CASE STUDY

PGESCo digitizes plant information with Octave solutions

Key facts:

Company: PGESCo

Website:
pgesco.com

Industry: Power generation

Country: Egypt

Octave products used:
Forte 3D *(Intergraph Smart 3D),* Facets P&ID *(Intergraph Smart P&ID),* Facets Electrical *(Intergraph Smart Electrical),* SmartPlant® Foundation, Forte Review *(Intergraph Smart Review),* Forte Interop *(Intergraph Smart Interop),* SmartSketch, Aspect Pipe Stress *(CAESAR II),* Aspect Structure *(GT STRUDL)*

Key benefits:

- Streamlined data management by mitigating human errors and improving the decision-making process through digitizing plant information
- Ensured precision in design and construction through the effective use of advanced design tools
- Enhanced project efficiency with smoother data transfers and more streamlined project delivery

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 megawatt (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.

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 and accelerate project.

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: 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.

- **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 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

Forte 3D and Aspect Pipe Stress 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.



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

Facets P&ID was used for system engineering to ensure correctness and generate the various engineering deliverables (valve, line and equipment lists, etc.). Facets Electrical was used for cables design, routing and termination, as well as generating electrical load list with breaker assignment.

For the structural design checks, Forte 3D was used for clash checking, and Aspect Structure for analysis of the structural designs.

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

The Octave-based system also integrated data from external third-party systems, such as Tekla and ARCHICAD. Structural design and architectural information could be easily exchanged between Forte 3D and the third-party systems easily to ensure fast clash checking.



Fig. 2: Power Block Area – the vendor models, such as the steam generators/boilers of the three units, are imported and integrated

Realizing results

PGESCo chose Octave solutions to meet the strict project deadline and enhance the quality of engineering deliverables.

The key reasons for choosing Octave solutions included:

- Unique rule-based architecture with the capability to automate engineering processes
- Proactive and efficient support tea
- Proven technology with strong references across industries and countries

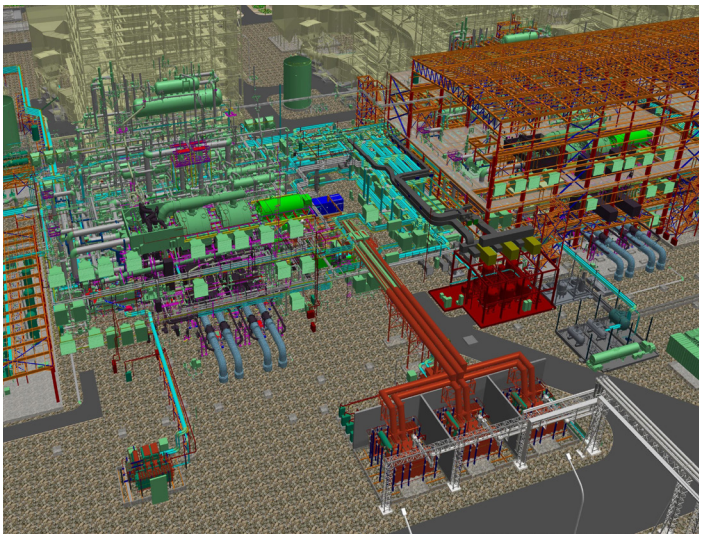


Fig. 3: A sectional view showing the internal complexity of the engineered commodities inside the Steam Turbine Generator (STG) building. The piping routing, pipe supports, equipment modeling and cable tray routing were all performed using Forte 3D. Steel structure information was imported from Tekla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

"Digitizing plant information with Octave 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."

Ahmed Nabil
Information & Systems Technology Manager, PGESCo



The rule-driven and data-centric nature of the Octave 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 Forte 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.

Moving forward

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

About Octave

Octave is a leader in enterprise software, turning data into decisive action and intelligence into your edge. Our software solves for and simplifies complexity, from the design and build to operations and protection of people, property and assets – for any scope, at any scale. For decades, we've partnered with customers to sharpen performance, elevate efficiency and amplify results. From factory floors to entire cities, our solutions are tuned to scale up what's possible from day one onward.

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