**Eastern Demand v6**

*By Bainan 12/05/2019*

The two BAs, SWPP and MISO, consist of big areas from north to south. It is unlikely that the whole area covered by these big BAs have the same hourly profile shape. Eastern demand v6 addresses the issue by further splitting these two BAs into subareas. The storyline details are as following:

1. Get SPP legacy BA hourly load profile 2016 from the official website, the profile is recorded in GMT ending hour and there are 16 legacy BAs reported <https://marketplace.spp.org/pages/hourly-load>
2. Contact SPP people through their internal request management system, the average turnaround time is about 3-4 business days <https://spprms.issuetrak.com/Login.asp> In this way, we got a list of counties for ‘owners’ reporting to SPP and a list of counties for the entire SPP area. However, the two lists are not consistent. We took the ‘owners’ one *.\SPP\SPP\_Counties\_Owners.xlsx* Also, the ‘owners’ name only matches legacy BA’s name partially. We conducted a mix and match in *.\SPP\SPP\_owners\_subBA.xlsx*
3. Contact MISO people through the customer service from the official website, the average turnaround time is about 1-2 business days. However, the geographical definition of subareas, also known as ‘Local Resource Zone (LRZ)’, is confidential from their perspective. Only merged historical hourly profiles are provided in their old website <https://www.misoenergy.org/markets-and-operations/real-time--market-data/market-reports/#nt=%2FMarketReportType%3ADay-Ahead&t=10&p=0&s=MarketReportPublished&sd=desc> We did a manually geographic matching using Figure 1 from their public report *.\MISO\MISO 2016 Independent Load Forecast Final.pdf.*
4. From 2 and 3, we get the county list of each subarea and the corresponding historical hourly demand profile. In this way, we further divide SPP into 16 subareas and MISO into 6 subareas. The subarea names can be found in the column names in *miso\_subarea\_demand\_profile\_2016.csv* and *spp\_subarea\_demand\_profile\_2016.csv*
5. Given the list of counties of each subarea, we map each bus previously assigned to SPP and MISO to the new defined subareas.
6. The final eastern demand v6 is generated in a similar procedure as we did in eastern demand v5 with updated *bus\_to\_ba\_map.csv* and additional inputs of subarea profiles.
7. A demo of generating the final profile can be found in *eastern\_demand\_v6\_demo.ipynb*

***Notes:***

* We found the summation of subareas hourly profile does not match the hourly load profile from EIA for both SPP and MISO. We followed the EIA’s total but keep the hourly shape of each subarea. To do this, the load value for each subarea is scaled hourly proportional to the relative ratio and the total matches the EIA report.
* Given the metadata of subarea hourly load profile from SPP, we should shift the whole year profile by 6 hours in order to make it start with the first hour in UTC time of 2016, which is consistent with our system. However, by checking the hourly difference, we found 7-hour shift has the minimum hourly difference comparing with the EIA data (both 1 hour more and less gives 10 times more total absolute differences).