GE
Water & Process Technologies

Case Study

Reducing Sodium Levels in Municipal Effluent for Agricultural Use

Challenge

Tenerife Island, the largest of the seven volcanic islands making up the Canary Islands, has an economy based heavily upon tourism and agriculture. With the demands for water rapidly growing, there are limitations both for quantity and quality of fresh water. This fresh water is vital for irrigating island crops such as bananas and keeping the tourist industry going. Though municipal effluent from the sewage treatment plant in the city of Santa Cruz was available as a water source for banana irrigation, the salinity was too high and desalting would be required.

Solution

The alternatives considered for this desalting application were electrodialysis reversal (EDR) and reverse osmosis (RO). In the volcanic Canary Islands, with 55 mg/l of silica in the water, EDR was selected as the best technological alternative because it could achieve a much higher water recovery than RO as it does not concentrate silica. (See Figure 1 for the EDR installation in the Canary Islands.)

Figure 1: electrodialysis reversal (EDR), Canary Islands

In addition, EDR has lower pretreatment requirements than RO. The existing sand filtration was sufficient pretreatment for the EDR, whereas an RO system would have required microfiltration as pretreatment. The original 4000 m^3/day (1 million gpd) GE Water & Process Technologies EDR plant was installed in 1996. The 1999 expansion doubled the size of the plant and utilized GE's new high performance membrane stacks to produce lower salinity product water with less DC power consumption.

Today, over 80% of the farmers in Tenerife's San Lorenzo Valley are using water from the reliable, cost-effective GE EDR plant. From the Canary Islands to California, GE continues to demonstrate its strong capabilities in the area of water reuse for agricultural purposes.

End-user:	BALTEN, a company owned by Cabildo Insular, the local government of Tenerife Island
Location:	San Lorenzo Valley, Tenerife, Canary Islands, Spain
Commissioned:	1996
Expansion:	1999
Application:	Irrigation of banana plantations
Feedwater source:	Municipal effluent
Feedwater quality:	1290 mg/l TDS
Product quality:	Phase 1: 380 mg/l TDS; Phase 2: 280 mg/l TDS
Water recovery:	88%
Capacity:	8000 m^3/day (2.1 mgd)
Technology:	Electrodialysis reversal (EDR)

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