

ARDENT MILLS ON-SITE POWER GENERATION

CASE STUDY

Integrating On-site Generation with Plant Operations

Interstates received a request to partner with Ardent Mills to provide engineering and automation for backup power generation at its Puerto Rico facility, allowing the site to operate during utility power interruptions. The solution coordinated by Ardent Mills and Interstates involved four 1-megawatt diesel generators, two utility power sources, automatic transfer switches, and plant operations. With approximately 4 megawatts of total generation capacity, the generator system was designed to support the entire facility.

The project featured significant coordination between Ardent Mills engineering and Interstates' power engineering team. Custom controls, operator screens, and load-management logic enabled the facility to manage generator start-up and operation as part of a unified power strategy rather than as an isolated backup system.

More Than Standby Power

Effective on-site generation requires more than installing generators. The equipment must communicate with transfer switches, fuel delivery systems, and plant controls so loads can be managed safely as generation becomes available. The project scope included developing engineering, controls, and application functionality needed to synchronize the facility's power sources, stage generator use, manage fuel-system operations, and adjust plant loading while the generators started and stabilized.

Outcomes

- Greater control over facility power reliability
- Approximately 4 megawatts of on-site generation capacity designed to support the entire facility
- Integrated coordination of on-site generation, utility power, fuel delivery, and plant operations
- Automated generator start-up, load shedding, load restoration, and transfer sequencing
- Automated fuel-system monitoring and email notifications
- Increased flexibility in responding to power needs



Challenges

1. **Managing multiple power sources**
The facility's power infrastructure included four 1-megawatt diesel generators, two utility sources, automatic transfer switches, and supporting fuel delivery systems, all of which needed to operate as a coordinated system.

2. **Maintaining operations during generator start-up**
The plant's generators took time to start and stabilize. Plant loads had to be reduced or temporarily shut down to prevent demand from exceeding available generation capacity.

3. **Coordinating power and production systems**
Generator controls could not operate independently of the plant. Power availability, fuel delivery, transfer-switch status, and plant loading needed to be managed through an integrated control strategy.

4. **Supporting reliable fuel delivery**
Because the generators depended on a consistent fuel supply, the fuel delivery system required integrated monitoring, controls, and redundancy. The facility also needed a way to alert designated personnel promptly if the system detected an abnormal condition.

5. **Coordinating installation across disciplines**
The project required close coordination among engineering, installation, instrumentation, and automation.

Solution

Combining power engineering and automation expertise, Interstates worked closely with Ardent Mills to develop an integrated controls and automation solution that connected the facility's generators, utility sources, automatic transfer switches, fuel delivery systems, and plant operations. Interstates' power engineering team contributed to electrical engineering and supervised the electrical installation, while the automation team helped develop the controls approach and application functionality.

The control strategy implemented by Interstates managed generator synchronization, start-up sequencing, staged utilization, load shedding, load restoration, and transfer sequencing. When on-site generation was required, the system could reduce or pause selected plant loads, allowing the generators to come online and stabilize. Once sufficient generation capacity was available, the system restored plant loads in a controlled sequence. With four generators providing approximately 4 megawatts of total capacity, the completed system was designed to support the entire facility.

When switching to utility power, the plant controls were programmed to remove loads from the affected systems, allowing the transfer to occur safely. Once the transfer switches were confirmed to be operating on utility power, the system was released to return to production.

Custom operator screens and application functionality provided visibility into the power system, fuel delivery system, and related operating conditions. The fuel delivery controls included built-in redundancy and automated monitoring to help maintain fuel availability for the generators. If the system detected an abnormal condition or potential equipment issue, it could send text notifications to designated personnel, allowing them to respond promptly.

Lead-lag logic balanced generator usage, while the integrated controls enabled power generation, fuel delivery, transfer equipment, and plant processes to respond together instead of relying on separate systems or manual operator intervention.

Results

To help Ardent Mills meet its goals of power reliability and increased visibility, Interstates integrated four 1-megawatt diesel generators, two utility sources, automatic transfer switches, supporting fuel delivery systems, and plant loads.

The completed system gave operators greater visibility into power-system and fuel-system performance through custom-developed screens, alerts, and applications. Fuel delivery was supported by integrated controls, automated text notifications, and system redundancy, helping personnel identify and respond to potential issues that could affect generator operation.

Generator start-up and load management became coordinated, automated processes. When a generator came online, the controls adjusted plant loading to support start-up and stabilization, then restored loads as capacity became available. This approach allowed on-site generation to function as part of the facility's operating infrastructure rather than solely as standalone backup equipment.

The project also demonstrated Interstates' ability to bring together power engineering, installation, instrumentation, and automation to solve a complex facility power challenge. Power Engineering led the effort on design and multi-system coordination for integrating the generator Automatic Transfer Switch (ATS) between the two services. The prefabrication work completed in Sioux Center helped streamline implementation in the field.

Ultimately, the Ardent facility gained greater flexibility to respond to power needs, manage available generation, coordinate fuel-system operations, and enhance operational continuity.



Going Forward

By successfully integrating on-site generation into plant operations, Interstates and Ardent Mills created a coordinated power management system designed to support greater reliability, operational control, and flexibility. The success of this project demonstrates Interstates' ability to bring together generation equipment, utility sources, transfer switches, fuel delivery systems, power engineering, prefabrication, automation, and plant processes into a unified control strategy.

This integrated approach gave Ardent Mills a more effective way to manage power events, generator utilization, fuel delivery, and plant loading while establishing a platform that can adapt as its facility and product needs change. The successful outcome reflects Interstates' capability to solve complex power and controls challenges and deliver on-site generation solutions aligned with an industrial facility's broader operational requirements.