



Tap water triumph

To meet the chronic water shortage in Karachi, Pakistan, DHA Cogen has installed a desalination plant to supply water to about 100,000 of the city's households and businesses.

TEXT: DENISE DAVIES PHOTO: NADEEM AHMED

KARACHI, SITUATED ON THE COAST of the Arabian Sea, northwest of the Indus River delta, is the economic and commercial capital of Pakistan as well as the largest city in the country. With a growing population, now reaching 14 million, the city faces an increasing demand for potable water, which its primary source, the Indus River, cannot meet.

Efforts to find a solution for the water shortage have been under way since the 1980s. In 2000 an international search began to look for a solution that would provide a new source of drinkable water to Karachi's Defence Housing Authority (DHA), one of the largest housing authorities in Asia.

As a result, in 2003 DHA Cogen Ltd (DCL) was formed as a joint venture between DHA and Sacoden Investments of Singapore. DCL has initiated and installed Pakistan's first cogeneration plant to produce both electrical power and potable water. Its investors are from both the public and private sectors.

"This project is the first private plant in the country to

provide power and the first to produce potable water for the public," says DCL CEO Waqas Mohsin.

"As with any project, there have been interesting challenges," he says. "However, we have come up with solutions to meet these challenges."

The initial challenge was to find a site that would be suitable in terms of proximity to consumers over the 30-year life of the project. The site chosen is on the edge of the Arabian Sea, close to a residential area but not near sources of pollution or dense population.



Waqas Mohsin, CEO at DCL.

For the production of potable water, DCL chose to use Alfa Laval technology because of the company's innovative solution – a desalination process that turns seawater into fresh potable water. "The major benefit is that it requires the minimum amount of energy to convert seawater into drinkable water," says Moshin.

>>>



The DCL desalination plant in Pakistan brings water and electricity to about 100,000 homes and businesses in Karachi.

An efficient desalination process

Desalination is the process by which seawater is rendered into freshwater. The seawater is heated to the point of evaporation, and the resulting vapours are then condensed into freshwater. The DHA Cogen desalination plant outside Karachi in Pakistan uses an Alfa Laval Multi-effect Desalination unit for this purpose.

The unit consists of a series of titanium plate heat exchangers that transform the steam, retrieved as a by-product from the power plant, into pure distilled water. Minerals are then

added to make potable water that can be distributed to the people of Karachi.

The plate technology provides very high thermal efficiency. The material used for the plates is grade 1 titanium, which is considered the ultimate material in terms of corrosion resistance in seawater.

Waqas Mohsin, DCL CEO, remarks, "The Alfa Laval technologies give us a tremendous advantage in providing a cost-effective solution that has low maintenance requirements. The use of

energy is extremely efficient in the system, and there is little wastage."

Thanks to the Alfa Laval technology, he says, the use of power from the power plant is kept to a minimum, ensuring that most of the power can be sold as a commercial venture.

The DCL desalination plant is the largest ever built by Alfa Laval, says Waseem Ahmed, country manager for Alfa Laval in Pakistan. "The Alfa Laval equipment, with its titanium plates, has brought real value to the project," he says. "The technology is not only



Waseem Ahmed, country manager for Alfa Laval in Pakistan.

energy-efficient but also easy to run and maintain."

Mohsin agrees: "Using the Alfa Laval plate concept and the design of the plant, it is easy to remove individual plates for inspection and cleaning," he says. "Furthermore, having two parallel units supplied by Alfa Laval makes it possible to stop one unit for maintenance without affecting the overall running of the power plant." ■



The DCL desalination plant is the largest one Alfa Laval has ever built.



The water returned to the Arabian Sea has a temperature and salt concentration that is in harmony with the local marine environment.



▶▶ www.alfalaval.com/here/desalination/DCL

“This project serves as a good example of public-private sector partnership.”

WAQAS MOHSIN, DCL CEO

>>> Since the cost for desalination is high, the desalination unit was complemented with a solution for power generation. The co-generation of power and water offers the advantages of high efficiency and revenue generation through the sale of electrical power, Mohsin explains. He says the project required great cooperation among all partners to find effective as well as environmentally friendly solutions.

“Alfa Laval, particularly the Pakistan office, has been a big support, coordinator, partner and intermediary,” says Mohsin. “They have offered tremendous support and have really acted as a member of the team.”

THE PLANT HAS BEEN UP AND RUNNING since the beginning of April 2008. It produces 94 megawatts of electrical power and about 3 million gallons of drinkable water daily, providing

water and electricity to more than 100,000 homes and businesses in Karachi.

The power plant and the desalination unit work in tandem and are operated by 50 employees, working in three shifts. The plant is based on a co-generation concept, which means that as much as possible it uses waste heat from one piece of equipment to run another piece of equipment; for example, exhaust steam from a steam turbine is used as heat source for the desalination process. The co-generation makes the plant highly efficient in terms of energy consumption, which in turn saves energy costs.

The plant also has a very large intake of seawater compared with the output of freshwater, which means the water that is returned to the sea has a salt concentration that is low enough to be safe for the marine life and the seabed in the area. The water is also of a temperature that is harmless to the local marine environment.

Development of a second phase of the DCL plant is now in the pipeline. When finished it will increase the electrical power output to about 200 megawatts daily and meet 50 percent of the projected water requirements of DHA.

“This project serves as a good example of public-private sector partnership to solve the problems of water and power,” Mohsin says. “It will serve as a model for similar projects in other coastal areas in Pakistan.” ■