HEXAGON PPM

CASE STUDY

PGESCO DIGITIZES PLANT INFORMATION WITH HEXAGON SOLUTIONS

Key Facts

Company: PGESCo

Website: www.pgesco.com

Description: PGESCo is a leading engineering services provider located in Cairo, Egypt. The company specializes in the power industry and has designed, supervised and managed over 36,290 MW worth of power projects in Egypt alone. In addition, PGESCo has over 13,640 MW worth of on-going and completed projects in Libya and Iraq.

Industry: Power Generation

Country: Egypt

Products Used:

Intergraph Smart® 3D
SmartPlant® P&ID
SmartPlant Electrical
SmartPlant Foundation
Intergraph Smart Review
SmartPlant Interop Publisher
SmartSketch
CAESAR II®
GT STRUDL®

IDENTIFYING GOALS

PGESCo was contracted to build the South Helwan Power Plant, a supercritical thermal power plant with three units containing; steam generators, steam turbine generators and steam condensers. Once ready, the plant would be generating 650MW of electricity from each unit.

For this project, PGESCo's main goal was to meet the strict deadline of having the plant operational on schedule, while enhancing the quality of engineering deliverables and ensuring client satisfaction. PGESCo was contracted for the Front-End Engineering Design (FEED) phase of the plant, which had to be executed in accordance with the latest international codes and standards.

For this, the company was searching for software solutions to help improve engineering productivity, as well as accelerate project schedules, enhance quality and accuracy of engineering design.

OVERCOMING CHALLENGES

For this project, PGESCo worked as a Client Consultant for the owner of the plant. The scope of work was divided into six phases:

- FEED (Front End Engineering Design) – preparing the conceptual design and issue tender documents for international bidding
- Tendering & evaluation – preparing the tender document, collecting and evaluating offers and nominating the chosen bidder
- Contracting – Contract negotiations with the bidder, reviewing the proposal, preparing and signing the contract
- Design - Detailed and final engineering design for architectural, civil, geotechnical, mechanical, electrical, control system and communication systems services.
- Construction management – reviewing the detailed design and fabrication of

Figure 1: The aerial view of the South Helwan Power Plant's 3D model, generated using SmartPlant Review.

the components & the equipment, as well as managing the construction/installation activities performed by contractors.

- Commissioning & testing – monitoring the commissioning and testing activities to ensure smooth handover from the contractor to client, and starting of operations to transmit generated power to the national electricity grid.

Intergraph Smart® 3D and CAESAR II® were used for piping layout, piping support design and piping analysis to carry out the piping design activities and ensure that the detailed design by the contractors was correct. SmartPlant P&ID was used for system engineering to ensure correctness and generate the various engineering deliverables (valve, line and equipment lists, etc.). SmartPlant Electrical was used for cables design, routing and termination as well as generating electrical load list with breaker assignment.

For the structural design checks, Smart 3D was used for clash checking, and GT STRUDL® for analysis of the structural designs.

In addition, the site engineers used Smart Review continuously during the construction management phase for further clarifications and to ensure that what was designed in Smart 3D matches what was actually constructed at site.

The Hexagon PPM-based system also integrated data from external third-party systems, such as Tekla and ARCHICAD.

> The rule-driven and data-centric nature of the Hexagon products helped PGESCo to improve the overall efficiency of the project delivery."

Structural design and architectural information could be easily exchanged between Smart 3D and the third-party systems easily to ensure fast clash checking.

REALIZING RESULTS

PGESCo chose Hexagon PPM solutions to meet the strict project deadline and enhance the quality of engineering deliverables. The key reasons for choosing Hexagon PPM, software included:

Unique rule-based architecture with the capability to automate engineering processes

Figure 2: Power Block Area – the vendor models, such as the steam generators/boilers of the three units, are imported and integrated using the Intergraph Smart 3D model.

- Proactive and efficient support team
- Proven technology with strong references across industries and countries

The rule-driven and data-centric nature of the Hexagon products helped PGESCo to improve the overall efficiency of the project delivery. While there were some issues between the integration of the electrical design and Smart 3D, the overall integration between different tools enabled smooth data transfer between different disciplines, supporting better revision control. This in turn allowed PGESCo to eliminate errors to improve the quality of the engineering deliverables.

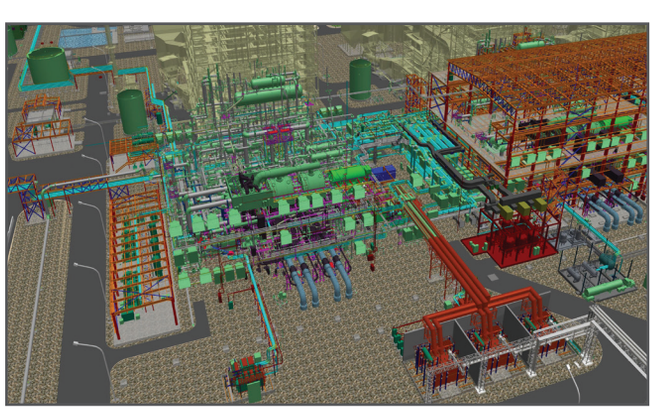

Figure 3: A sectional view showing the internal complexity of the engineered commodities inside the Steam Turbine Generator (STG) building. The piping routing, pipe supports, equipment modeling, and cable tray routing were all performed using Intergraph Smart 3D. Steel structure information was imported from Tekla intelligently. Intergraph Smart3D clash management solutions profoundly helped in creating a fully integrated, clash-free design.

Figure 3: Actual construction status of the power block area during the South Helwan project indicating that construction activities matched and validated the commodities modeled in Intergraph Smart 3D.

MOVING FORWARD

For this venture, PGESCo had a team of approximately 60 people working on the project, with 30 people having access to Hexagon tools, out of them only 20 engineers have the ability to modify and delete data, and the rest with viewing rights. PGESCo will continue to work with Hexagon tools in its current projects and expects similar benefits in the future.

Ahmed Nabil, Information & Systems Technology Manager at PGESCo, said, "Digitizing plant information with Hexagon tools helped us in eliminating human errors and data mismatches through automation and integration. We were able to use the information at the right time and place, with the latest data incorporated. Analyzing plant information was easy and could be done based on the business needs during each step of the project."

About Hexagon

Hexagon is a global leader in digital solutions that create Autonomous Connected Ecosystems (ACE). Our industry-specific solutions create smart digital realities that improve productivity and quality across manufacturing, infrastructure, safety and mobility applications.

Hexagon's PPM division empowers its clients to transform unstructured information into a smart digital asset to visualize, build and manage structures and facilities of all complexities, ensuring safe and efficient operation throughout the entire lifecycle.
Hexagon (Nasdaq Stockholm: HEXA B) has approximately 20,000 employees in 50 countries and net sales of approximately 3.5bn EUR.
Learn more at hexagon.com and follow us @HexagonAB.