GE
Industrial Solutions

envisage*

Energy Management System

Providing a clear and accurate look into the world of energy management

envisage Energy Management System opens up a *virtual window* to analyze and control your facility's real-time power usage – onsite or through a web browser or mobile device.

To manage rising energy costs and the constant demand to keep mission-critical systems operating efficiently, GE Industrial Solutions re-imagined the traditional energy management system (EMS). GE **envisage** offers the most comprehensive, customizable software solution with the most responsive and experienced services resource team anywhere.

What does envisage do?

The integrated EMS provides an accurate and easy-to-understand graphical representation of the facility to help you make informed, timely decisions. It monitors energy consumption, analyzes collected data, receives automatic warnings of device events, performs advanced harmonics analysis, allocates energy costs, and even manages loads.

This intelligent system is at the ready 24/7 to give owners, managers, and engineers a secure and complete check of the quality and reliability of the power source, with email and text message alerts if needed.

Complete system approach

envisage can communicate with a wide number of GE and non-GE devices, including meters, trip units, generators, transformers, drives, and switches. The software supports the latest industry protocols, as well as over 100 legacy and third-party protocols.

envisage is remarkably scalable and forward compatible in accommodating changes to energy architecture and expansions in the facility. New equipment can be brought online literally in seconds.

envisage Monitoring

envisage Power Analytics

envisage Energy Tracker

envisage Control & Automation

Customizable modules

The complete envisage solution offers a choice of four customizable modules that can be standardized: Monitoring, Power Analytics, Energy Tracker, and Control & Automation. By optimizing the methods that control both processes and equipment, assets are utilized more effectively and efficiently, minimizing the downtime from power transients.

Minimum Server Requirements

- Intel dual core 2.0 (Dell Precision™ Workstation 360)
- 4 GB dual-channel memory
- Microsoft® Windows® XP SP3, Server 2003, Win 7, Server 2012 or Win 8 x32 or x64
- Internet Explorer 8.0 version
- 200 GB hard drive
- 1 GB Ethernet card (static IP addresses only - no DHCP support)
- Email server connectivity if configuring for email reports
- Uninterruptible Power Supply to PC

Key features

envisage Monitoring

- Unlimited devices
- Intelligent energy devices
- Building management devices
- Web access and mobile app

envisage Power Analytics

- Waveform capture and analysis
- Sophisticated analysis of multiple devices to pinpoint problems
- Identify necessary power quality improvements

envisage Energy Tracker

- Total energy and peak demand
- Coincident demand reporting
- Energy profiling, load analysis reports
- Virtual metering
- Custom rate structures available

envisage Control and Automation

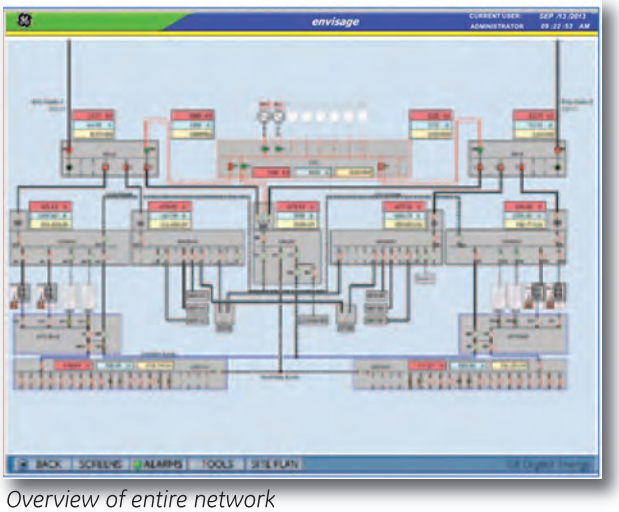
- Open/close breakers remotely to eliminate arc flash hazard
- Automatically manage loads
- Compatible with the latest cyber-security initiatives
- Shut down unnecessary systems during peak usage to avoid penalty

envisage Monitoring

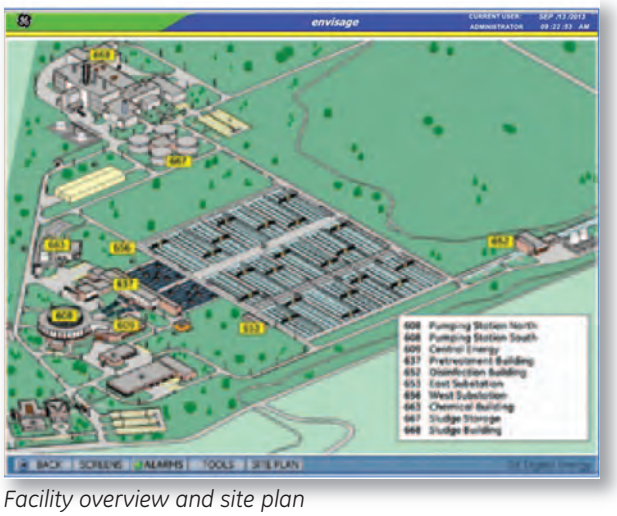
The envisage Monitoring module displays real-time power and demand data from remote intelligent energy devices as well as facility-wide infrastructure systems.

A birds-eye graphical site diagram provides a model representation of the complete facility and leads quickly to more detail in dynamic oneline schematics for the site location and even individual installed devices and monitored values. It keeps you completely and accurately informed of the system's status in real-time – both locally and remotely – through customized views that aggregate and scale the information you need.

Energy monitoring includes trend data from meters, relays, and breaker trip units in order to analyze the power system. It allows you to highlight and acknowledge unusual activity and alarm conditions with the real-time and historical alarm viewers to ensure that problems do not go unnoticed.



Overview of entire network



Facility overview and site plan

Typical monitored values include:

- RMS current
- Current demand
- Peak current
- RMS voltage
- KW and KWh
- Peak KW demand
- Apparent power (KVA) & apparent energy (KVAh)
- Reactive power (KVAR) & reactive energy (KVARh)
- Power factor
- Frequency
- Event records
- Additional system parameters - water, air, gas, electric, steam, HVAC, backup power, security
- Switch position and breaker status

Typical connected devices include:

- Meters
- Trip units
- UPS
- Solar chargers
- CRAC units
- ATS
- PSG
- PDU
- Generators
- VFD
- PLC
- Proactive relays
- "Smart" power strips

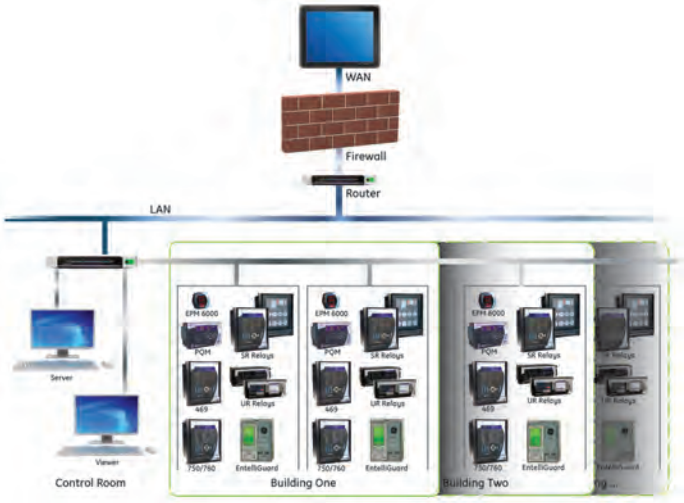
envisage Power Analytics

The envisage Power Analytics module remotely captures disturbances on the electrical network such as total harmonic distortion, individual harmonic distortion, and subcycle transients.

Event logs of triggered high-speed electrical disturbances are displayed in a prioritized list that is automatically written to the database. Event-triggered waveform recordings and out-of-limit logs provide an accurate system-wide depiction of power disturbances and allow for forensic analysis.

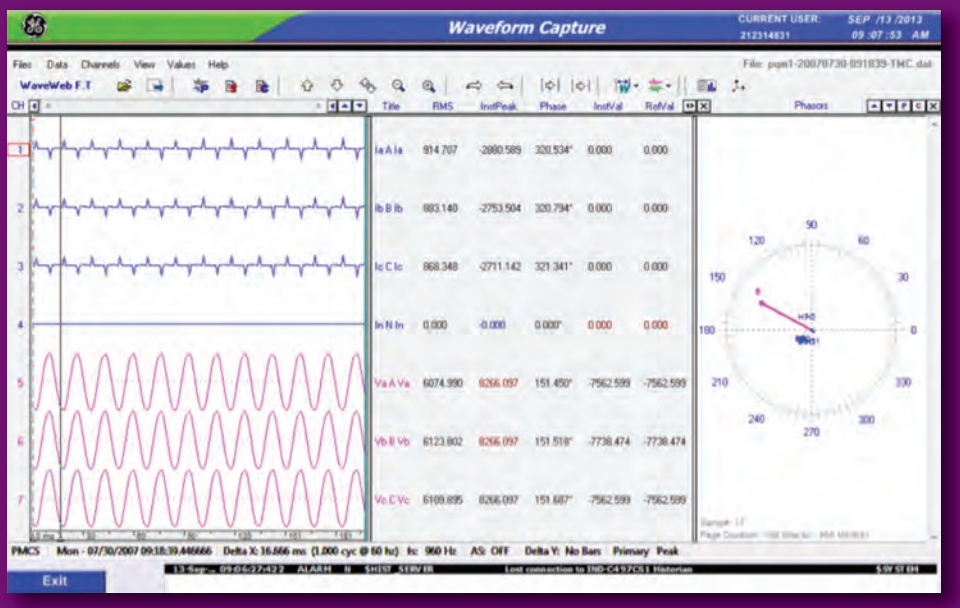
Through these data logging and trending capabilities, power quality information and events can be easily analyzed to highlight the frequency, duration, and severity of problems. Specifically, envisage can perform event-triggered waveform recording, sag and swell analysis, and out-of-limit logs to provide an accurate system-wide depiction of power disturbances.

Essential where there is a high mix of non-linear loads and expensive equipment, Power Analytics brings visibility to previously hidden network events, allowing preventive action before costly process shutdown, or supporting investigative efforts to trace cause of failure.



The envisage Power Analytics interface

- Real-time harmonic data from PQ measuring devices to provide instant network status
- Event Recorder to show frequency and magnitude of equipment-damaging system instabilities
- Waveform recorder overlays multiple devices to isolate & understand the exact nature of a problem



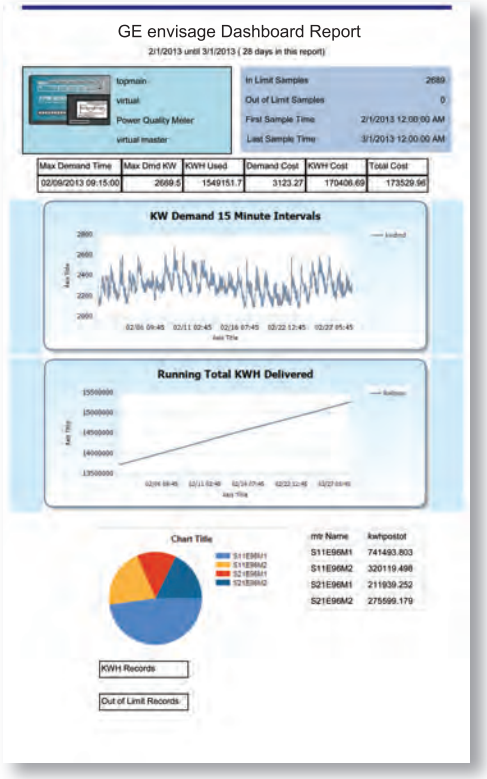
Monitor and perform waveform analysis using updated device data

envisage Energy Tracker

The envisage Energy Tracker module is an essential tool for managing energy usage and identifying areas for cost savings. The Energy Tracker module aggregates energy data to create individual energy reports and bills for a variety of groupings.

For example, billing can be generated with a variety of detail from a feeder, by device, by department/cost center, or by floor. The format of the reports and bills can be customized to match the same format found in utility bills, including values such as total energy and peak demand power use based on specific rate structures.

envisage brings accountability to the facility by providing the capability to allocate costs based on usage and specifically identify usage for particular areas of the facility. This focuses the scope and increases the effectiveness of energy management strategies by providing measurable results.



Dashboard report

The envisage Energy Tracker interface

- Individual power bills, with energy and peak usage, created for each cost center to assign cost accountability
- Utility configurator to define and understand existing energy costs
- Viewer screens with profiles of energy and peak demands
- Designed to comply with LEED certification

envisage Energy Tracker facilitates effective energy reduction strategies to achieve significant savings on power bills.

envisage Control & Automation

The envisage Control & Automation module executes energy management strategies by automating load-shedding schemes to minimize energy charges.

This module enables automated strategies by interfacing directly with facility devices (GE and non-GE) controlling on-site generators, utility feeds and the power distribution network. The envisage Control & Automation module along with intelligent devices allows the creation and implementation of customized control and automation schemes to protect assets and ensure optimal energy efficiency and value.

A single correct operation can justify the cost of the envisage system.

The envisage Control & Automation interface

- Transfer scheme exerciser screens to create and implement power feed transfer plans, ensuring maximum process uptime
- Breaker control panels to manually open, close and lock-out breakers remotely
- Load management screens to plan efficient equipment startup, increasing equipment life and reducing peak demand
- Remote control capabilities enhance workplace safety in accordance with NFPA and NEC standards
- Automate equipment staging in order to control process startup
- Control the opening, closing, and tripping of breakers remotely
- Employ automatic transfer schemes to ensure continuous power for mission critical processes by automatically switching to stable power feeds and shedding load when appropriate
- Reduce energy charges with automated shedding of non-critical loads during peak rate times.

Who Benefits?

envisage is ideal for anyone concerned with advancing efficiency and minimizing the downtime caused by power transients.

- **Data centers** – envisage offers root cause analyses required by stakeholders who seek assurances about the reliability and quality of the facility's electricity supply
- **Hospitals** – envisage can help lower energy costs, electrical outages, and regulatory compliance – custom JCAHO reporting saves labor and provides required records
- **Industrial** – Large power-intensive industries such as oil and gas, mining, and food and beverage seeking to control energy costs
- **Commercial** – Buildings designed to comply with LEED certification

Comprehensive Package

The GE team provides complete integration service capabilities, along with software and hardware components, for every phase of the project and ongoing support. GE can fulfill the entire project scope including software, network switches, PLCs, engineering and installation services, connection diagrams, conduit schedules, and onsite startup.

A complete Energy Management System includes all of the specific needs for your facility:

Energy Management Evaluation

- Consultation on the energy management system requirements of the site

Project Management

- Drive project delivery schedule
- Ensure all system requirements are met
- Implement software configuration and customization

System Hardware

- Server computer
- Meters, relays and intelligent devices
- Ethernet switches
- Communication gateways
- PLC equipment for control when required

Software

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- Communication from each device is processed, analyzed, and displayed via GE Cimplicity
- Data stored in MS SQL database
- Four optional, customizable modules
  - envisage Monitoring - open platform allows real-time communication with systems such as security, HVAC, power generation, water, and flow for the entire campus
  - envisage Power Analytics - identify power problems, analyze waveforms and power usage, record events
  - envisage Energy Tracker - determine where power is consumed, generate reports
  - envisage Control & Automation - web access and mobile app

Trust GE to safeguard mission-critical loads and improve reliability.

imagination at work

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