

Turning wastewater into useable resources

RYAVERKET WASTE WATER TREATMENT PLANT, SWEDEN

Procurement objectives

The Ryaverket wastewater treatment plant has the highest inflow of any Nordic plant, handling over 4000 litres of sewage per second. One of Ryaverket's goals is to consider environmental factors in its treatment methods and when purchasing equipment and supplies. Requirements such as energy efficiency, low chemical consumption and bulk transports are applied in procurement. Technical and environmental criteria are often as important or more than bid price.

In 2010 the world's largest disk filter plant was procured. Due to the compact size of the plant, new technology was sought that would use much less space but achieve the same results as traditional sand filters. Disk filters consist of fabric sheets with extremely small holes, standing side-by-side and on edge. This gives a much larger effective area, which makes the filtering more efficient. The project has included several tenders and the procurement described below is one of them.

Background

Gryaab AB is the state-owned company responsible for wastewater treatment on behalf of seven municipalities in the Gothenburg area. Gryaab owns and operates the Ryaverket plant, situated on the Swedish west coast. A high level of treatment is necessary to ensure that the sea into which the treated water is discharged is affected as little as possible. Gryaab follows the City of Gothenburg's environmental requirements for disposal and recycling of materials and toxic substances.

By removing the nutrients in the wastewater, Gryaab helps to ensure that the sea is not eutrophied. Residual products from the treatment process find beneficial uses. Biogas that is produced during sludge treatment is turned into an environmentally friendly vehicle fuel. Sludge is composted into reconstituted soil, used for landscaping and surfacing. Treatment costs are financed by water and sewage fees applied to all households in the owner municipalities.



Criteria used

A tender was issued using the open procedure for the supply of mechanical equipment. In addition to the minimum environmental requirements of the City of Gothenburg, a life-cycle costing approach was taken.

Subject matter of the contract:

Delivery and installation of pumps, pipes and other mechanical equipment for disc filter plant.

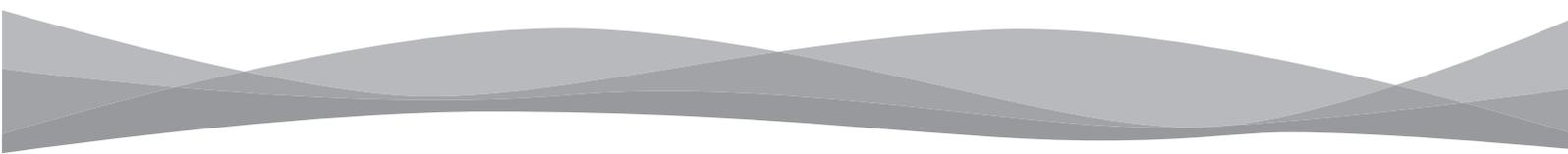
Technical specifications:

Products and materials should have the lowest environmental impact possible throughout their life-cycle. Raw materials should be sourced from renewable resources and products should offer a long service life with low operating and maintenance costs. Products should be reusable or recoverable on disposal, i.e. reused in their entirety, recoverable as a new product or used for energy recovery.

Verification: Suppliers will be required to declare the products that they use as part of the building information system, including their environmental characteristics. Where relevant, information should be provided regarding the environmental classification of products according to a third-party environmental assessment system.

Award criteria: Most economically advantageous tender on the basis of purchase price plus the cost of energy consumption by the pumps over a ten-year period, calculated according to the following formula:

Energy consumption of pump at specified capacities * Hours per year operating at that capacity * Cost of energy (= 1 SEK per kWh)*
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Verification: Tenderers should submit a declaration regarding the energy consumption of the pumps accompanied by the calculation above.

Contract performance clauses: *Environmental Management Plan*

The contractor shall establish an environmental plan that sets out the responsibilities and activities required during the contract period. The contractor shall, within two weeks of contract award make any necessary amendments to the environmental plan. The contractor's environmental plan shall be submitted to the client for review. The environmental plan must include, as a minimum:

- Name and contact details of the environmental manager;
- Description of the environmental impacts of the work and critical points;
- Waste disposal plan;
- Provisions for self-inspection;
- Provision of necessary documentation to the client.

Results

Gryaabs's disk filter plant is not only efficient but has also received many awards for its architecture. This cutting-edge technology has generated much interest from other water utilities. By evaluating the accumulated energy cost for ten years on top of the price of the equipment Gryaab purchased the most financially advantageous equipment. It is easy to make the mistake of choosing the cheapest equipment only to discover after a couple of years that the equipment is expensive to run and actually not the best choice at all. It is important to look at the entire picture – both for financial and environmental reasons.

Environmental impacts

Due to the volume of sewage handled, Ryaverket produces a lot of sludge: about 55,000 tonnes per year. This can now be used in several ways. Most of it is composted and used as surfacing and landscaping soil, but a small amount is stored for six months in order to kill off any hazardous bacteria so that it can be used on agricultural land. Sludge treatment generates biogas, about 60 GWh per year in Ryaverket's case. The crude gas is sold to Gothenburg Energy, which cleans it, compresses and sells it on as motor fuel. To increase biogas production, Ryaverket also accepts fat and food waste from restaurants, schools and food producers in the Gothenburg region.

When Gryaab purchases chemicals and other supplies it often requests larger bulk transports, this ensures there is a lower environmental impact as there are fewer journeys and an efficient delivery structure is maintained.

Lessons learned

Gryaab's experience with life-cycle costing (LCC) has been successful, and the plant will apply it in upcoming procurement actions. In the future, the Ryaverket plant will receive an increasing amount of wastewater which will affect the discharge levels of nitrogen and phosphorous. Thus the treatment process will need to be expanded. In order to gather new ideas about how to improve the process Gryaab recently advertised procurement of a feasibility study to seek knowledge from a number of expert consultants.