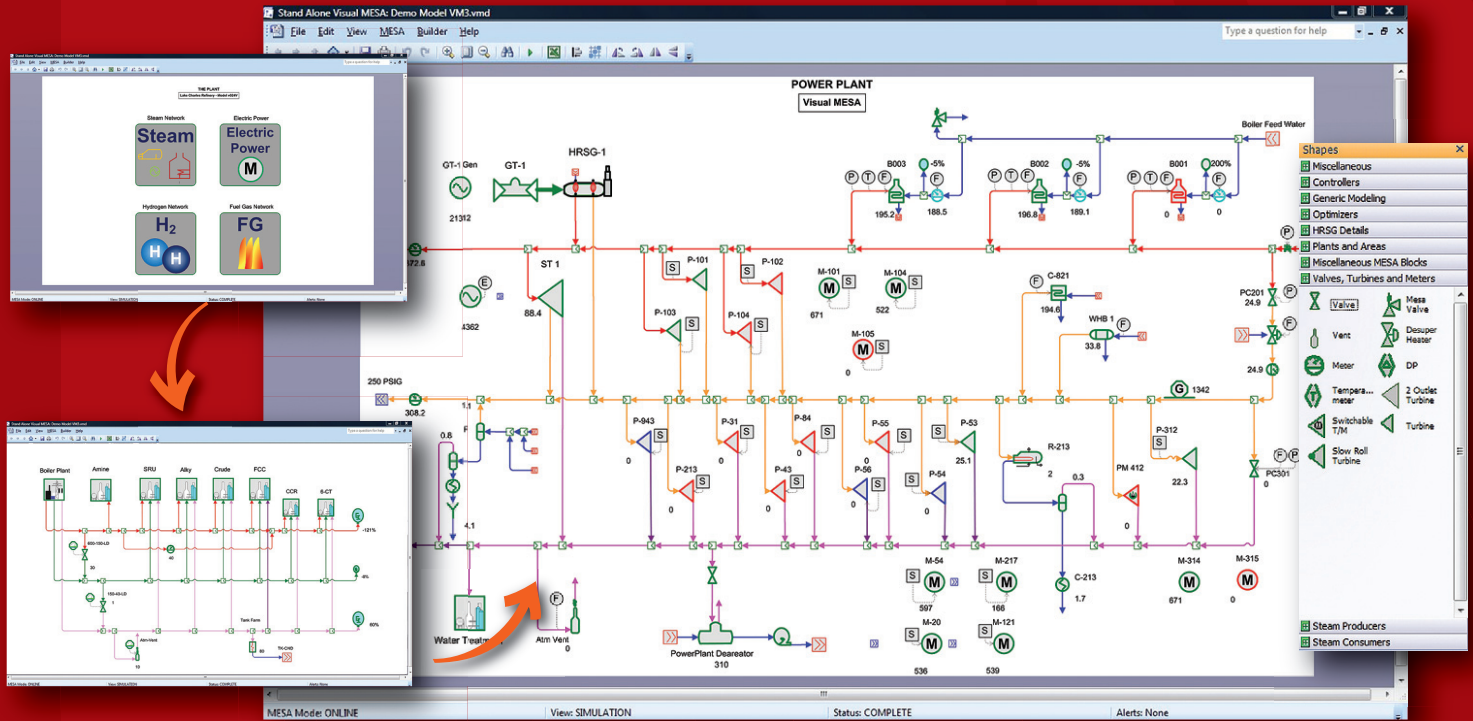


YOUR ENERGY WATCHDOG



COMPANY BACKGROUND

Soteica was founded in 1984 to provide world class process industry software solutions to the refining and petrochemical industries. Based in Houston, Soteica provides global coverage with principal offices in Barcelona, Buenos Aires, and São Paulo.

Soteica's team of experienced engineers and programmers has implemented a large variety of projects including those related to Energy Optimization, Production Accounting, Advanced Process Control, Planning and Scheduling, Operator Training Systems and Plant Information Systems.

Soteica is one of the most experienced software houses in the energy management system market, providing our customers with a turnkey solution that has been successfully implemented at dozens of refining, petrochemical, and other industrial facilities around the world.



VISUAL MESA

Energy costs are a very large and necessary part of the operating expense of industrial facilities such as refineries, petrochemical and chemical plants, pulp and paper mills, biofuels facilities, district heating/cooling systems and industrial gas plants. Tradeoffs between the electrical and steam system have become especially significant since the advent of electrical deregulation in some markets. The operational complexity is compounded with the introduction of emissions constraints due to ever-tightening environmental regulations.

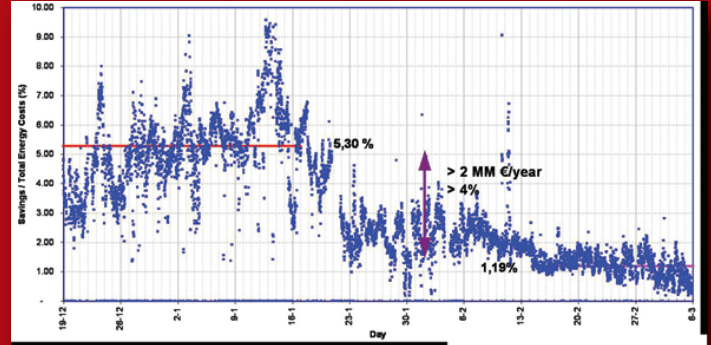
This presents a challenging scenario for management of steam, electrical, water, hydrogen, fuel, and other utilities.

Significant cost savings can be achieved by using an optimization program that is able to leverage the flexibility inherent in the site's energy systems in order to recommend lowest cost utility operation. Visual MESA was developed to do just this.

REDUCE ENERGY COSTS and SUSTAIN THE SAVINGS

This chart shows the reduction in lost opportunity costs at a medium-complexity Refinery with an integrated Olefins Unit in addition. This customer has subscribed to our Sustainability Program which ensures that their model is “evergreen”, or consistently made current, and that Visual MESA is available and running as a service 24x7x365 in order to provide the customer recommendations for the lowest cost utility operation that are trustworthy.

- First month "Base line" - Visual MESA executed on-line, but no optimization actions are taken.
- Second month - Visual MESA optimization recommendations are implemented by operations progressively as staff are familiarized with its functioning.
- Third month - Visual MESA optimization recommendations are implemented on a consistent basis, ensuring maximum sustained cost savings.



WHAT VISUAL MESA DOES

- Manages energy cost using real-time and historical data
- Allows operators and engineers to have detailed coverage in four distinct areas:
 1. Monitoring: Monitors the sitewide utilities systems (i.e. steam, electric, boiler feedwater, condensate, chilled water, hydrogen and fuel systems). Assists in the management of the utilities systems by monitoring all variables, calculates and historizes energy-related key performance indicators for the individual units and the plant as a whole, and provides warnings of important changes.
 2. Optimization: Optimizes the utilities systems to operate at minimum cost within equipment and emission constraints.
 3. "What If?" Planning: Predicts how the utilities systems will respond to proposed changes such as a new plant, plant expansions, change of process, shutdowns, etc. using current, historical, or user-defined data.
 4. Auditing, Accounting and Data Validation: Audits the system with continuously validated data. Mass Balance closure of the utilities is determined at every location where enough instrumentation is available.
- Successfully “bridges the gap” between utility and process operators.
- Incorporates a User Interface that is, implicit, intuitive and User-friendly.
- Provides an excellent ROI with simple payback on investment achieved within 6 months.
- Offers a proven and validated software solution to industrial facilities with dynamic steam generation and usage, cogeneration, heating/cooling capacity and other sitewide utility systems.
- Provides sustained energy savings to clients over time as Visual MESA has a history of over 20 years of successful application at over 40 sites, including some of the world’s leading refining and petrochemical companies.

VISUAL MESA TECHNICAL AND IT CHARACTERISTICS

- Built-in and customizable MS-Excel-based reports
- Non-linear models
- Field-proven SQP and mixed integer optimization routines
- Energy contract modeling capabilities.
- Closed loop optimization capabilities
- Runs continuously connected to online data and operates with any data historian via OPC
- GUI for simulation, optimization and steam accounting and “drag-and-drop” model building tools.
- Solutions that are easily accessed and shared with any PC on the plant network via MS-Visio drawings, MS-Excel reports and HTML web pages.
- Ability for multiple users to open and develop different models (both offline and online) in addition to the one acting as “Watchdog” which is running unattended as a service.

VISUAL MESA OPTIMIZATION - OPEN LOOP AND CLOSED LOOP

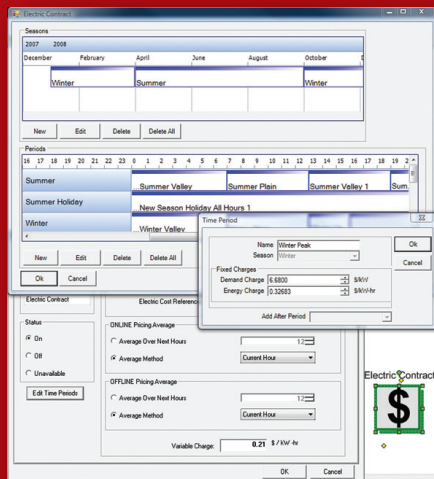
Visual MESA has mathematical models and mixed-integer, non-linear, optimization routines (SQP) built-in to identify how the utilities systems (steam, fuel, hydrogen, condensate, chilled water and electric power) can be run at the minimum cost while meeting required plant demands and other critical constraints.

An online Visual MESA model usually runs unattended as a service in “Watchdog” mode. Visual MESA can operate in open loop providing recommendations for the operators to take action, or it can be deployed in closed loop, where Visual MESA acts directly on the setpoints of the manipulated variables.

Visual MESA'S BOTTOM LINE: Minimize the total energy operating cost of the site.

ELECTRICAL CONTRACT MODELING

Visual MESA makes it easy to introduce complex electrical contracts into the model. Considerations such as seasonality, daily (including holidays) and hourly variations, can be represented with the help of the corresponding templates. More complex arrangements can also be modeled.



FUEL SYSTEM / HYDROGEN SYSTEM / EMISSIONS

Visual MESA is able to represent specific pollutant constituents in order to make recommendations that account for the site's emission permits. Visual MESA can track these constituents through the fuel and hydrogen systems. The fuel system can be modeled in great detail to include contractual issues such as differing fuel oil grades, alternate natural gas suppliers, and supply quotas, including penalties incurred when such quotas are exceeded. In addition, fuel system modeling can include the purchase and sale of fuel gas and hydrogen, and CO2 trading, where applicable. When co-generation options are available, properly managing the fuel/steam tradeoff can yield significant economic benefit.

Site-wide hydrogen networks can also be modeled (including their impurities) in order to understand the economics of the contracts with third party suppliers versus producing hydrogen internally in a reformer or in a PSA units or other purification process.

This allows Visual MESA to find an optimal solution taking into account the simultaneous interaction of the steam, electrical, water, fuel and hydrogen systems operations in one model. And, this solution is always found in consideration of the emissions constraints for the site, as well.

ECONOMICS

Visual MESA users have documented annual energy cost reductions on the order of 5-6% from optimization. Additional savings can be obtained by:

- Tracking performance.
- Auditing and accounting of the steam and boiler feed water to help reduce wasted steam and to help identify imbalances.
- Evaluating "What-if" cases regarding operational changes, planning of start-ups and shutdowns (load-shedding), and projects requiring capital investment.
- Alerting the user of changes in measured values, accomplished by a periodic scan of all flowmeters in the model, and warning the user of any changes that have occurred which exceed a pre-defined threshold.

ENERGY KEY PERFORMANCE INDICATORS

Visual MESA also functions as a calculation server for energy related Key Performance Indicators (KPIs). In particular, these KPIs typically include main equipment efficiencies, imbalances in steam headers, emissions levels, energy cost by unit or plant, current energy cost, optimized energy cost and energy intensity on the site as well as the individual plant level.

REPORTING

Visual MESA uses MS-Excel as its reporting tool. In addition to standard reports for all types of equipment that have been modeled, Visual MESA has an MS-Excel add-in that enables the user to create his own reports. These reports can also be saved as HTML pages in order for them to be published on the site's intranet. Moreover, the user can commence Visual MESA what-if executions from within Excel, providing great flexibility when comparing alternative operational scenarios.

Cost Summary (\$/hr)			
Standard Cost	Optimized Cost	Delta	Unit
\$11,741.98	\$10,845.81	\$896.17	

Fired Steam Generation Summary (million/hr)			
Name	Standard	Optimized	Delta
600F Fired Boilers	150	100	-50
600R Cogens	450	451	1
600F CCS	400	451	49

Letdown Summary (million/hr)			
Name	Standard	Optimized	Delta
600-100	30	3	-27
100-40	1	1	0
Vent	10	6	-4

33 Plant Compressor Steam Rate Recommendations (million/hr)			
Name	Standard	Optimized	Delta
600F Steam To	272	262	-10
150F Extraction	200	250	45
Combinat	60	40	-20



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