, and the absorption refrigerator.

The award criteria were weighted as follows: Price (50%), technical aspects (25%), improvements to the current minimum requirements (15%), execution plan (6%), and a training plan for staff (4%).

Contract performance clauses:

The primary contract clauses related to performance efficiency were defined as follows:

- Cogeneration engines must have electrical efficiency ≥41% and thermal efficiency ≥42.5%
- Absorption refrigerators must have co-efficient of performance (COP) ≥0.75
- Biomass boilers must have a thermal efficiency ≥93%
- Photovoltaic monocrystalline solar panels must have an electrical efficiency ≥20%
- Photovoltaic polycrystalline solar panels must have an electrical efficiency ≥14%

Results

The contract for the supply, installation and commissioning of the new equipment was awarded in March 2013 and the new equipment was installed in 2015 by the winning supplier. The contract for the management software was awarded in July 2014 and installation took place in 2015. An analysis of the first results regarding performance will be available in 2016.

Environmental impacts

The significance of the construction sector to the European economy, society and environment is difficult to overstate, particularly given the following key facts:
In practice

Dedicating ERDF funds to innovation projects has increased the value of health infrastructures in the public sector. SERGAS recognised the importance of including key stakeholders at all stages of the project and thus developed an approach that was based on, users’ needs, requirements and ideas. These were factored into the procurement requirements.

As part of the original market engagement, SERGAS received expert input about the most suitable equipment available on the market and which equipment would achieve the best energy generation mix. Further key stakeholders included healthcare professionals (e.g. hospital staff) who were involved in the planning, execution and evaluation phase of the project. This also helped to foster the acceptance of the new concept in the organisation. Putting a project management unit in place to coordinate such large projects was certainly of great value, as well as inviting appropriate professionals to participate in the innovation process.

Lessons learned

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For related information, please see European GPP criteria for Electrical and Electronic Equipment used in the Health Care Sector and the Technical Background Report and GPP criteria for office buildings (to be published in early 2016).

1. Information taken from the guide Procuring Innovative and Sustainable Construction Solutions, from the SCI-Network