



Verification and Validation of Operational AQMv7.0.7 and AQMv7.0.8

Ho-Chun Huang and [EMC VPPPG Branch](#)

October 10 2024, NCWCP, College Park, MD



Outline

- The operational Air Quality Model (AQM) verification
- Comparison of model performance between AQMv7.0.7 and AQMv7.0.8 in the summer 2024.
- Summary

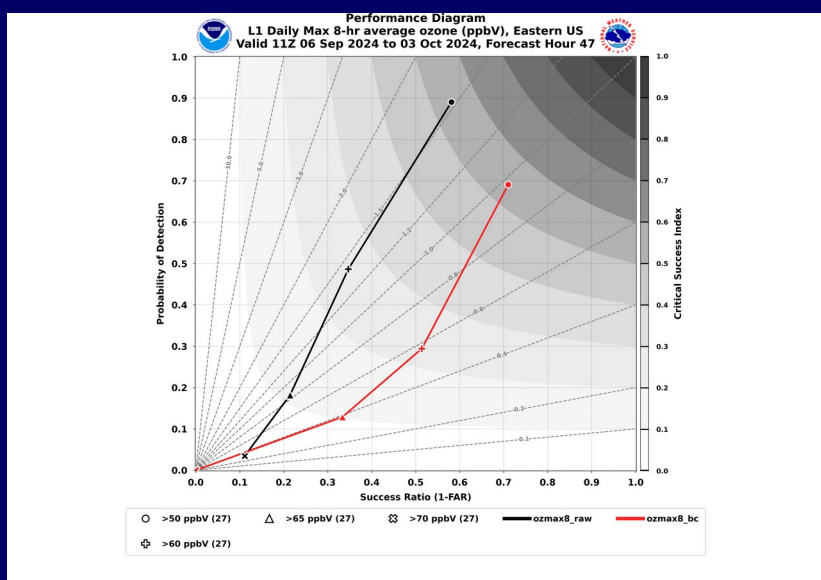
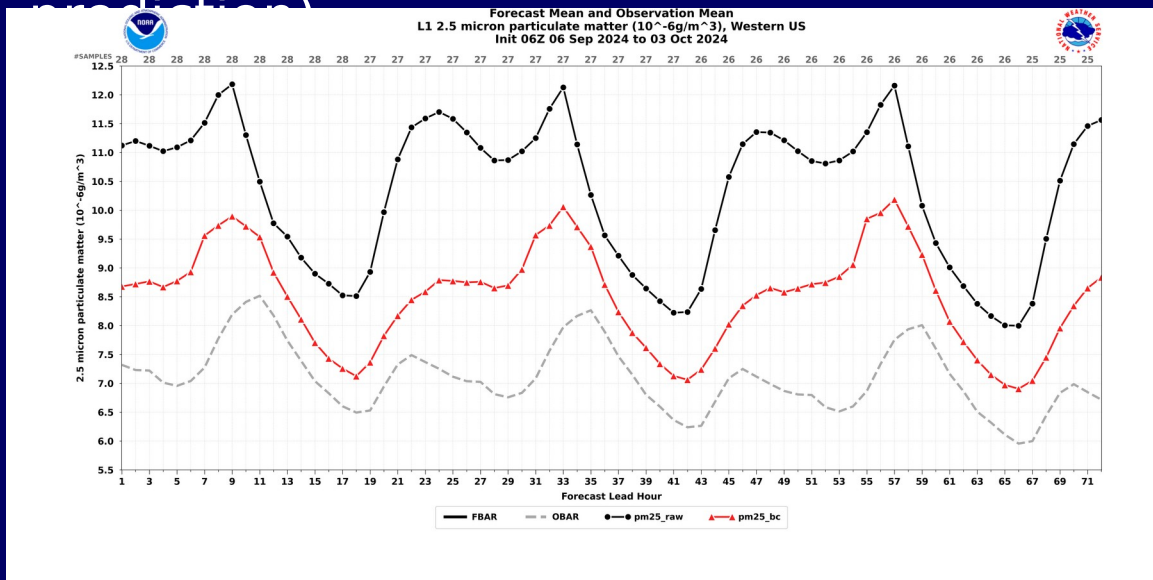


AQM O₃/PM₂₅ Verification by the EVS

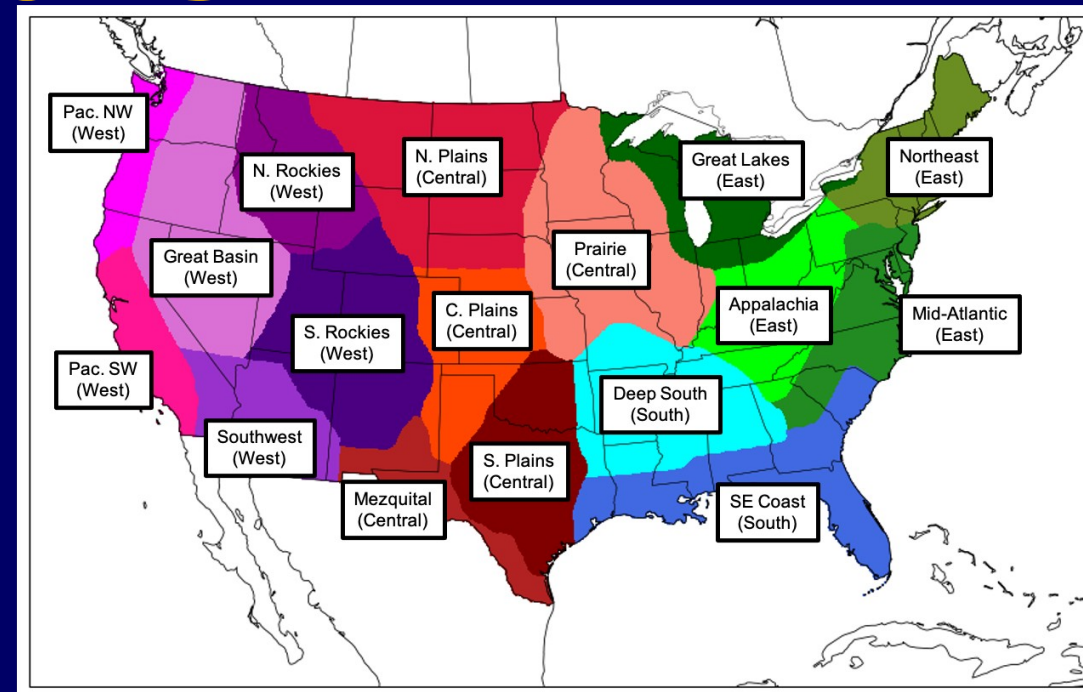
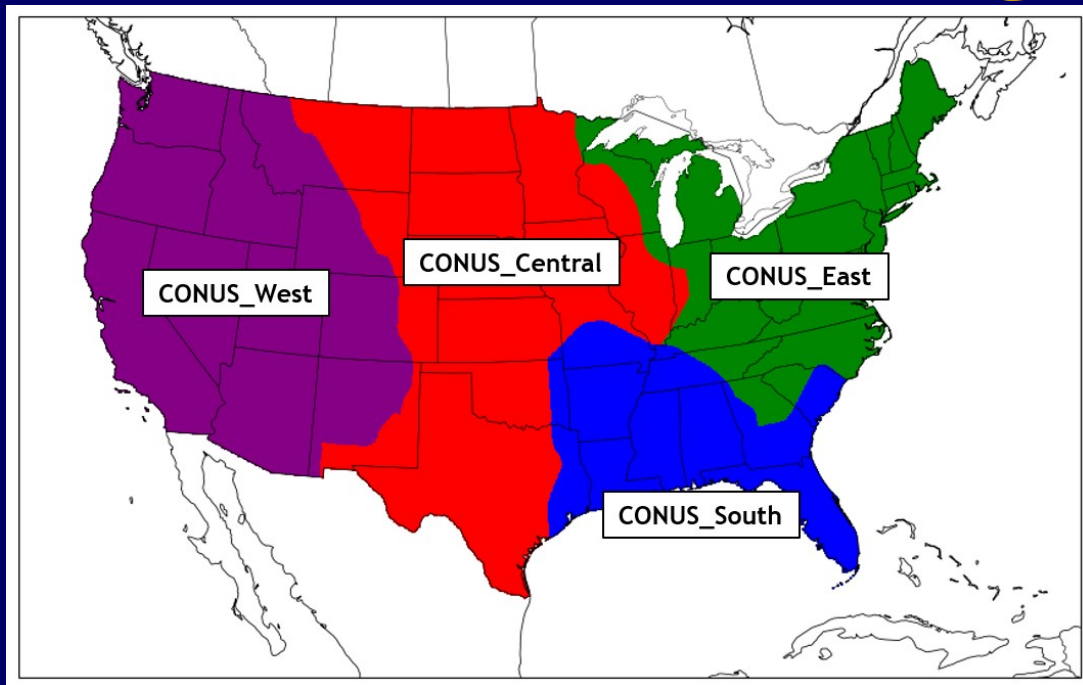
- EMC Verification System (EVS) was implemented on March 26, 2024, i.e., EVSv1.0.7 for AQMv6 verification.
- EVSv1.0.8 was implemented to support AQMv7.0.7 verification.
- EVS provides 24/7 operational support for all NCEP modeling suites including AQM.
- The community-based [METplus](#) verification software system is the core of the EVS.
- Verification graphics are displayed on [the EMC website](#) for real-time updates.

Operational AQM O₃/PM₂₅ Verification

- Location: https://www.emc.ncep.noaa.gov/users/verification/air_quality/aqm/prod/
- Statistic metrics for a period of last 31 days are updated daily.
- Multiple verification regions (Bukovsky Regions and grouped regions)
- O₃/PM₂₅ mean concentration of observed, raw model, and bias corrected by predicted hours
- Performance diagram for daily Max 8HR-AVG O₃ and 24HR-AVG PM₂₅ (day 1-3)



EVS Verification Regions



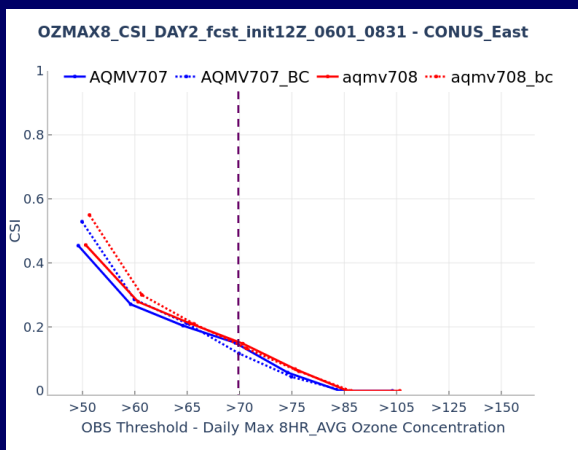
Bukovsky Regions were developed to group areas of similar regional climatologies.

Model Performance Comparison

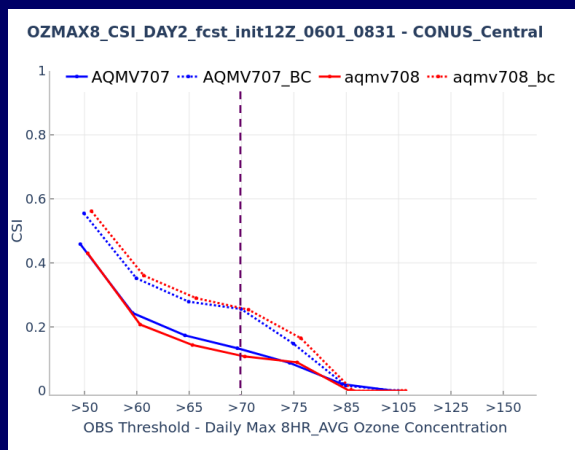
- AQMv7.0.7 and AQMv7.0.8
- Ozone and PM_{2.5}
- June-August 2024
- 12z cycle run and day 2 forecast
- CONUS_East, CONUS_Central, CONUS_South, and CONUS_West

Daily Maximum 8HR-AVG O₃

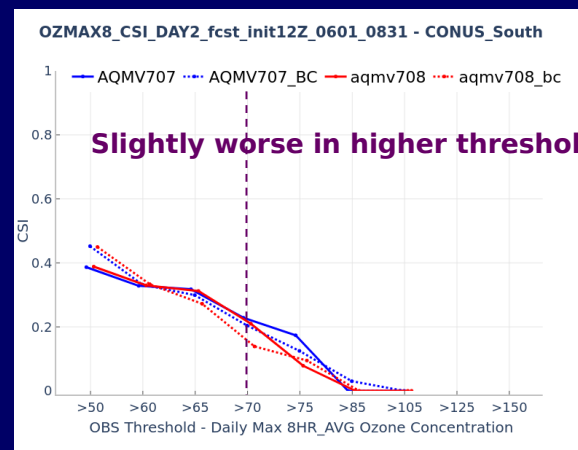
Conus_East



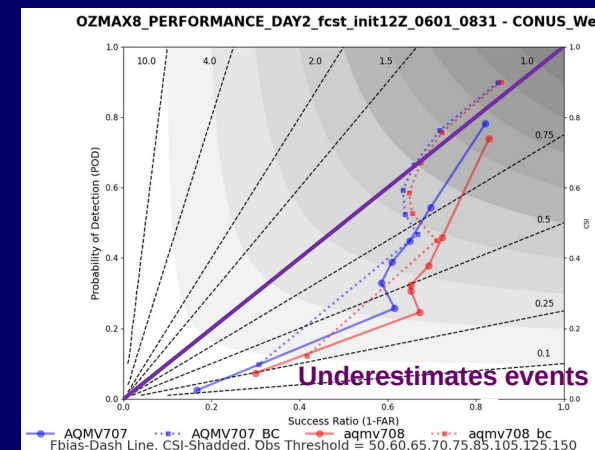
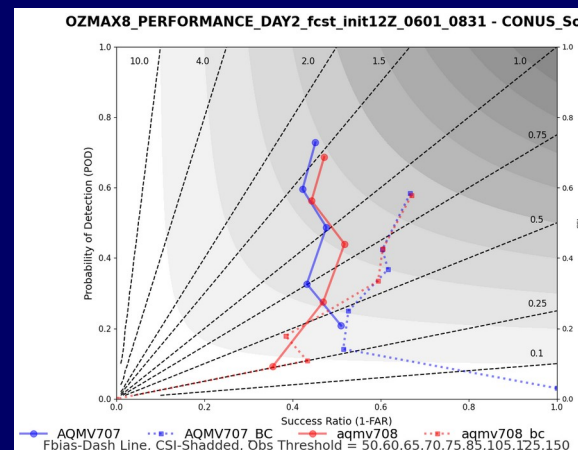
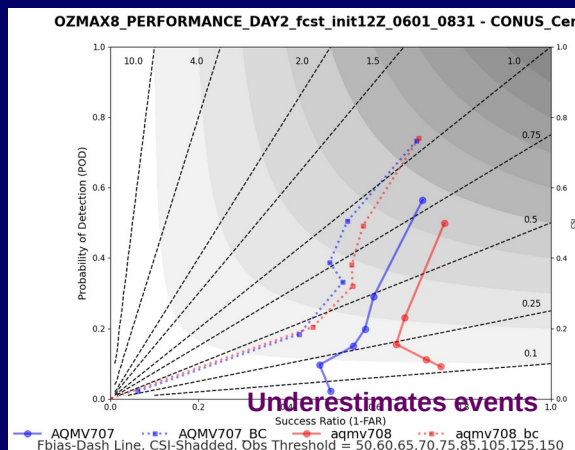
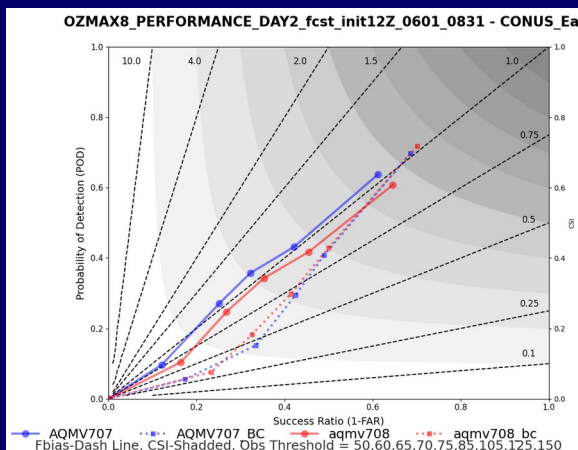
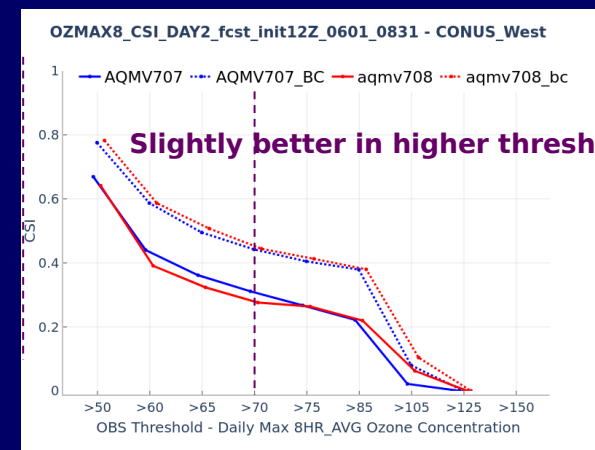
Conus_Central



Conus_South

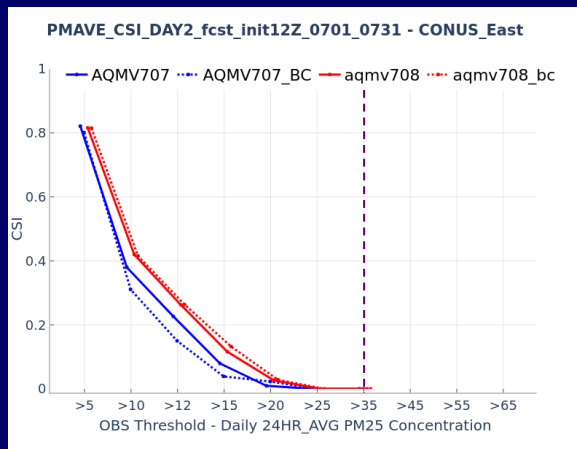


Conus_West

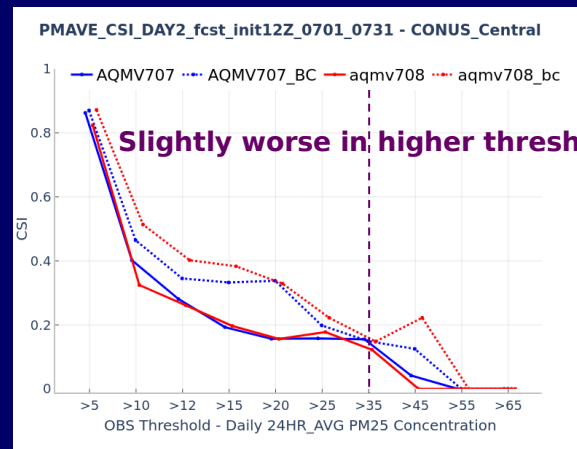


24HR-AVG PM25

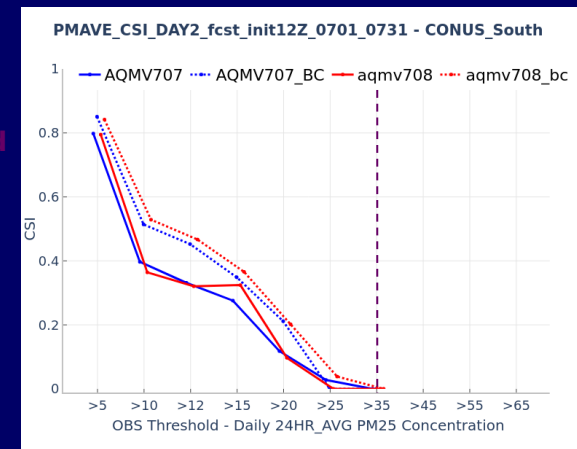
Conus_East



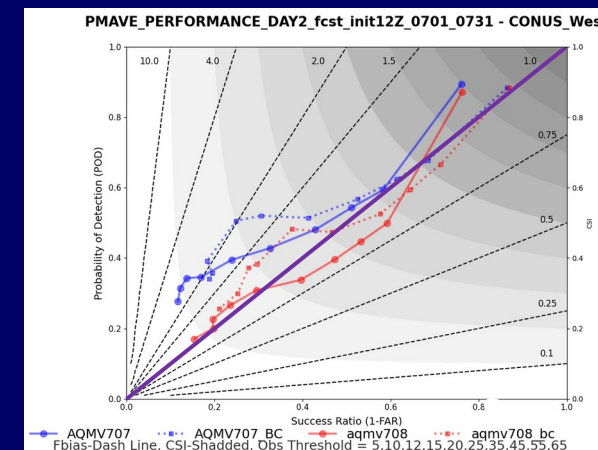
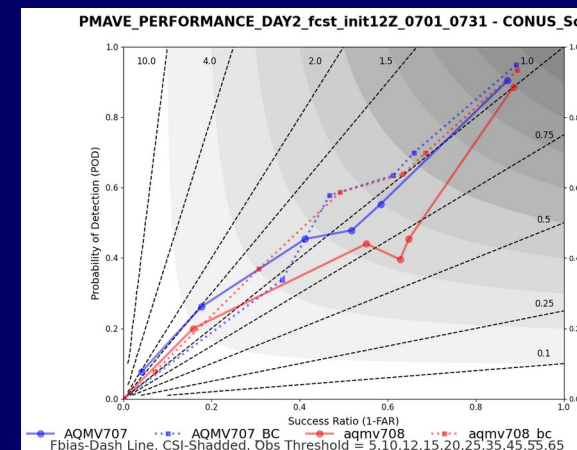
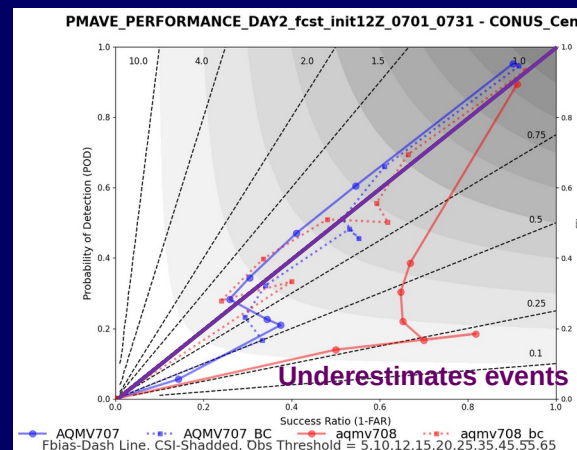
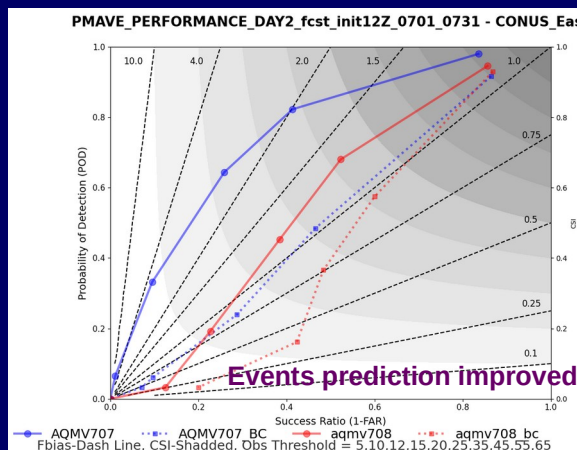
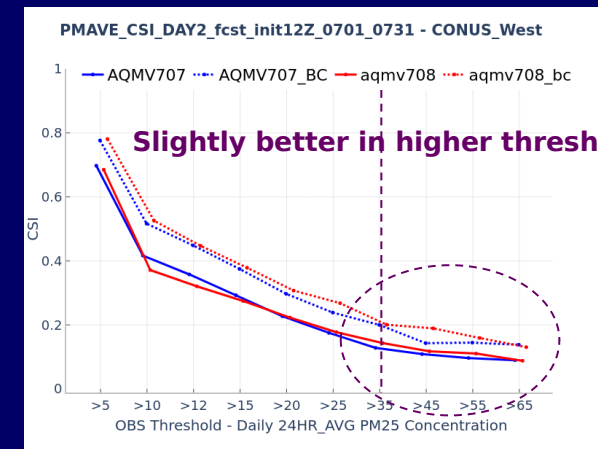
Conus_Central



Conus_South



Conus_West



Summary

- NCEP's operational AQM model is verified with the EMC Verification System (EVSv1.0).
- The operational website/products reveal the mean performance of operational AQM of previous 31 days in near real-time.
- AQMv7.0.8 was implemented on October 1 2024. It has a similar model performance as compared to AQMv7.0.7, but with a slightly better performance in the CONUS_West.
- EVSv2.0 will include more AQM verification graphics and performance metrics as well as last 90 days performance in AQM operational websites. EVSv2.0 is scheduled to be implemented in Fall 2025.