

**Choptank Electric Cooperative Load Profile Application Guide Introduction**

The Cooperative provides the weather sensitive equations utilized for converting monthly read data to hourly load data for the purposes of settlements. The resulting values produced by these equations are used by the Cooperative to determine all Hourly Energy Obligations submitted to PJM. Every customer in the Cooperative’s service territory will be assigned to one of the provided load shapes. The profiles do not represent each customer’s total load, but rather the hourly shape that is scaled to match the customer’s total bill cycle consumption.

**Determining a Customer’s Load Profile**

The Load Profile equation that should be used for a customer is based upon their Rate Code. The list below shows all the Rate Codes and the associated Load Profile. Please note that the rate codes having a prefix of a capital ‘D’ indicate “Distribution Only” i.e., served by a 3<sup>rd</sup> party Retail Electric Supplier (i.e., Customer Choice). With respect to load profiling, these are treated the same as a Rate Code without a ‘D’ prefix and are not listed twice in the mapping below.

Profile	General Service	Irrigation	Lighting	Medium Commercial	Primary General Service	Residential	Small Commercial
Rate Code	C	FI	A1 though A5	M	P	R	CRC
	C-S	FI2	B1 though B7	MCP	PCP	R-S	S
	CCE		F1 though F12	MCP2	PCP2	RO	SCP
	CCE2		H1, H2	MCS	PRC	RP	SCP2
	CD		L-S	MCS2	PRO	RPR	SIS
	CDS		L1 through L5	MNC	PRO2	RPR2	SIS2
	CO		Z2, Z5, Z11, Z16	MRC		RPR3	SRC
	CP			MRC2		RRC	
	CPS			MRC3		RW	
						RWO	

**Select the Appropriate Season**

To evaluate a given profile day, the season of the day being profiled must be determined. Many load profiles are divided into four seasons. These four seasons are defined below:

- Spring – March 1st though May 31st
- Summer – June 1st through August 31st
- Autumn – September 1st through November 30th
- Winter – December 1st through February 29th

If a profile does not utilize four seasons, each month is treated as a season. In this case, the month season-type represent any day in that calendar month.

### Select the Day-Type

For all load profiles there are 2 possible day-types as defined below.

- WEEKDAY – Monday through Friday where the weekday does not fall on a NERC holiday.
- WEEKEND – Saturday, Sunday, and NERC Holidays

### Select the Weather Response function

For each combination of Season and Day-type, there will be a set of Weather Response Functions. For each hour, there may be multiple equations but only one equation will be applicable to a given hour, and is based on the Input Variable, Lower Bound, and Upper Bound. The input variable will be either:

- Temperature: Hourly Temperature at that hour
- Peak Daily Temperature: Peak Hourly Temperature value for that day

All temperature values come from those recorded by the National Weather Service at the Salisbury-Ocean City Wicomico County Regional Airport (KSBY) weather station.

In the example below, if it were a Residential customer on a Spring Weekday and the temperature at Hour Beginning 12 was 74 degrees, the second equation would be utilized and the first would be ignored.

PROFILE	SEASON	DAYTYPE	HOUR	INPUT VARIABLE	LOWER_BOUND	UPPER_BOUND	COEFFICIENT	Constant
Residential	SPRING	WEEKDAY	12	TEMPERATURE	-50	66	-0.03743	3.25462
Residential	SPRING	WEEKDAY	12	TEMPERATURE	66	150	0.03491	-1.48745

### Apply the Weather Response Function

After selecting the appropriate equation for each hour, there should be a total of 24 weather response functions for a given day (excluding the Spring Ahead Day which will have 23 and the Fall Back Day which will have 25). Each weather response function has a coefficient and a constant. The profile value should be calculated as shown below:

$$\text{Profile Value} = \text{Coefficient} * \text{Input Variable} + \text{Constant}$$

Using the previous example of a Spring Weekday with a Temperature of 74, the equation would look like the below.

$$\text{Profile Value} = 0.03491 * 74 + (-1.48745)$$

$$\text{Profile Value} = 1.09589$$

The resulting profile value for that profile and hour would be 0.734822892.

### Construct the Full Load Profile and Apply the Customer Usage

For a typical customer bill period there will be approximately 31 days of metered usage, although this number can vary based on a variety of factors. In a typical 31-day period, there will be a total of 744 hours. After

evaluating the WRF equations for the specific temperature, season, and day-type at each of the 744 hours, the full load profile for the customer's bill period is represented by concatenating the 744 values sequentially. The customer's single monthly usage can now be applied to the Hourly Load Profile for the same date range. This is done by creating a customer Usage Factor for the bill period. The usage factor is calculated as:

$$\text{Usage Factor} = \frac{\text{Bill Period Actual kWh}}{\text{Sum of Profile Values for the Bill Period}}$$

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The Usage Factor should be multiplied by the hourly load profile values for the bill period to produce a time series of hourly values for the specific customer.