



# VISUAL MESA

## Real-Time and Multi-period Optimization

## Multi-period Optimization of District Energy Supply

### Development of Day-Ahead Scheduling to Supplement Real-Time Optimization at TECO

Jose Garcia, Thermal Energy Corporation  
Juan Ruiz, Soteica Visual MESA LLC

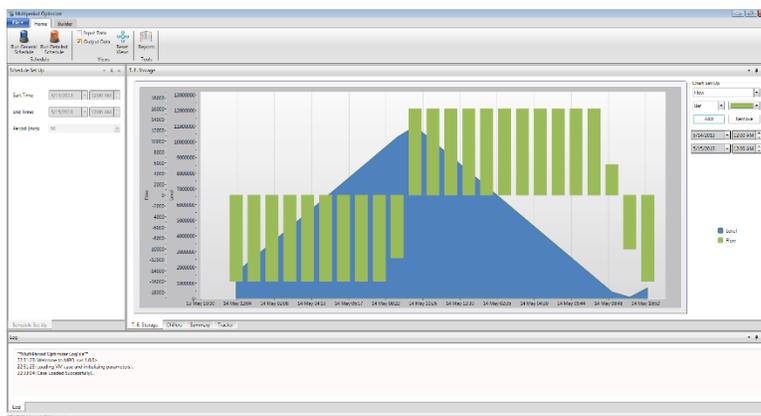
TECO operates the largest district chilled water system in the country, which serves 45 buildings and 19 million square feet across 8 hospitals and 8 college/university buildings in the Texas Medical Center in Houston.

Since 2009, TECO has been using Soteica's industry-leading Visual MESA software to drive lowest real-time utility supply operation. Visual MESA's Real-Time Optimization (RTO) of utility supply routinely provides 2% to 5% savings in Fuel and Electricity spending.

Available "Handles" to address the minimization of energy spend challenge include: manipulation of cogeneration and boiler steam production, chilled water supply, the export of steam, and the management of real-time power purchase and sale. The 24/7/365 handling of the complex relationships and tradeoffs presents an overwhelming challenge for the operators in their effort to minimize cost.

A real-time model, which considers plant control strategies and system reaction to changes in the utilities, addresses the challenge by giving the operators direct advice about minimum cost utility operation.

In addition to the RTO function, Visual MESA is providing assistance with the Day-Ahead scheduling of certain assets, including the Thermal Energy Storage (TES) at TECO. Soteica is currently collaborating with TECO to develop a scheduling system for the optimal operation of the TES and Chillers using Visual MESA's Multi-period Optimization (MPO) capability.



**Results:** The model used at TECO enables the operators to drive to the lowest cost utility system operation on a continuous basis and is integrated into the Standard Operating Procedures to ensure the utility system is operated according to best practices. Savings achieved are quantified and tracked over time.

Visual MESA's Multi-period functionality adds the ability to optimize Day-Ahead Scheduling in addition to the real-time operation, which further extends the economic benefit to TECO. Savings are delivered by TES optimization, minimization of operator time in scheduling, and improvement of chilled water production efficiency.

Energy costs are a very large and necessary part of the operating expense of district energy facilities. Tradeoffs between the electrical, steam, and chilled water systems are especially significant since the advent of electrical deregulation. This presents a complex problem in determining how to manage your steam, chilled water, electrical and fuel efficiently. Significant cost savings can be achieved by using an optimization program which acts on the flexibility inherent in the site's energy systems. Visual MESA was developed to successfully address these energy management issues.

Introducing the best-of-breed **Visual MESA** software solution:

- **Reduce energy spend by 2 to 5%**
- Excellent ROI (usually less than 6 months).
- Proven and validated software with over 20 years of successful applications.
- Current users include global, super major industrial producers.
- An online, real-time system for utilities management.
- Multi-period optimization of scheduling of power and thermal energy storage for the day-ahead against forecasted load and utility pricing.
- Engineering model of your utility system.
- Accurate modeling of commercial contracts and environmental permits.
- Real-time economic optimization of your energy network, including emissions, while respecting permit and operational constraints.
- Provides forward-looking visualization of energy spend and KPIs for more effective management decisions.
- Empowers the collaboration between operators and engineers with detailed coverage in five distinct areas:
  1. **Monitoring:** Monitoring the steam, electric, chilled water and fuel systems. Assists in system management by providing alerts of important changes.
  2. **Optimization:** Optimizes the production and use of steam, fuel, chilled water, and power to reduce costs. Recommends minimum cost utility supply operation by solving the mixed-integer and non-linear optimization using an SQP-based method.
  3. **Multi-period Scheduling:** Optimized Dispatch of Power and Thermal Energy Storage Assets.
  4. **"What If?" Planning:** Predicts how the steam system will respond to proposed changes such as a new equipment, change of process, and shutdowns, using current, historical, or user-defined data.
  5. **Auditing, Accounting and Data Validation:** Auditing the system with continuously validated data.

## Soteica Visual Mesa LLC

15995 Barkers Landing, Suite 320 - Houston, TX 77079  
Tel. +1 (281) 829-3322

[www.svmesa.com/contact.php](http://www.svmesa.com/contact.php)