



CYME

Power Engineering Software and Solutions

CYME 9.0 New Features

Meeting the needs of the modern long-term grid planning framework

Electric utilities face numerous challenges related to fast-changing technologies, customer expectations, economics and regulatory landscape.

Driven by its vast user base, the CYME team pushes the envelope of its best-of-breed power system analysis software with the release of CYME 9.0, the first version of a new generation aimed at supporting utilities in their efforts to align their practices with the climate and clean energy goals of the 21st century.

The CYME 9 Series is a new generation of our software supporting utilities in the modernization of their long-term grid planning framework. Built on core components such as time-series analysis, distributed energy resources (DER) optimization, non-wires alternatives (NWA) and project portfolio evaluation, CYME 9.0 paves the way to the integration of the capacity planning process with the distributed resources planning process. All this through a powerful and versatile user interface connecting simplicity with efficiency.

Key new features include:

- A unique Load Relief DER Optimization module optimizing energy storage systems as well as dispatchable inverter-based generators to mitigate capacity problems on strategic grid assets.
- A new Microgrid Modeling and Analysis modules enabling unprecedented simulations of islanded – but also grid-connected – microgrids.

- A revamped Techno-Economic Analysis allowing an easy, intuitive, yet exhaustive financial assessment of concurrent grid projects.
- An expanded integration of the Load Flow with Profiles analysis with the Advanced Project Manager to enable true long-term, time-series capacity analysis.
- Continuous improvement of core components such as Load Flow Analysis, DER Impact Evaluation, Integration Capacity Analysis, Arc Flash Hazards Analysis, Harmonic Analysis, Scripting Tool with Python®.
- Several improvements to the software framework, user interface and one-line diagram navigation.

Partnering with utilities, listening to the voice of the customer and leveraging our cutting-edge engineering and IT expertise, the CYME team continues to serve the industry with a state-of-the-art engineering tool that brings dependable results at users' fingertips.

Going beyond traditional CAPEX projects

To further improve our offering on the modeling and analysis of non-wires alternative, this new

version of CYME brings forth the Load Relief DER Optimization module which assists engineers with the evaluation of load relief projects using battery energy storage systems (BESS) as well as dispatchable and non-dispatchable generation. The module bundles two distinct algorithms: one for the optimization of BESS and dispatchable generation and one for the sizing of non-dispatchable generation.

The Dispatchable DER Optimization Analysis optimally sites, sizes and sets the converter controls of BESS and dispatchable electronically-coupled generators with the objective of reducing the loading on strategic grid assets. The module can be used alone or can leverage the power of the Load Flow with Profiles analysis module to automatically determine the maximum energy demand and time parameters of the overloaded asset.

The Non-Dispatchable DER Sizing Analysis determines the required generator size to mitigate user-defined levels of asset overload occurrences. The analysis simultaneously evaluates different generation technologies, handling each technology's specific behavior.

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Microgrid design, simulation and analysis

CYME 9.0 tackles the need for microgrid modeling with a new module that lifts the simulation requirement for a source equivalent or swing generator to exist in any connectivity model. This enables unprecedented simulations of islanded – but also grid-tied – microgrids. The capability of the module includes:

- Unbalanced power flows, short circuit analysis, quasi-static time-series analysis and load flow with profiles analysis on islanded and grid-connected microgrids.
- Detailed modeling of grid-forming DERs, such as isochronous and droop control modes, factoring in operational/physical limits.
- Customizable load shedding and curtailing algorithm for islanded simulations where the load offsets the available generation.

Expanded capability for long-term planning

A myriad of improvements has been brought to the Techno-Economic Analysis module to improve the user efficiency, broaden the scope of the financial analysis and cater for the comparison of concurrent grid projects. Acquisition and O&M costs, as well as other financial attributes, can now be defined for each asset of the equipment library, while the global cost library offers additional flexibility for non-depreciable assets, system reconfigurations and multi-year costs. Ultimately, automatic cost assignment is now possible for all asset types based on an intelligent detection of overall grid model changes after a sequence of modifications.

When used in conjunction with the Advanced Project Manager, the capability of the Techno-Economic Analysis expands

further through the concept of cost template. The latter allows to pre-define typical project costs not reflected in the connectivity model as a function of the project type. New reports facilitate the financial evaluation of scenarios such as concurrent mitigation solutions by providing their net present value based on investing activities as well as expenses and losses.

In turn, the Advanced Project Manager has been rendered more user-friendly and is more capable than ever with its new project creation wizard, a leaner user interface and more granularity in the definition of the subproject categories. A new series of report summarizing the grid impacts of future system reconfigurations, load growth projects and DER interconnection projects was also developed.

The picture would not be complete without the many additions to the Load Flow with Profiles analysis, such as the new management of seasonal equipment ratings as a function of time, the easier profile assignment for global load and generation adjustments and the new CSV output mode for results that are saved to the drive. It should be noted that simulation results have been augmented with several new abnormal conditions metrics emphasizing worst magnitude, longest duration, total duration, first year of occurrence, etc. These translate into new tabular reports, color-coding layers and heat maps so that the user can make the most out of all this data.

Software perennity through continuous improvement

As always, the CYME team renews its commitment to enhance its industry-leading software to keep up with the ever-raising expectations of its users. More power, more automation and more flexibility

translate into more efficiency at your fingertips.

DER Impact Evaluation

– New substation-level analysis considering all circuits fed from the same transformer bank for voltage verifications, support for multiple dispersed installations including synchronous and induction generators, user-defined node monitoring, and more.

Integration Capacity Analysis

– Algorithmic optimizations resulting in a performance improvement up to 20X!

Load Flow Analysis

– Several enhancements to better solve complex grid models with numerous controls.

Arc Flash Hazards

– Support for the latest IEEE Standard 1584-2018™ and the 2018 version of the NFPA 70E® / CSA-Z462® Standard.

Voltage Regulators – New modes of reverse sensing logic for high-DER-penetration circuits, such as auto-determination, bias bi-directional, bias co-generation, reverse co-generation, plus a complete equipment library based on Eaton's Cooper Power series voltage regulators.

As the CYME team keeps improving its calculation engines and refining its modeling capabilities, the outcome of these multi-faceted user-driven development initiatives makes CYME 9.0 a fundamental tool for all power engineering studies.

For over 30 years, the CYME team has built a strong reputation with its clients by delivering the best software solutions backed by excellent customer-oriented service. For information on the CYME Software, or for a web demo, please reach out to us at cymeinfo@eaton.com. Users can get more details on CYME 9.0 by downloading the Readme document at <https://my.cyme.com/downloads/software>.

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