

The Easy Way To Model Electric Energy Storage Using Excel

By

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Let G = the MWhs (megawatthours) from all non CO_2 sources this hour

Let D = the MWhs demand this hour (which is also the average MWs)

Let S = the amount of MWhs in storage going into the current hour

Let S^+ = the amount of MWhs in storage exiting the current hour

Let S_{\max} = the maximum MWhs that can be stored in storage

Let $S_{\min} = 0$ the minimum MWhs that can be stored in storage

Then storage can have these three outcomes exiting the current hour

IF ($S + G - D > S_{\max}$ then $S^+ = S_{\max}$)

IF ($S + G - D < 0$ then $S^+ = 0$)

Else ($S^+ = S + G - D$)

The Excel formula in a cell needed to execute the three above tests is:

$\text{IF}(S+G-D>S_{\max} , S_{\max} , \text{IF}(S+G-D<0 , 0 , S+G-D))$

If the first equation is true then set storage to max, else do another test to set the value to zero, and then the final else is the level of storage.

Delta storage is $S^+ - S$ which is > 0 for energy going into storage and < 0 for energy being extracted from storage which is also the load served.