The field proven Spectrum Power™ TG Load Forecast program provides the EMS operator with an estimate of the hourly electrical demand for both the current day and up to the next thirteen days for one or more regions of the electrical network. Total demand is separated into several components for analysis and prediction.

The program utilizes historical load patterns categorized by season for the base load component. A daily load component representing the varying hourly load pattern, over the week is added, as is a component representing any known scheduled nonconforming loads. These components are easily adjustable by the operator using graphical displays.

Load Forecast calculates the weather component for each hour, based on the interactively developed weather model and the weather forecast for the coming week. The load-weather model is a seasonal model (four seasons maximum), containing weather variables custom selected to give accurate results in the user’s unique service area. This load-weather model is optimized by use of historical weather data pertaining to the utility’s network service area.

In order to develop an accurate load forecast, the program can optionally use the weather forecast. Weather forecasts may be either manually entered through a display or provided via a real-time link to a weather bureau. The output Load Forecast is available for use with all other control center and energy management solutions.

Control center and energy management solutions

Answers for energy.
power application programs, such as Unit Commitment and Load Management. This helps you plan system generation, control activities, and better utilize resources.

Design Basis

The program uses a generalized load-weather model based on stepwise linear regression techniques. This model has the following form for each region for each day i and hour j:

\[ Y(i,j) = B(i,j) + S(i,j) + W(i,j) + N(i,j) + Z(i,j) \]

where:

- \( Y(i,j) \) is regional load
- \( B(i,j) \) is the base regional load
- \( S(i,j) \) is the day-of-the-week component
- \( W(i,j) \) is the weather-induced load component
- \( N(i,j) \) is the scheduled non-conforming load
- \( Z(i,j) \) is the random load component

The base load, as well as the day-of-the-week component, are filtered as real-time data is received by the system. The weather component is modeled by a seasonal model containing weather variables selected for each customer’s climatic area. These include temperature, windspeed, solar radiation, and humidity. The coefficients for these weather variables are recomputed daily, using an optimal fit algorithm with the historical data to the present time, thus continually refining the coefficients used to improve the accuracy of the prediction.

Functions

The Load Forecast Program:
- Initializes the model based on historical data
- Incorporates tailored seasonal climatic models
- Calculates optimal coefficients for weather model every 24 hours
- Filters long-term average components.
- Provides both tabular and graphical displays of the forecast.

Operator Interface

The EMS operator is provided with the complete capability to:
- Define and modify the load-weather models for each region and each season
- Run and save studies via off-line models
- Monitor results in both tabular and graphic formats
- Enable selected models for on-line use.

System Configuration

The Load Forecast program makes extensive use of Power TG’s state-of-the-art Archive Management Subsystem for storage of the system load and weather-related data. The program may be run periodically (typically on each hour following the scanning of meter readings) as well as by operator request. It also updates the weather coefficients shortly after midnight. To allow the user of the Load Forecast program maximum flexibility, Load Forecasting can be run on the primary CPU or on an application primary CPU if available. The program is efficiently written to run on any Windows™ or Linux machine with minimal impact on system performance.

Sizing Data

- Forecast Period: 336 hours (expandable)
- Forecast Interval: 1 hour
- Geographical Resolution: 20 regions (expandable)
- Number of seasonal load/weather models: 4 per region
- Number of weather variables: 5 per model
- Number of intermediate variables: 6 per model
- Number of hourly coefficients: 24 per weather variable
- Number of study areas available: 6
- Data retained for restart: 14 days

These sizes are for actually delivered systems and can be easily expanded to meet specific utility needs.

For more information, please contact your Siemens representative.