



Semantic AI Energy Pro

AI-Powered Dynamic Optimization for Chiller Plants



Intelligent Energy Optimization

Semantic AI Energy Pro harnesses advanced AI to enhance energy efficiency in chiller plants. By analyzing operational data and real-time weather information, our solution dynamically optimizes performance to meet your specific needs. At the heart of our system is a Physics-Guided Machine Learning (PGML) algorithm that integrates engineering expertise with big data analytics, ensuring accurate and reliable results for informed decision-making. With Semantic AI Energy Pro, you can achieve continuous energy savings while improving your building's overall performance. Experience a smarter, more efficient approach to energy management and optimize your chiller plant operations today.

Unique Technology

The **Semantic AI Energy Pro** leverages **Physics-Guided Machine Learning (PGML)** to harmonize advanced algorithms with fundamental physical principles, ensuring accurate and energy-efficient control across your facility. Experience unparalleled efficiency with a solution that evolves with your needs, delivering intelligent, automated plant control with ease.

Features:

- **Minimal Data Requirements:** Only three months of historical data is needed to power the Semantic AI algorithms, delivering fast and reliable optimization.
- **Fully Automated Plant Control:** Take the guesswork out of energy management with hands-free control for ultimate operational efficiency.
- **Dynamic Adaptability:** Leverages machine learning to dynamically address changes in chiller plant equipment performance, ensuring up-to-date optimization at all times.
- **Universal Compatibility:** Designed to seamlessly integrate with **any BMS brand**, ensuring a smooth transition for diverse infrastructures.
- **On-Premises and Online Deployment:** Supports both on-premises and cloud-based deployment options, offering flexibility to meet various operational needs.
- **Flexible and Adaptive:** Tailored to site-specific conditions, enabling optimal performance in any environment.

*All pictures and specifications are for reference only and are subject to change without prior notice.

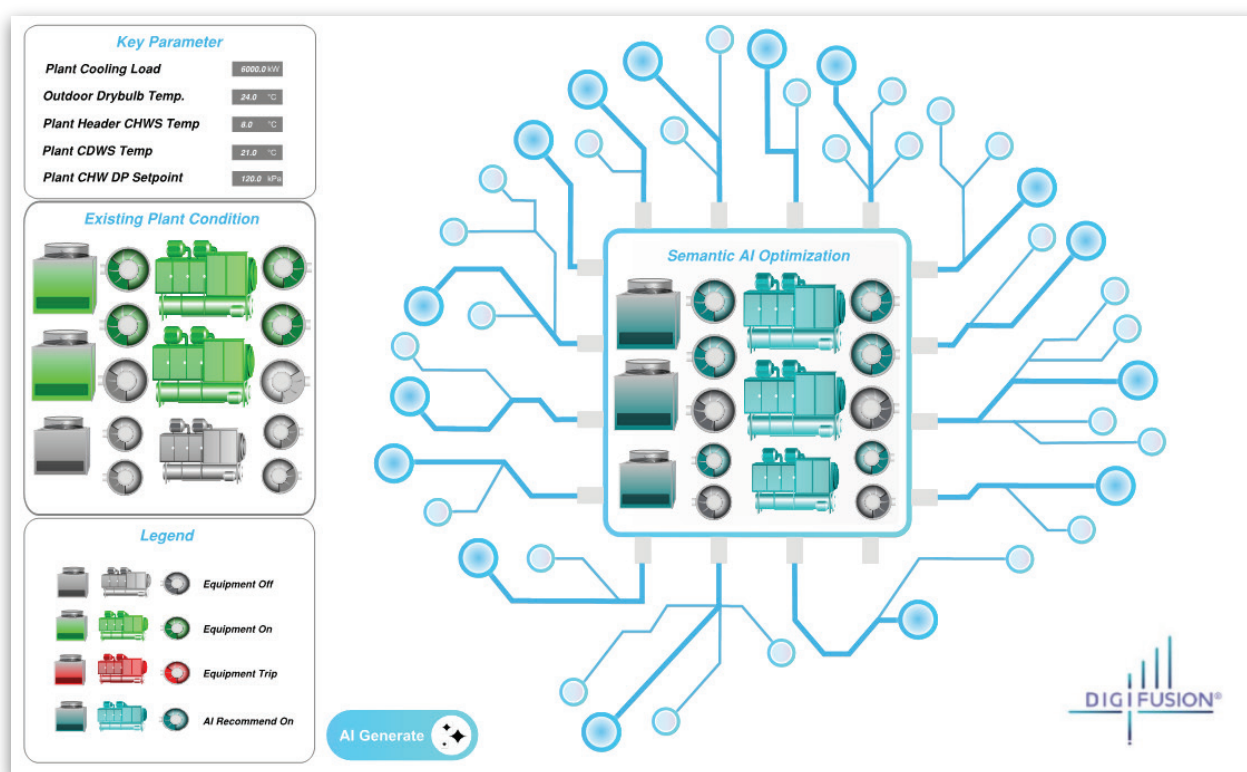
System Components

The Semantic AI Energy Pro consists of three integrated systems:

1. **Visualization:** Offers intuitive visual insights into energy management.
2. **AI-Based Optimizer:** Provides real-time optimization recommendations for chiller plants.
3. **Reporting:** Extracts real-time data and information for comprehensive reporting purposes.

1. Visualization

The **Visualization module**, integrated within the Building Management System (BMS), serves as a user-friendly graphical interface (GUI) for reviewing chiller plant optimization recommendations. Users can easily access and control the recommended optimal operational patterns, enhancing decision-making and efficiency.



2. AI-Based Optimizer

The AI-Based Optimizer employs a Physics-Guided Machine Learning (PGML) algorithm to deliver real-time optimization calculations and dynamic suggestions. This localized approach allows the optimizer to respond to current plant conditions without requiring an internet connection. Additionally, the optimizer continuously updates the equipment model by dynamically retrieving operating data and retraining the model, ensuring that optimization recommendations are always current.

1. Reporting

The reporting module extracts real-time data for detailed analysis of chiller plant performance. It features an interactive interface with multi-dimensional analytics, including cooling load metrics, individual chiller Coefficient of Performance (COP), and temperature setpoints. This allows users to gain comprehensive insights into system efficiency.



*All pictures and specifications are for reference only and are subject to change without prior notice.

Connectivity, Stability, and Safety

- **Local Server Installation:** The dynamic AI-based optimizer is installed on a local server to ensure connectivity, stability, and safety. This setup allows for continuous operation and real-time recommendations, even when offline.
- **Higher Server Standards Required:** For on-premises installation, a higher-grade server is needed to support the Data Visualization Platform and Fault Detection and Diagnostics (FDD) Analytic Platform if applied.
- **Active High-Frequency Data Querying:** Leverages machine learning to dynamically address changes in chiller plant equipment performance, ensuring up-to-date optimization at all times.

Comprehensive View of Chiller Plant Operation Patterns: The high-frequency data enables the AI to learn more effectively by capturing conditions that may be missed in larger interval BMS data logging.

Centralized Computing Power: The computational demands of high-frequency querying are managed within the Semantic AI Energy Pro server, ensuring that the BMS remains unaffected and operates smoothly.

Service	On-premises	Online
Server Requirement	(See Below Table)	(See Below Table)
SQL Server	Local Server	Local Server
Optimization Platform (GUI)	Local Server	Local Server
AI-Based Optimizer	Local Server	Local Server
Data Visualization Platform	Local Server	Cloud Service
FDD Analytic (optional)	Local Server	Cloud Service
Cooling Load Prediction Module	Not Support	Support

Technical Specifications

Features	On-premises	Online
Processor	Intel Xeon E-2378 2.6GHz, 16M Cache, 8C/16T, Turbo (65W), 3200 MT/s	Intel Xeon Silver 4314 2.4G, 16C/32T, 10.4GT/s, 24M Cache, Turbo, HT (135W) DDR4-2666
Memory	2 x 8GB UDIMM, 3200MT/s, ECC	2 x 32GB RDIMM, 3200MT/s, Dual Rank 16Gb BASE x8
Storage Controllers	RAID 5 PERC H755 SAS Front	RAID 5 PERC H755 Adapter FH
Drive Bays	3 x 2TB Hard Drive SATA 6Gbps 7.2K 512n 3.5in Hot-Plug	3 x 2TB Hard Drive SATA 6Gbps 7.2K 512n 3.5in Hot-Plug
Power Supplies	Dual, Hot-Plug, Redundant Power Supply (1+1), 600W, Mixed Mode	Dual, Hot Plug, Redundant Power Supply (1+1), 800W, Mixed Mode
Mounting Method	Rack-mounted / Tower	Rack-mounted / Tower
Embedded Management	iDRAC9, Basic 15G	iDRAC9, Enterprise 15G
Operating System	Microsoft Office/Linux	Microsoft Office/Linux

*All pictures and specifications are for reference only and are subject to change without prior notice.