

What is One ft of Water Worth to Brookfield?

In looking at alternatives to manage the waters of Deep Creek Lake the question arose as what is one foot of water worth to the generator owner, Brookfield.

In the absence of direct information from Brookfield as to the revenue capability of the generator facility one has to resort to other means to estimate income and then determine the price/cost of one foot of lake water.

Because the calculations are just order of magnitude numbers simplifying assumptions are made.

1. Volume of 1 ft of lake water:

$3900 \text{ acres (lake surface area)} \times 43,560 \text{ ft}^2/\text{acre} \times 1 \text{ ft} = 1.7 \times 10^8 \text{ ft}^3$

2. The capabilities of the turbines:

600 ft³/sec produces 18 MW (specifications for the turbines; I found somewhere a suggestion that they may be operating at 310 cfs per turbine rather than the nominal design value of 300 cfs)

3. The number of hours the turbines operate to consume one foot of water:

1 ft implies $\rightarrow 1.7 \times 10^8 \text{ ft}^3 / 600 \text{ ft}^3/\text{sec} \times 1 \text{ hr} / 3600 \text{ sec} \rightarrow 78.7 \text{ hrs of operation}$

4. The total amount of energy produced by one foot of water:

$78.7 \text{ hrs} \times 18 \text{ Mw} \rightarrow 1,416 \text{ MWhrs}$

5. The annual production of energy by the facility:

Average generation per year is 28,500 MWhrs (from a Stone & Webster report commissioned by Reliant, the predecessor to Brookfield, and mentioned elsewhere) $\rightarrow 28,500 / 1,416 = 20 \text{ ft of water}$.

6. The average income per unit of energy:

From PJM data (PJM is the broker company, coverage includes Maryland and Pennsylvania, that sets all the rates for generation, transmission, and distribution, a complicated process), revenues are around \$40 MWhr (can't get a real number; changes every 5 minutes; took an average between low and high)

7. The estimated annual income from the Deep Creek Lake facility:

$(4) \times (6) \rightarrow 1,420 \text{ MWhr} \times \$40/\text{MWhr} = \$57\text{K}!!!!$

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