

TAC-Approved Methodology:

**Generating and Maintaining the Load Distribution Factor Library**

**Version 3.0**

**TAC Approved: XX/XX/XX**

Document Revisions

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| 9/29/2010 | 1.0 | First draft | John Adams |
| 9/28/2017 | 2.0 | Updates for PUN import/export modeling | J. Chen/A. Sills |
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Introduction

This methodology describes the steps needed to generate and maintain Load Distribution Factors (LDFs) used in the Congestion Revenue Right (CRR) and Day Ahead Market (DAM) clearing activities. LDFs are developed using historical State Estimator or SCADA data.

Per Protocol Section 4.5.1, ERCOT shall generate and maintain the appropriate LDF libraries for use in the DAM and CRR Auctions. ERCOT updates the LDF libraries by maintaining the existing LDF sets and generating new LDF sets when required, based on significant changes in system-wide load patterns. Updates are regularly required for seasonal load patterns due to weather changes, but updates may also be prompted for reasons described further in this document.

Each set of LDFs should have a 24-hour weekday and a 24-hour weekend load profile, to represent the load conditions in each hour of a weekday and weekend.

# Generating Load Distribution Factors

Loads Not Associated with Private Use Networks

In order to generate the LDFs, ERCOT shall first select one proxy day for weekday and another proxy day for weekend. The proxy days are selected based on the load and weather conditions, so that they can represent the desired load conditions for the season to be modeled.

For each of the selected proxy days, ERCOT then retrieves historical State Estimator load data on all individual modeled loads contained in the most recent operational network model. The hourly average of the State Estimator load data will be used as the initial LDF for the individual loads. DC-tie loads are set to zero. New loads for which historical data does not exist may be set to zero.

Loads Associated with Private Use Networks

ERCOT uses a different methodology to generate LDFs for Private Use Network (PUN) loads as they behave differently from non-PUN loads considering the manner in which the load is being served.

For the weekday and weekend load profile used within the DAM, ERCOT retrieves the past 4-week historical data of the net power consumption at the PUN, and then uses the hourly average value of the net power consumption as the initial net load distribution at the PUN level. The net load distribution at the PUN level is further distributed to the individual loads inside the PUN based on their historical state estimator load data.

For CRR Auctions, the LDFs for PUN loads will be set to 0.

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| [Replace Section 2.2 above with the following upon system implementation of NPRR831:]  2.2 Loads Associated with Private Use Networks  ERCOT uses a different methodology to generate LDFs for Private Use Network (PUN) loads as they behave differently from non-PUN loads considering the manner in which the load is being served.  For the weekday and weekend load profile, ERCOT retrieves the past 4-week historical data of the net power consumption at the PUN, and then uses the hourly average value of the net power consumption as the initial net load distribution at the PUN level. The net load distribution at the PUN level is further distributed to the individual loads inside the PUN based on their historical state estimator load data. |

# Implementing Load Distribution Factors

It is possible for discrepancies to occur between retrieved historical load data and the desired load profile, as the historical data could be affected by phenomena such as distribution transformer outages or load rollovers. As a result, ERCOT shall further verify the load data and make the necessary adjustments to reflect the load profiles under normal operating conditions.

The table below shows the validation steps that are conducted to verify the LDFs prior to usage.

|  |  |  |
| --- | --- | --- |
| Validation Checks used to Verify LDF Sets | | |
| *Type Index* | *Validation Screening Type* | *Criterion for Validation Failure for a Specific Load* |
| 1 | Spikes | Maximum LDF is greater than 2 times of LDF average plus 10 MW |
| 2 | High Values | Any hour LDF is greater than 60 MW |
| 3 | Jumps | The difference between any hour LDF and previous-hour LDF is greater than 10% of previous-hour LDF plus 15 MW |
| 4 | Negative LDF | LDF MW is less than zero |
| 5 | Constant LDF | Average of LDFMW is non-zero but standard deviation of LDF-is equal to zero |
| 6 | Zero LDF | LDF MW is equal to zero for at least one hour but average of the LDF is non-zero across all hours |
| 7 | Non-conforming | List of Non-conforming Loads is subject to review |

During the validation, ERCOT may determine that the initial LDF values of certain loads are not a good representation of their load profile. ERCOT may modify the LDF for those loads by using techniques such as:

1. Set the value to zero;
2. Use the daily average value for all hours;
3. Interpolate the value for questionable hours based on data from the adjacent hours; or
4. Retrieve data from another proxy day.

Once the new LDF set is verified and, if necessary, updated through the validation steps, the files containing weekday and weekend LDF data are sent to the ERCOT EMMS Production team, who uploads the data into the Market Management System (MMS) for use in DAM. The ERCOT CRR team is informed that the LDF libraries have been updated and the new set is available for future CRR models. The new LDF data is posted on the ERCOT MIS and an automatic notification is sent to Market Participants advising them that the LDFs have been updated. PUN load LDF data is redacted from the MIS postings and all self-serve load’s LDFs are set to zero when the data is used by the downstream applications.

# Maintaining Load Distribution Factors

ERCOT shall monitor and maintain the existing LDFs in the MMS, and make necessary adjustments to reflect the latest changes in the models and real time operations.

ERCOT may adjust the existing LDF data in the MMS to address significant changes in the load patterns.

Reasons for updating the LDFs include:

* Regular seasonal updates;
* Load model changes with a database load;
* Significant PUN net consumption changes due to its Resource outages; and
* Significant Block Load Transfer (BLT) of load into the ERCOT system.