

## Power and Water Co-optimization in the Middle East

*How to minimize costs while optimally meeting demands*



Throughout the Middle East region, changing technologies and renewable targets are driving the need for simulation studies to ensure that organizations meet the demand for power generation and water production. This customer chose PLEXOS because of its specific ability to handle power/water co-optimization modelling for co-generation and desalination.

### PLEXOS Model Database

Co-optimize generation, heat production and water desalination production processes.

Model coal, solar PV, CSP and pumped storage hydro power plants.

Develop expansion planning studies and compute reliability indices.

### Situation

Given the complex nature of the code constraints involved, the project started with WSP UK, consultants with an intimate understanding of the local intricacies. The team used PLEXOS to model the cogeneration plants and then collaborated with Energy Exemplar to develop the PLEXOS code. Once tested, the customer appointed the Energy Exemplar team for the implementation.

### Solution

With over 400 different system elements, the project represented a new step in fully co-optimized world of energy systems. However, the software's unique architecture and fully integrated modules ensured that all requirements were included in the objective function.

The Energy Exemplar team also ran three-year backcasts to calibrate the system model database and found close dispatch results which confirmed that optimization performed the same as the live system.

### Results

With a calibrated database, the customer has a flexible model for performing a wide range of studies. Now secure in their analysis, the customer can run many scenarios to determine the reliability of their co-generation and desalination system.

The customer also compared the existing plan with the PLEXOS optimized plan and realized a short-term operational cost savings by implementing the optimized plan.

PLEXOS simultaneously solved for generation and water capacity dispatch, and the customer is confident in meeting electricity and water demands.

To learn more about power and water co-optimized models, visit: [energyexemplar.com](http://energyexemplar.com) or contact us at [info@energyexemplar.com](mailto:info@energyexemplar.com).