

## Case Study

# Continuous Power Supply for a Key Government Residential Complex



**When:** 2022 - 2023

**Where:** Eastern Region, KSA

**Site:** Eastern Region, KSA (Military City, KKMC – Ministry of Defense)

**Client Brief:** The Ministry of Defense required a reliable power solution for the King Khalid Military City (KKMC), which accommodates 2,000 residents. The objective was to ensure consistent power delivery during the extreme summer heat.

**Power Plant Capacity:** Byrne installed a 30 MW power solution with a secondary distribution network, including transformers, distribution boxes, and a durable fuel storage system. The plant was integrated with the grid and designed for flexible power output to maintain stability across the residential complex.

**Operational Challenges:** Byrne faced significant challenges, including rapid mobilization and the transition from existing turbines to the new plant within a tight timeline. Extreme temperatures, reaching up to 50°C, tested equipment resilience, yet the power plant consistently delivered uninterrupted power, showcasing robust engineering and operational excellence.

**Solution Overview:** Byrne's comprehensive approach included:

- **Custom Power System Design:** An optimized layout and power plant design addressed both immediate and long-term energy needs, enhancing efficiency and minimizing derating from limited summer ventilation.
- **Generator Synchronization:** A fleet of synchronized generators

achieved the 30 MW capacity, managing complex power demands and exceeding capacity during peak periods.

- **Continuous Power Management:** A rigorous operational plan balanced loads across generators, minimizing the risk of failure and ensuring stable output.
- **Scheduled Maintenance:** Maintenance was coordinated to avoid power supply disruptions, utilizing predictive diagnostics to stagger repairs.
- **On-Site Support:** Continuous technical support monitored performance and addressed issues promptly, with real-time KPIs sent to headquarters.
- **Online Monitoring:**

An advanced monitoring system enabled proactive issue detection, ensuring uninterrupted service.

- **Spare Parts Management:** On-site inventory of critical parts facilitated rapid response to mechanical issues, particularly during peak demand.

**Result:** The project achieved enhanced reliability and safety, improving residents' quality of life and ensuring uninterrupted government operations. Economic stability was maintained, preventing losses and ensuring business continuity. The successful synchronization of generators and robust maintenance protocols demonstrated Byrne's ability to deliver uninterrupted power even in challenging conditions, showcasing the effectiveness of temporary power solutions in complex environments.

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