CYMDIST can perform several types of analyses on balanced or unbalanced three-phase, two-phase and single-phase systems that are operated in radial, looped or meshed configurations. The base module includes per-phase voltage drop and power flow analysis, fault calculations (fault flows and fault voltages), protective device coordination, optimal capacitor placement and sizing, load balancing and load allocation/estimation. CYMDIST is also equipped with add-on modules to perform more specialized analyses such as reliability analysis, contingency analysis, harmonic analysis, switching (tie-points) optimization, and more.

CYMDIST is an extremely powerful tool to assist you in creating "what-if" studies and performing simulations to evaluate the impact of modifications to your network, actual or future. With the newly added "Network Forecaster" function you can view/modify/create time-dependent projects in the selected period, that consist of any modifications such as the addition of any load at a given date (year, month or day), change/replacement of power transformers within the substation, rephasing/reconductoring project, network switching or reconfiguration, etc.

Features and Capabilities

- Power flow and voltage drop analysis
- Fault analysis
- Optimal capacitor placement and sizing
- Load balancing and load allocation/estimation
- Harmonic analysis
- Switching (tie-points) optimization
- Service restoration
- Reliability analysis (predictive and historical)
- Contingency analysis
- Substation and sub-network modeling and analysis
- Secondary network analysis
- Arc flash hazard
- Protective device coordination
Analytical Capabilities

- Balanced and unbalanced Voltage Drop analysis (radial, looped or meshed).
- Protective device coordination verification according to user-defined criteria for device clearance and loading.
- Fault current calculations for RMS, asymmetrical and peak values for all shunt fault configurations.
- Fault flow and fault voltage analysis throughout the network taking into account pre-fault loading conditions.
- Optimal capacitor placement and sizing to minimize losses and/or improve voltage profile.
- Load balancing to minimize losses.
- Load allocation/estimation using customer consumption data (kWh), distribution transformer size (connected kVA), real consumptions (kVA or kW) or the REA method. The algorithm supports multiple metering units as fixed demands and large metered customers as fixed load.
- Motor starting analysis (voltage dip and maximum motor size allowable).
- Flexible load models for uniformly distributed loads and spot loads featuring independent load mix for each section of circuit.
- Load growth studies for multiple years.
- Feeder interconnection for load transfer simulations.
- Phase merging capability.
- Automatic re-conductoring and re-phasing of selected sections.
- Distributed Generation.

CYMDIST–RAM - Predictive & Historical Reliability Assessment

CYMDIST(RAM) provides a framework within which scenarios are run and the impacts of the related investment such as DA (Distribution Automation) can be evaluated and understood.

The program computes the standard reliability indices for the overall system and all the corresponding protection zones such as MAIFI, SAIFI, SAIDI, CAIDI, ASAI, ENS (Energy Not Supplied), AENS and LEI. It also computes customer point indices such as the frequency of interruption, the duration, etc., for each customer and protection zones.

CYMDIST can simulate the impact of DA since the protective devices and switching devices can be modeled with their automated and/or remote control attributes. The program accounts for the selected reclosing schemes in conjunction with the fuse saving/clearing options as well as the actual coordination of the protective devices. The driving time and inspection time (function of the line/cable length) are included in the restoration time and fault indicators (visual or remote) are supported and will affect the total restoration time. Automated or manual load transfers are taken into consideration automatically and will be allowed if capacity constraints are not violated.

CYMDIST(RAM) features a module to calibrate the predictive model based on historical data. This functionality is very handy to adjust the failure rates and repair time for the overhead lines and cables in order to match the simulated model with historical indices.
CYMDIST-HARMO - Harmonic Analysis

CYMDIST-HARMO features a number of analyses, including frequency scan, voltage distortion and current distortion calculations on unbalanced systems. CYMDIST-HARMO allows the user to easily detect resonant frequencies due to capacitor banks, and to model non-linear loads and other sources of harmonic currents such as converters and arc furnaces. With these capabilities, it is possible to evaluate the impact of these non-linear loads on your distribution network.

The program will compute standards indices such as the voltage distortion factor, the current distortion factor, the telephone interference factor, etc. The program supports the addition of the standard single-tuned filters, double-tuned filters, C-type and high-pass filters, and you may compute the effectiveness of these filters and modify them at will in order to attain acceptable level of harmonic distortion on your distribution network.

With CYMDIST-HARMO you can perform phase or sequence analysis, driving point and transfer point frequency scanning analysis, voltage and current harmonic distortion, calculation of telephonic indices, system detuning analysis, and more.

CYMDIST-CAM - Contingency Analysis

CYMDIST-CAM is designed to study the impact of single forced or planned outages on the electrical distribution system. It finds the optimal switching plan to restore electrical power to priority customers and to recover the maximum possible load in the affected areas. Contingencies may be set at the substation, circuit or component level, meaning that you may study the impact of losing a transformer-bank in the substation or simply simulate a damaged component on the main feeder.

CYMDIST-SOM - Switching Optimization

CYMDIST-SOM assists the distribution engineers in determining the optimal feeder configuration that will minimize losses, improve the voltage profile and balance the load between feeders. The module can determine the optimal location of the tie points by suggesting new locations (addition of switching devices) or recommending new switching schemes for existing devices to achieve your objective. It will help you minimize abnormal conditions such as overloaded equipment and low voltage conditions, and to minimize unbalanced loading among interconnected feeders.

Reporting and Graphical Capabilities

CYMDIST reporting facilities allow to fully define the analyses results into web reports. CYMDIST includes a variety of report templates for all types of analyses. You can combine any reports, and create new ones, utilize any CYMDIST variable and created your own mathematical expressions using any of those variables, which further extends the reporting possible with CYMDIST.

You can entirely customize and color-code the one-line diagrams displayed in CYMDIST. The software comes with a collection of templates and libraries that you can expand; and you can also create your own.

- Create your own library of symbols, or modify the symbols provided in the standard library.
- Compose your own color coding layers to display analysis results, input data information, etc.
- Customize the display of any element of the one-line diagram (individually or by device type).
- Add text, lines, circles, etc. and insert graphical elements in your network, and save them with your network database.

And with CYMDIST-MAP map overlay module, you can display raster or vector map images (geographical landbase such as DWG, DXF, SHP, etc) as layers directly underneath the electrical model. You can select and toggle on/off the different layers. You can also copy the map and the electrical model to the clipboard for pasting into other Windows applications.
CYMDIST-SUB/SUBNET - Substation and Sub-Network Modeling and Analysis

With CYMDIST-SUB/SUBNET you can model all the major components of the distribution substation and any sub-network such as the detailed modeling of an industrial facility. The graphic editor of CYMDIST is utilized to build the One Line Diagram of the substation. The impact of all components of the substation as well as all components of the feeders connected are taken into consideration during the analysis. Thus, the user is able to analyze the effects of a change in the nominal operating condition of one feeder on another.

CYMDIST-SNA - Secondary Network Analysis

CYMDIST-SNA allows the Power Flow and Short Circuit analyses of heavily meshed secondary network distribution systems for any voltage level. You can build the secondary grid and include the complete vaults with their transformers and protective devices, the secondary lines or cables, and the distribution transformers. It includes comprehensive presentation tools for selective visualization and effective management of large datasets, like spreadsheets, rapid graphics, and a multitude of context-dependent reporting facilities.

Complementary Modules

**CYMDIST Gateway** - CYMDIST Gateway is the CYME solution for the creation and maintenance of the CYMDIST distribution network data model. The connectivity network extracted from your Geographic Information System (GIS) is accurate, electrically complete, with actual loads and switch status; and this network model can be updated easily. CYMDIST Gateway is a generic interfacing method with the libraries of your enterprise GIS. It is a stand-alone solution that features a data manipulation engine reading the GIS data format. It builds the network connectivity without using proprietary code and generates the files needed by CYMDIST.

**CYM-ARC Flash Hazard** - This module computes the necessary parameters required to assess the risk level and adopt the adequate safety procedures. It complies with industry recognized standards and methods for performing ARC Flash Hazard calculations to facilitate the calculation of arc flash hazards in different types of equipment in various power systems.

**CYMTCC - Protective Device Coordination** - This module addresses Time Over-Current protection for Industrial, Commercial and Distribution Power systems. The program comes with an extensive database of over 5000 protective devices that are easily called to produce Time-Current curve plots and device settings reports. It also features a unique Coordination wizard to suggest protective device settings/adjustments and ratings. CYMTCC features a direct interface to CYMDIST to verify the coordination of protective devices, the maximum permitted operating time («Reach») and the maximum permitted continuous load current.

**Data Repository**

All the data resides in standard SQL tables and XML files so it can be easily populated or queried by third parties applications. CYMDIST can be interfaced with or embedded in other applications such as AM/FM/GIS system, DMS, NMS, OMS or SCADA systems and is available as a Microsoft Component Object Model (COM) for integration with other COM-compliant applications.