

Grid monitoring and load balancing

This workflow continuously monitors electrical grid conditions and automatically adjusts load distribution to maintain optimal performance and prevent outages. It reduces manual intervention while ensuring grid stability and efficient energy distribution.

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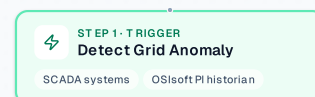
WORKFLOW TRIGGER

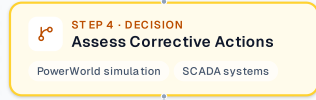
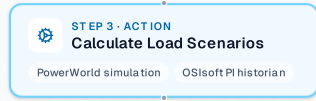


Real-time grid sensor data indicates voltage or frequency deviation beyond normal operating thresholds

Visual Flow

Each node represents an automated step. Connections show how data and decisions move through the workflow.





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Step-by-Step Breakdown

Detailed explanation of each automated stage in the workflow.

1

⚡ TRIGGER

Detect Grid Anomaly

SCADA systems identify voltage, frequency, or load imbalances across transmission and distribution networks. Real-time telemetry data triggers the automated response workflow.

2

 ACTION

Analyze Grid Topology

GIS mapping software provides current network configuration and identifies affected substations and transmission lines. The system maps potential load redistribution pathways.

GIS mapping software

SCADA systems

3

 ACTION

Calculate Load Scenarios

PowerWorld simulation runs multiple load balancing scenarios to determine optimal power flow adjustments. The system evaluates capacity constraints and generation dispatch options.

PowerWorld simulation

OSIssoft PI historian

4

 DECISION

Assess Corrective Actions

The system determines if automatic load switching can resolve the issue or if generation adjustments are required. Critical thresholds determine the response pathway.

PowerWorld simulation

SCADA systems

5

 ACTION

Execute Load Redistribution

SCADA systems automatically switch circuit breakers, adjust transformer taps, or modify generation dispatch to rebalance the grid. Real-time commands are sent to field equipment.

SCADA systems

OSIsoft PI historian

6

 ACTION

Update Asset Records

Maximo logs all switching operations and equipment status changes for maintenance tracking and regulatory compliance. Historical performance data is archived.

Maximo asset management

OSIsoft PI historian

7

 OUTPUT

Generate Grid Report

The system produces a comprehensive incident report with corrective actions taken and grid stability metrics. Operators receive real-time dashboard updates and alert notifications.

Oracle Utilities

OSIsoft PI historian



Outputs

- Automated grid rebalancing commands

AI Business OS

- Equipment switching logs
- Voltage stability incident report
- Real-time operator dashboard updates



Key Metrics

- Grid frequency deviation (Hz)
- Voltage stability index
- Load balancing response time (minutes)
- Equipment switching success rate



Tools & Integrations

- SCADA systems
- GIS mapping software
- PowerWorld simulation
- OSIsoft PI historian
- Maximo asset management
- Oracle Utilities

AI Business OS

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