Description of my previous methodology:

Use 3D shade calculator to calculate fraction of submodules (3 per module, 36 in total) that are shaded for each hour. This is the input to the shade database’s “string fraction shaded” field. It does differ slightly from the shade database implementation in SAM, which I believe is based on fraction of the area shaded, not of submodules. Thus the inputs to the shade database are slightly different between the two methods. However, the shade database rounds the shaded fraction to the nearest 10%, which is likely to minimize this difference.

Take output of shade database (shade loss fraction) and multiply (1-loss)\*SAM AC output for each hour. This is not \*exactly\* the same as applying it to the DC output, as is the intent of the shade DB. What is the output of the shade DB applied to in SAM? Is it just the beam fraction? If so, and the diffuse loss is applied as well, then the two should be roughly equivalent(?)

I found that using the Shade DB with no I-V curves did make a difference of a couple percent for Chris’s array. It also makes a difference if you use linear shading of the string vs. shading by fraction of bypass diodes in the string shaded, again a couple percent, but this ONLY matters if you are using the shade DB with I-V curves; without the curves the two shading methods are the same

Here are the files I am sending to you:

CDHouseShading.s3d – 3D shading scene with the array separated into bypass diode groups

CD3pass.csv – The hourly shading factors for this array, both linear at the string level by area and by fraction of bypass diodes affected. These become the shade factor (SF) inputs to the shade DB

CDHouseBeta.sam – This is the SAM file using SAM beta from October

CDHouse2.csv – This is the weather file to input for SAM; it includes zeroing out snow so you don’t have to use the snow function in SAM

CDHouseAnnualShadeVal calls GetShadeLossVal on an annual, hourly basis in Matlab to determine shade loss for the array. It outputs both the hourly shade loss percent and the access keys in the database. The access is [NumStrings DiffuseFrac MaxShade counter]. CDHouseHourlyInfo.mat is called to determine each hour’s radiation, temperature, and string level shaded fraction (SF)…this file has both linear and bypass diode SFs in it so you can switch between the two if you want. The hourly shade loss percent and access are saved in CDHouseResults.mat for the linear and bypass diode cases run with the 8 string database with no I-V curves.

DB8\_noIV.mat is just the 8 string database with no IV curves (hope it matches what you have!)

My validation results (running both the DB standalone and in the new beta SAM) are in SamShadeDBValidation.xlsx.

SunRunReport2.pdf is sort of a technical report on the shade database that I wrote for Sunrun. It may be of use for reference or SAM documentation.