Seminole Electric
COOPERATIVE, INC.
IN PARTNERSHIP WITH THOSE WE SERVE

Current Load Forecast Description Statement

Short Term Load Forecast Methodology

Seminole Electric Cooperative, Inc (SEC) uses services provided by Pattern Recognition Technologies (PRT). PRT provides hourly load forecasts for SEC's Direct Serve load, SEC's load in Progress Energy Florida (dba FPC)'s control area, and SEC's load in Florida Power and Light's control area. PRT provides the temperature forecasts for ten (10) identified sites are used to generate the load forecasts. Forecasts are provided for the current day and seven days (168 hours) beyond midnight of the current day.
Load forecasts beyond seven (7) days are provided by SEC Strategic Planning group. See Long-Term Load Forecast for details.

Long-Term Load Forecast

SEC long-term forecasts are developed on an annual basis by SEC Strategic Planning group. Below is the description of the methodology that extracted from SEC Ten Year Site Plans that submitted to State of Florida Public Service Commission.

Weather Data

SEC obtains hourly weather data from the National Oceanic and Atmospheric Administration (NOAA) for six weather stations located in or around SEC's Member service area. To better reflect weather conditions in each Member's service territory, different weather stations are assigned to individual Member systems based on geographic proximity.

Monthly heating degree hours (HDH) and cooling degree hours (CDH) are used in the energy usage models, while the peak demand models use HDH and CDH on SEC's peak days. SEC uses different temperature cut-off points for air conditioning and space heating demand. In addition, there are different winter cut-off values for Members in the northern versus the southern regions.

Forecast Methodology

SEC's Integrated Forecasting System consists of the following sub-models:
(1) Residential Consumer Model
(2) Appliance Model
(3) Commercial/Industrial Consumer Model
(4) Other Class Consumers Model
(5) Residential Energy Usage Model
(6) Commercial/Industrial Energy Usage Model
(7) Other Class Energy Usage Model
(8) Peak Demand Load Factor Model
(9) Hourly Load Profiles and Load Management
Each model consists of ten sub-models because each Member system is modeled and forecast separately. Individual Member model results are aggregated to derive the SEC forecast.

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1. Residential Consumer Models

For each Member, annual consumers are a function of the Member's service area population, with a first-order auto-regressive correction used when necessary. The amount of new residential housing permits was found to be a significant variable in six of the Members' residential consumer models. Forecasts are benchmarked using previous year actual data. Seasonally adjusted monthly forecasts are developed from annual data. Expected new large commercial consumers are included.

Other consumer classes generally include irrigation, street and highway lighting, public buildings, and sales for resale, which represent less than 2 percent of SEC's Members' total energy sales. A few Member systems include some of these classes in the commercial/industrial sector. For the others, annual consumer forecasts are projected using regression analysis against population, or a trending technique.

2. Appliance Model

The Appliance Model combines the results of the Residential Consumer Model with data from the Residential Appliance Survey to yield forecasts of space-heating and air-conditioning stock variables which are used in the Residential Energy Usage Model and the Peak Demand Load Factor Model. Annual forecasts of the shares for the following home types are produced: single-family, mobiles, and multi-family homes. Each home type is segregated into three age groups. Next, annual forecasts of space-conditioning saturations are created. Finally, the air-conditioning saturations and the space-heating saturations are combined with housing type share information, resulting in weather-sensitive stock variables for heating and cooling.

3. Energy Usage Model

The Residential Energy Usage Model is a combination of econometric and end-use methods. For each Member system, monthly residential usage per consumer is a function of heating and cooling degree variables weighted with space-conditioning appliances, real price of electricity, and real per capita income. Forecasts are benchmarked against weather-normalized estimated energy in the previous year of the analysis period. The usage per consumer forecast is multiplied by the consumer forecast to produce monthly residential energy sales forecasts.

For each Member system, monthly commercial/industrial usage per consumer is a function of heating and cooling degree variables, real price of electricity, real per capita income, total non-farm employment, and dummy variables to explain abrupt or external changes. A first order auto-regressive correction is used when necessary. Forecasts of energy usage per consumer are benchmarked to previous year estimates. Energy usage per consumer forecasts are combined with the consumer forecasts to produce monthly commercial/industrial energy sales forecasts. Expected new large commercial loads are included in the forecast.

Historical patterns of energy usage for other classes have been quite stable for most Members and usage is held constant for the forecast period. Trending methodology is used for the Members with growth in this sector.

4. Total Energy Sales and Energy Purchases

Residential, Commercial/Industrial, and Other class energy sales forecasts are summed to create total retail energy sales forecasts for each Member system. Retail energy sales forecasts are converted to Member energy purchases from SEC at the delivery point using historical averages

of the ratio of calendar month purchases to retail billing cycle sales for each Member. Therefore, these adjustment factors represent both energy losses and billing cycle sales and calendar month purchases differences. The latter, as a function of weather and billing days, often changes erratically.

5. Peak Demand Load Factor Model

The SEC peak demand forecast is derived after the Member monthly peak demands and hourly load forecasts have been created. Member peak demands are derived by combining the forecasts of monthly load factors with energy purchases from SEC. Monthly peak demand load factors are a function of heating and cooling degree variables, precipitation, air-conditioning and space-heating saturations, and heating and cooling degree hours at the time of the Member's peak demand. Two seasonal equations for each Member system are developed: one for the winter months (November through March) and the other for the summer months (April through October). The forecasted monthly load factors are combined with the energy purchases from SEC forecasts to produce forecasts of monthly peaks by Member.

6. Hourly Load Profiles

Hourly demand forecasts are created using an algorithm that contains the following inputs: normal monthly hourly profiles, maximum and minimum monthly demands, and energy. This algorithm produces monthly hourly load forecasts by Member. SEC peak demands are derived by summing the Members' hourly loads and identifying the monthly coincident maximum demands.