Purpose:
To retrospectively compare and improve target volume dose coverage for breast boosts using eMC.

Methods:
In this study, 101 retrospective breast patient cases were planned and treated for an electron boost (ranging from 6Gy/3F to 16Gy/8F). All patients were planned using Varian Eclipse (v8.9). Dose contributions from tangents were not taken into account. All plans were based on CT scan datasets. Breast boost CTVs were delineated with adequate expansion for PTV and insert size for treatment. All plans were delivered with treatment intent of 90% coverage to the CTV. Actual treatment prescriptions were based on CAX percentage depth dose with no dose distributions.
Without changing any parameters (eMC algorithm, contours and treatment), dose distributions were generated. Actual delivered treatment monitor units were entered into the plans and analyzed for CTV dose coverage. For inadequate CTV coverage, plans were either normalized manually or via the TPS. Boost volume coverage was compared for delivered MU and EMC dose distribution MU. Dose coverage for V90 (volume receiving 90% of the prescribed dose) was set to 98%. Dose to 90% of the CTV (D90) and difference in monitor units for both plans were compared.

Results:
Majority (83%) of patients had been treated with 9 or 12MeV. Data consisted of a random sample of 51 right and 49 left boosts with a mean CTV=10.04cm2. The D90 increased from a mean of 89.7% to 92.5% (p=0.000) and similarly V90 increased from a mean of 85.8% to 96.6% (p=0.000). Monitor Units between both plans increased by 3% for adequate coverage of the CTV. Verification of insert output factors using eMC were within ±0.5% of measured.

Conclusions:
This retrospective study indicates improvement in target coverage requires a small and significant increase in MU for breast boost treatment without changing planning parameters or technique.