Digital for Power & Utility
Bottom Line Success
Solutions for Traders, Fuel and Portfolio Managers
THE POWER INDUSTRY
A Sector in Transition

The Rise of Renewables
Shifting priorities in dispatch strategies

Decreasing Energy Prices
Puts more pressure on managing to lower costs

Changing Consumer Behavior
Alters their preferences for energy sources and energy demand

Clean Air Act Requirements
More pressure to deliver electricity from greener sources

Proliferation of Data
Empowering new approaches, new technology, and new challenges

Deregulating New Markets
Increasing competitive pressures while expanding revenue opportunities
THE NEED FOR INSIGHTS

A Complex Set of Personas and Dynamics

<table>
<thead>
<tr>
<th>Operating Personas</th>
<th>Needed for Optimal Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Portfolio Manager</strong></td>
<td>Optimal unit commitment and dispatch given the demand and constraints on fuel and emissions, to participate in the market profitably.</td>
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<tr>
<td><strong>Power Trader/Scheduler</strong></td>
<td>Offer the generation into the market with optimized schedules and costs.</td>
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<tr>
<td><strong>Fuel Manager</strong></td>
<td>Insights into fuel needed to meet MW commitment. Market insights to trade fuel intelligently for bottom-line contribution</td>
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<tr>
<td><strong>Generation/Transmission Planner</strong></td>
<td>Real-time insights into grid requirements, DERs, and generation capacity.</td>
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<tr>
<td><strong>Operations Manager</strong></td>
<td>Real-time insights into plant/fleet capacity, reliability status and outage scheduling.</td>
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</tbody>
</table>
OPTIMIZATION

The Game Changer for Traders & Portfolio Managers

Without Optimization — the Cost Is High
• Suboptimal dispatch within fleets
• Market penalties
• Suboptimal fuel purchasing
• Over-buying power when consumers are producing energy

With Optimization — the Benefits Are Significant
• Optimal unit schedules honoring all of the constraints with cost
• An understanding of real-time portfolio dynamics
• Ability to purchase the correct amount of fuel
• Penalty avoidance when emissions limits are violated
• Automated communication to ISOs/Energy Exchanges and Regulators
• Real time shadow settlements and financial KPIs

INPUTS
• Demand
• Generation
• Contracts
• Transmission Limits
• Market Prices
• Market Conditions

OUTPUTS
• Financials
  • Expected P&L
  • Revenue
  • Costs (Production, O&M, Emissions)
• Physical Data
  • Optimized Unit Schedules of Energy & Ancillary Services
  • Hydro Schedules
  • Fuel Consumption

Portfolio Management Optimization Model

Bids, Offers, Settlements
Communication with Third Parties and ISO
POWER AND UTILITY

Use Cases for Bottom Line Success

By applying optimization software to a wide range of incoming data from across the company’s energy ecosystem, fuel buyers, powers traders and portfolio managers can make more refined decisions for greater profitability. The use cases below outline how optimization leads to informed business decisions and positive financial impacts.

**Bid-to-Bill**
Enables power companies to more effectively compete in today’s volatile energy markets. Provides capability to meet daily needs for bidding into ISO markets, settlement and invoices and statement management.

**Portfolio Optimization**
Allows companies to more economically balance generation dispatch schedules and resource fuel in today’s volatile markets while meeting contractual commitments, serving load, and reducing costs.

**Straight-Through Scheduling**
Enables power companies to capture more revenue from untapped opportunities in deal management in the face of market dynamics, rising costs, and risk.

Learn More
BUSINESS OPTIMIZATION USE CASE

BID-TO-BILL

Enables power generation companies to more effectively compete in today’s volatile energy market environment by providing solutions to meet daily needs to bid into the ISO markets, settle up and manage invoices and statements.

CHALLENGE

Bid formulation and evaluation is labor intensive, error-prone, and often behind ISO deadlines.

• The vast amount of data being collected from operations is impossible for the Analyst to process and leverage to offer blocks and power pricing.

• Traders spend more time on templates and data filling rather than on Bidding strategies with the understanding of true costs.

• During settlement, manual calculations with thousands of Charge codes with the actual generation are cumbersome and error prone.

SOLUTION

Portfolio Optimization
Leverage real operational data to improve portfolio optimization and arbitrage your portfolio to reduce production costs for unit dispatch with better bidding strategies.

Offer/Bid Management
View recommendations for smarter bids and offers based on defined risk tolerance and actual production costs.

Financial Settlement
Enable a complete shadow settlement with ISOs and manage invoices and statements with ease.

Energy Accounting
Generate accurate accounts of energy produced and fuel burned to reconcile settlements with ISOs, exchanges and 3rd parties from meter readings.

RESULTS

Increase productivity
Increase revenue
Decrease penalties
Decrease risk associated with human error
BUSINESS OPTIMIZATION USE CASE

PORTFOLIO OPTIMIZATION

Allows companies to more economically balance generation dispatch schedules and resource fuel in today’s volatile energy market while meeting contractual commitments, serving load, and reducing costs.

CHALLENGE

When unit commitment and economic dispatch for a mixed generation portfolio with complex fuel contracts and emission constraints is done in silos, the bottom line is impacted and is sub-optimal.

• The impact of operational variations on name plate capacity, heat rate, ramp up and turn down rates due to machine deterioration, maintenance, or ambient conditions can lead to over commitment or under estimation of real time availability for energy markets and ancillary services.
• Fuel traders can’t assess fuel requirements to nominate and manage take or pay contracts.
• It is difficult to understand the actual hydro schedules in complex hydro systems.

SOLUTION

Optimal Scheduling
Create optimal unit commitment and economic dispatch schedules by co-optimizing energy and ancillary services across the generation portfolio. Arbitrage between plants to meet demand while minimizing the production costs and capturing more revenue from the market.

Market Intelligence & Forecasting
Increase the forecast accuracy for capacity, market pricing, and load.

Fuel Management
Track and manage fuel needs for trading and power generation.

Fuel Transport
Tune fuel transportation schedules in line with optimal scheduling.

Bilateral Transaction Management
Manage bilateral transactions in real-time in support of back-office processes.

RESULTS

Increase portfolio revenue
Better dispatch by unit
Reduce production costs
Improve storage and transportation costs in line with power production
BUSINESS OPTIMIZATION USE CASE

STRAIGHT-THROUGH SCHEDULING

Enables power generation companies to capture more revenue from untapped opportunities in deal management in the face of market dynamics, rising costs, and risk.

CHALLENGE

Back-office processes are manual and tedious causing traders to miss revenue opportunities.

- Too much time is spent balancing the power and gas book.
- Traders can’t iterate fast enough to capitalize on excess capacity after day-ahead commitments.
- To comply with e-tagging and regulatory audit requirements on trades takes significant manual efforts populating the correct templates.

SOLUTION

Market Intelligence & Forecasting
Break down the barriers between operations and trading with improved forecasts of capacity based on ambient conditions; enable portfolio hedging with power price forecasts based on market conditions. Price the excess capacity to sell as strips and blocks.

Portfolio Management
Leverage optimal scheduling to improve offer and bid management as well as bilateral transactions.

Financial Settlement
Leverage shadow settlements to identify and reduce P&L leakage.

Business Communication
Improve communications with exchanges, ISO/TSO/RTO, plants, and gas pipelines. Enables e-tagging and other regulatory reporting.

RESULTS

Better forecasts reduce risk and costs

Monetize excess capacity after day-ahead commits

Reduce communication time with RTO/ISOs, regulators, and operations
DRIVING CORE BUSINESS OUTCOMES

GE Business Optimization Solution

**Market Intelligence and Forecasting**
On demand forecasting of plant capability and market behavior to maximize revenue.
- Capacity Forecast
- Power Price Forecasting
- Load Forecasting
- On-Demand/Strip Pricing

**Portfolio Management**
Optimally schedule and plan the portfolio to maximize profit.
- Optimal Scheduling
- Offer/Bid Management
- Portfolio Structuring
- Bilateral Transaction Management
- Fuel Management
- Outage Planning

**Business Communication**
Efficiently communicate and transfer data with ISOs, internal and external parties.
- ISO Communication
- Exchange Communication
- Assets Operations
- Gas Nomination
- Fuel Transport
- ISO Outage Management
- E-Tagging

**Financials**
Smarter financial forecasts, settlements, post analysis.
- Financial Forecasts
- Financial Settlements
- Post-analysis/KPI
- Energy Accounting
- General Ledger

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Transparency & visibility

Increased revenue

Streamlined external communications

Increased visibility

Digital for Power & Utility Bottom Line Success

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Learn how GE’s Business Optimization Solution can help your organization adjust to today’s dynamic power sector.

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