

Overview of the Kuraymat 150MWe Integrated Solar Combined Cycle Power Plant (ISCC), Kuraymat, Egypt

The Kuraymat project is located at about 95 miles south of Cairo, on the eastern side of the River Nile. It comprises two gas turbines of about 40 MWe each, one steam turbine of about 70 MWe, one parabolic trough solar field capable to generate about 200 GWh/a (thermal) of solar heat plus all associated balance of plant equipment which includes a steel structure to hold the 160 skal-et-parabolic trough collectors spread over an area of 624,438 square meters. On completion, the plant will be capable of generating 62 MW of solar heat at temperature of 393 degrees.



The Kuraymat Location

It is the Egyptian Government's objective to grow the solar energy generation sector as part of their strategy of diversifying electric power production. The global development objective is to reduce greenhouse gas emissions from anthropogenic sources by increasing the market share of low greenhouse gas emitting technologies.

The solar field for Egypt's first modern, large-scale solar thermal facility was completed in December 2010. On average the Kuraymat site provides from more than 2,400 kilowatt hours of solar irradiation per square meter and year.

The solar technology for this project was provided by Flagsol GmbH, a member of the Solar Millennium AG corporate family. Flagsol designed the solar field, delivered the control for the solar field and was responsible for supplying important key components, primarily the parabolic mirrors and absorber pipes. The solar field was built and is put into operation in cooperation with the Egyptian company Orascom Construction Industries. The Dutch NEM Company supplied a special Heat Recovery Steam Generators (HRSGs) integrated with an HTF steam generator, including all logics and dynamic analysis and one by-pass system. The electricity is partially obtained from natural gas, and partially from Concentrated Solar Power (CSP). The combination is known as Integrated Solar Combined Cycle (ISCC). NEM provided software packages which handle the interaction between the solar field, oil/water heat exchangers and the HRSG.

Project Overview

Background:

Technology	Parabolic trough
Status	Under Commissioning
Country	Egypt
City	Al Kuraymat
Lat/Long Location	29°16 ' North, 31°15 ' East
Electricity Generation	34,000 MWh/yr (Expected)
Explanation	Expected generation is based on solar fraction of anticipated total generation of 852,000 MWh/yr.
Company	New and Renewable Energy Authority (NREA)

Construction:

Break Ground	January 1, 2009
Start Production	December 30, 2010
Developer(s)	NREA

Plant Configuration :

Solar Field :

Solar-Field Aperture Area	131,000 m ²
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Power Block :

Turbine Capacity (Gross)	150.0 MW
Turbine Capacity (Net)	150.0 MW
Output Type	Steam Rankine

Project data:

Project name	Kuraymat ISCC Power Plant
Plant location	Al Kuraymat, Egypt
Customer	Iberinco S.A.U. Bilbao
End user	New and Renewable Energy Authority
Year of operation	2011

Gas Turbine:

Number of units	1
Type: GE	Frame 6FA
Fuel	Natural gas

Heat Recovery Steam Generator

Number of units	1
Type	Modular HRSG (hybrid)
Pressure Levels	2
Special feature	Solar heat as energy source

Steam:

Steam flow (kg/s)	69.4
Steam pressure (bara)	95
Steam temperature (°C)	500-560

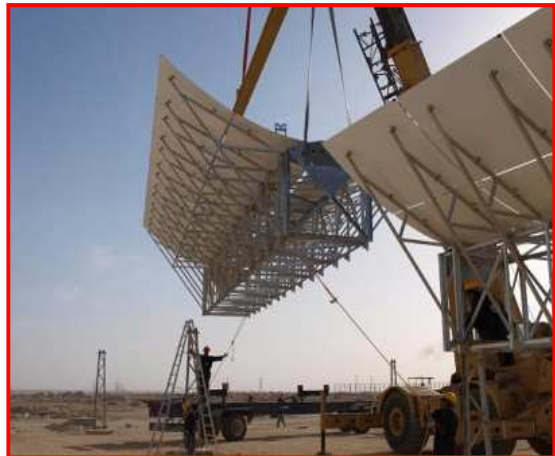
Photos of the Kuraymat Integrated Solar Combined Cycle Power Plant



Location of the Kuraymat Hybrid Power Plant

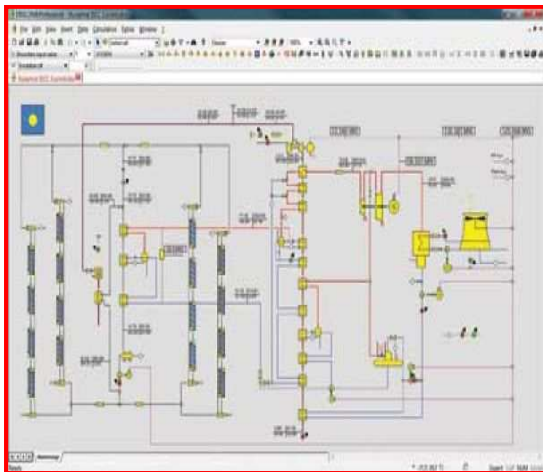


The Kuraymat Hybrid Power Plant

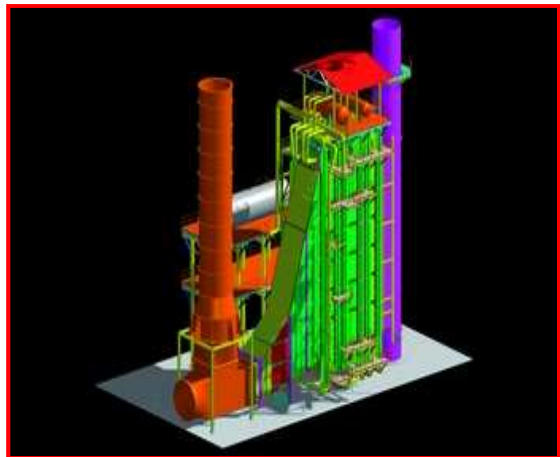


The Kuraymat Project approached Completion

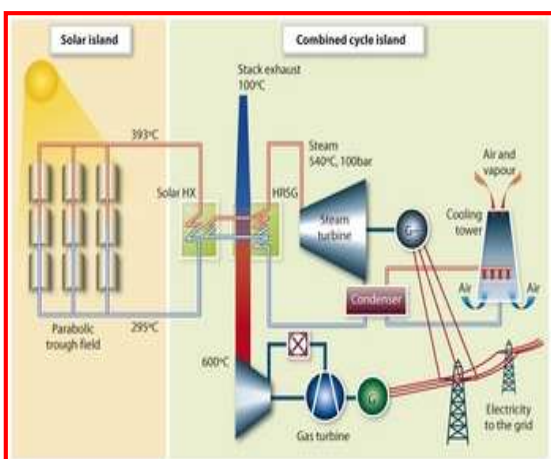




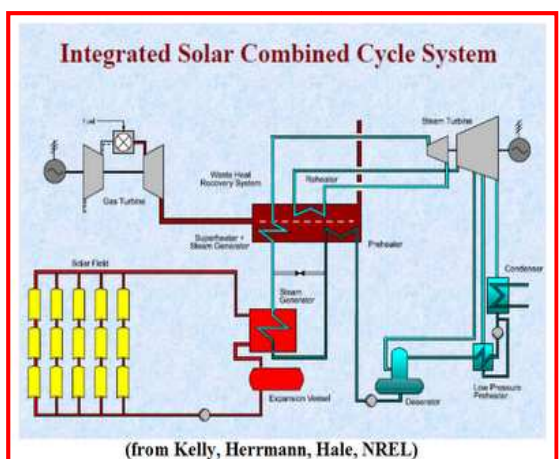
Schematic of an ISCC Power Plant



NEM Heat Recovery Steam Generation for Kuraymat



Flow Diagram for the Kuraymat ISCC Project



Ebisilon Heat Balance Model for the Kuraymat ISCC Power Plant

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