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Energy demand forecasting

This workflow automatically generates hourly and daily energy demand forecasts by analyzing historical consumption data, weather patterns, and real-time grid conditions to optimize generation scheduling and grid operations.

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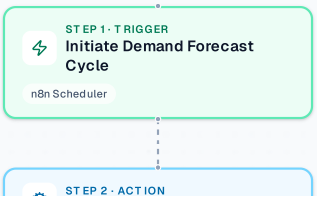
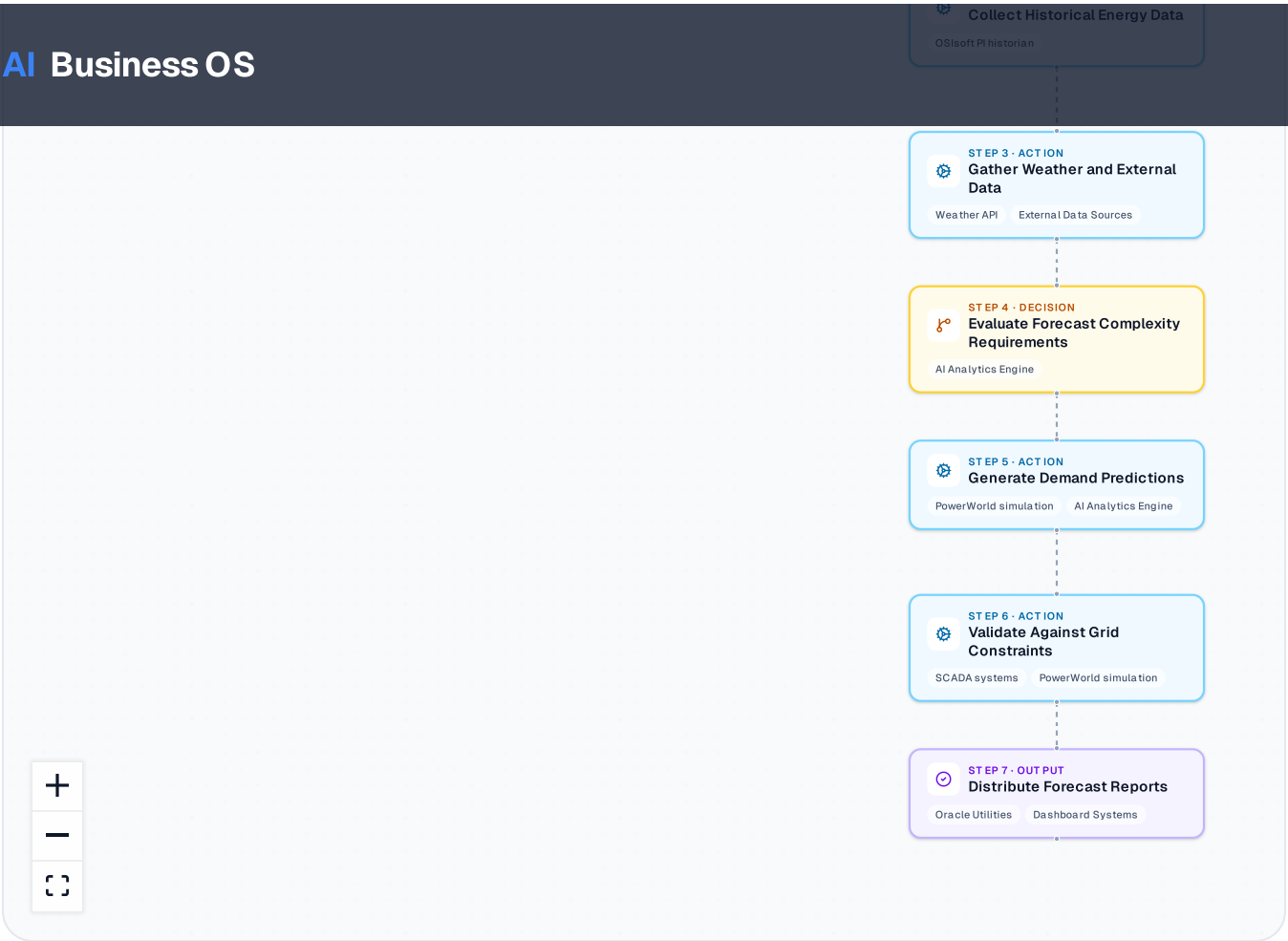
WORKFLOW TRIGGER

Scheduled execution every 4 hours or manual trigger for updated forecast requirements

Visual Flow

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





Step-by-Step Breakdown

Detailed explanation of each automated stage in the workflow.

1

TRIGGER

Initiate Demand Forecast Cycle

Workflow starts automatically every 4 hours or when manually triggered by grid operators requiring updated demand projections.

n8n Scheduler

2

ACTION

Collect Historical Energy Data

Retrieves past 12 months of energy consumption patterns, load profiles, and seasonal trends from the PI historian database.

OSIsoft PI historian

3

ACTION

Gather Weather and External Data

Pulls current weather conditions, 7-day forecasts, and economic indicators that influence energy demand patterns.

Weather API

External Data Sources

4

DECISION

Evaluate Forecast Complexity Requirements

Determines whether to use simple trend analysis for normal conditions or advanced modeling for extreme weather events or special circumstances.

AI Analytics Engine

ACTION

5

Generate Demand Predictions

Runs machine learning algorithms to create hourly demand forecasts for next 48 hours and daily forecasts for next 7 days.

PowerWorld simulation | AI Analytics Engine

6

ACTION

Validate Against Grid Constraints

Cross-references forecasted demand with transmission capacity and generation limits using SCADA system data.

SCADA systems | PowerWorld simulation

7

OUTPUT

Distribute Forecast Reports

Sends formatted demand forecasts to grid operators, generation schedulers, and trading teams through automated dashboards and alerts.

Oracle Utilities | Dashboard Systems

Outputs

- 48-hour hourly demand forecast
- 7-day daily demand projection
- Peak demand alerts and warnings

- Forecast accuracy metrics report

Key Metrics

- Forecast accuracy percentage
- Mean Absolute Percentage Error (MAPE)
- Peak demand prediction variance

Tools & Integrations

- n8n Scheduler
- OSIsoft PI historian
- Weather API
- External Data Sources
- AI Analytics Engine
- PowerWorld simulation
- SCADA systems
- Oracle Utilities
- Dashboard Systems

AI Business OS

Actionable AI implementation strategies for business leaders ready to transform their operations.

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