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Symmetry

Tailored workspaces—optimized facility

Process Software Platform for Energy Management



Tailored workspaces—optimized facility

Comprehensive Utility Optimization

Symmetry, a process software platform, is a comprehensive simulator that captures all aspects of your models from reservoir to product distribution.

Electricity and steam utility optimization studies have been attempted in refining and chemical industries for many years. These studies, however, have proven difficult to progress beyond optimizing utility systems independently of production. The Symmetry platform provides total petrochemical or refinery site process modeling that offers you a solution to predicting production yield and utility consumption simultaneously. With the Symmetry platform, you can:

- Layer financial data into process utility models
- Fine-tune utility models to match plant data
- Customize the user-friendly interface
- Link utility models with process models

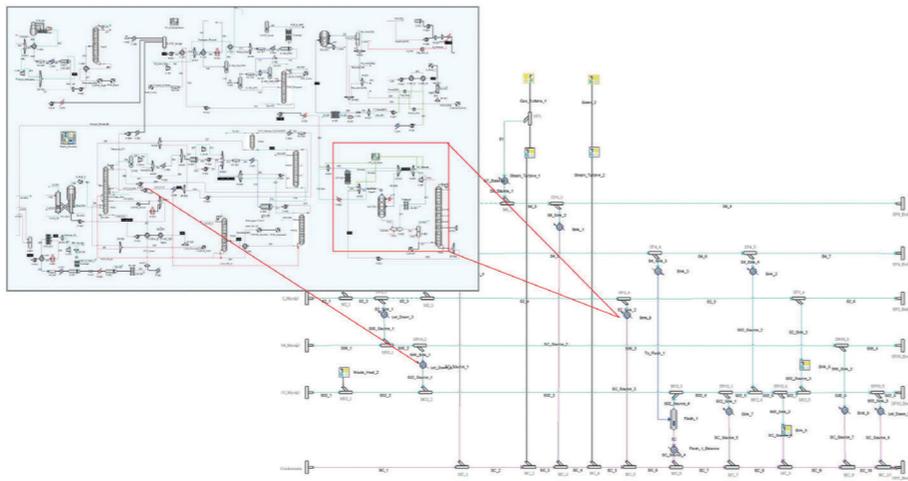


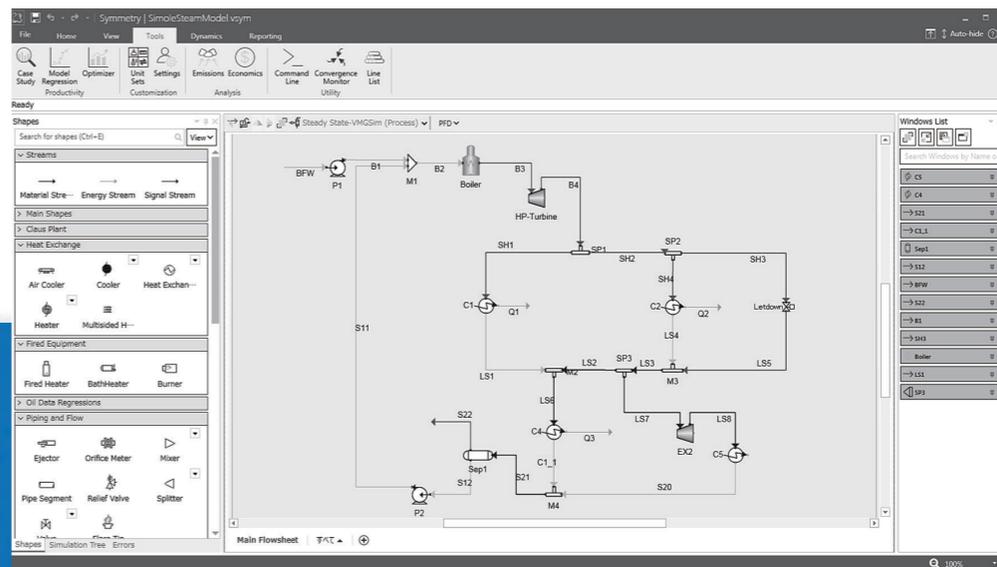
Figure 1. Seamless simulation of refinery and utility modeling.

Model Creation Environment

The Symmetry platform provides a comprehensive process flow diagram drawing tool using Microsoft Visio® to generate high-quality, interactive process drawings. The platform's simulation solver monitors the degrees of freedom of the flowsheet and immediately invokes the necessary calculations when the degrees of freedom are satisfied. With over 24,000 compounds available in a hydrocarbon database, the Symmetry platform enables petrochemical and refinery modeling that can be combined with PIONA molecular structure-based components.

- Steam Table (1997 standard for water and steam)
- Pure Component Database (including more than 24,000 compounds)
- PIONA Molecular Structure Base Modeling

Figure 2. Symmetry User Interface.



Model Creation Environment

- Fire Heater**  Furnace model can be applied to boilers handling radiant and convection heat transfer rigorously.
- Burner**  Combustion model can calculate fuel rate from a burner outlet condition and handle gas, liquids, and solid fuels.
- Heat Exchangers**  Performs a steady state, two-sided heat and material balance calculation. A detail rating is also available.
- Pitch Utility**  Calculates an overall composite curve for a group of unit operations.
- Heater/Cooler**  Handles heat transfer of one fluid.
- Compressor/Turbine**  Models compressor or turbine behavior by adiabatic or polytropic efficiency input, or a set of user- defined performance curves.
- Process Calculator**  Performs custom calculations by providing an interface similar to a spreadsheet.
- Excel® Unit Operation**  Easily creates Excel-Symmetry platform link models by using automatic Visual Basic for Application (VBA) code.

Utility systems will have different model detail requirements depending on the purpose. Whereas plant engineers may need rigorous boiler models for operations analysis, production planners may require a less detailed tool to study plant scale optimization. The Symmetry platform's modeling environment responds to various requirements, allowing the unit level detail necessary for an engineering study or the whole site scale for energy management.

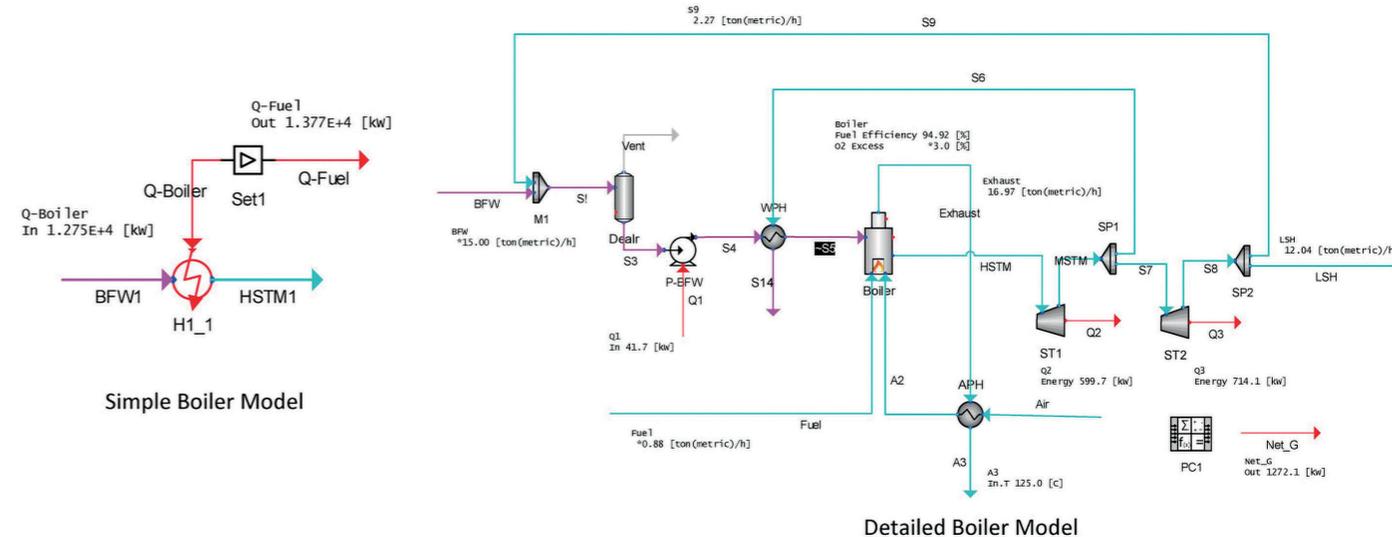


Figure 3. Flexible modeling.

User-Friendly Excel Interface

Users can easily create linked Excel-Symmetry platform models by using the Excel unit operation without writing VBA code. The Symmetry platform also has a Component Object Model (COM) automation option that provides a programming interface to directly interact with the process simulator without the graphical user interface. The Symmetry platform can be accessed from any COM-compliant application such as Excel (VBA), Visual Basic, and Visual C++.

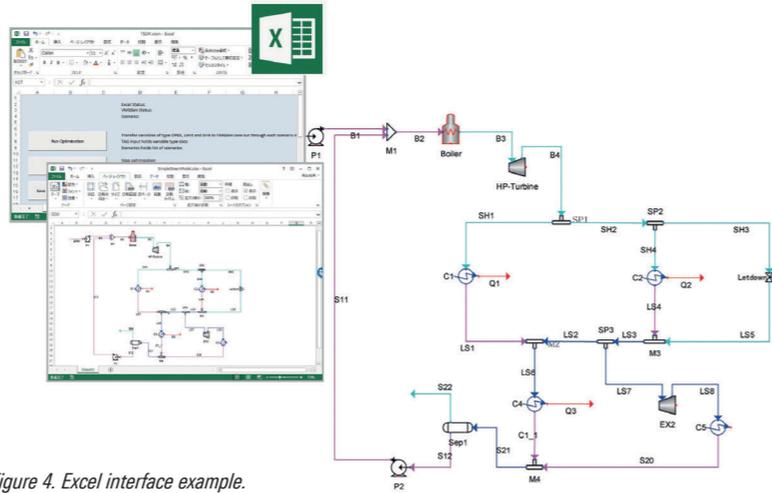


Figure 4. Excel interface example.

Link to Process Model

It is important for the plant site optimization to calculate the marginal cost and profit correctly. The Symmetry platform provides seamless simulation between process models and utility models. As a result, high-accuracy marginal cost estimation is available.

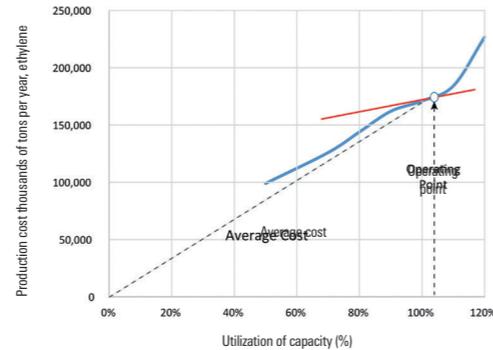
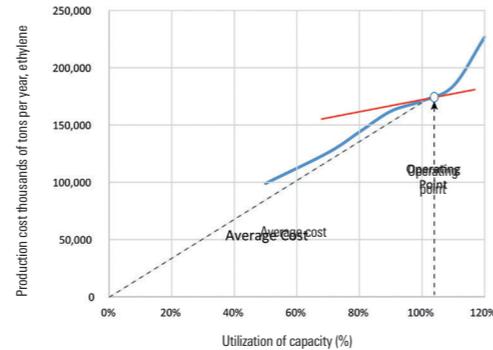


Figure 5. Ethylene plant example.





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