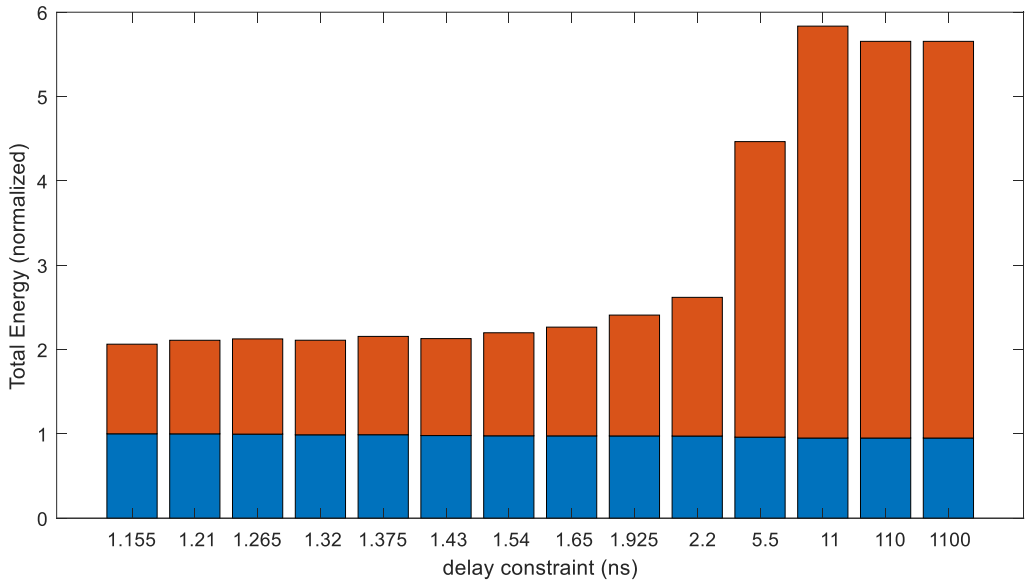
RESULTS

Before delving into the results, the minimum delay used as reference in these graphs is found out to be 1.1 ns. The resulting Dynamic and Leakage Power used for reference are 1231.2 uW and 208.3129 uW

The x axis is has 14 points, which are +5%, +10%, +15%, +20%, +25%, +30%, +40%, +50%, +75%, +100%, 5x, 10x, 100x, 1000x of minimum delay (found out to be 1.1 ns). The Y axis is normalized sum of dynamic and leakage energies for the respective delay constraints.

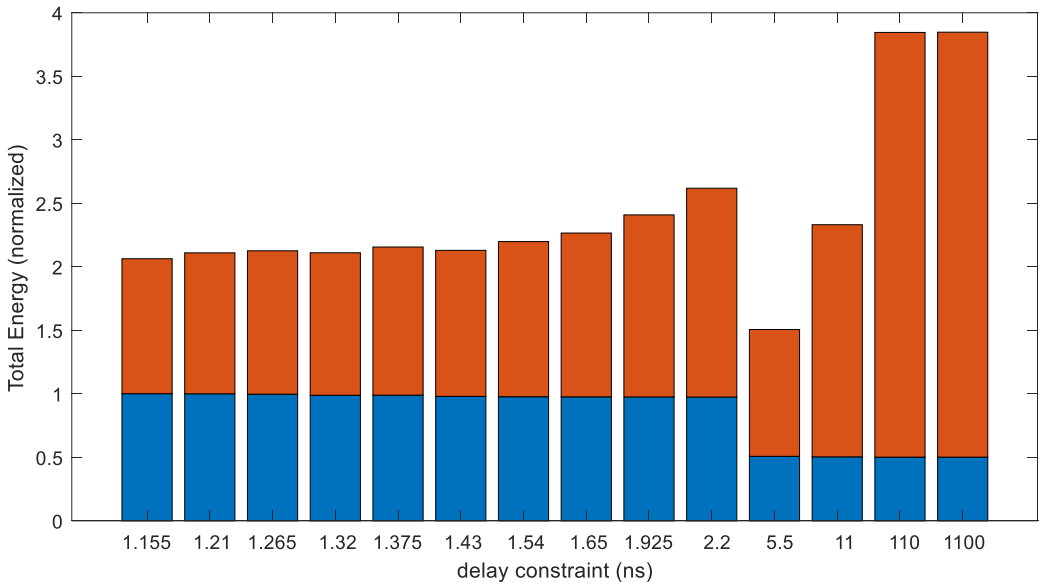
Graph 1: Sizing Optimization only at 1V V_{dd}



Library used: RVT only | 1V V_{dd}

As the delay is increased, the leakage keeps increasing according to the established patterns, with a slight decrease in dynamic energy.

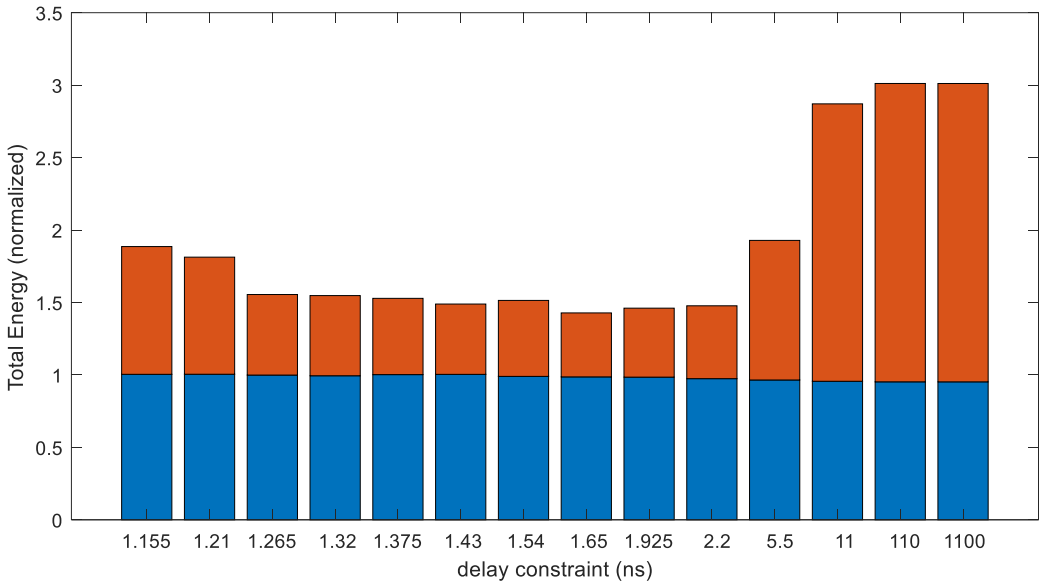
Graph 2 Sizing optimization using results from 1V, 0.85V and 0.75 V V_{dd}



Library used: RVT only | 1V, 0.85 V, 0.75 V V_{dd}

Due to the opportunity to decrease V_{dd}, there is a permanent drop in dynamic energy consumption (as energy is directly proportional to V_{dd} squared), at a certain delay constraint. This is expected and is according to the established patterns.

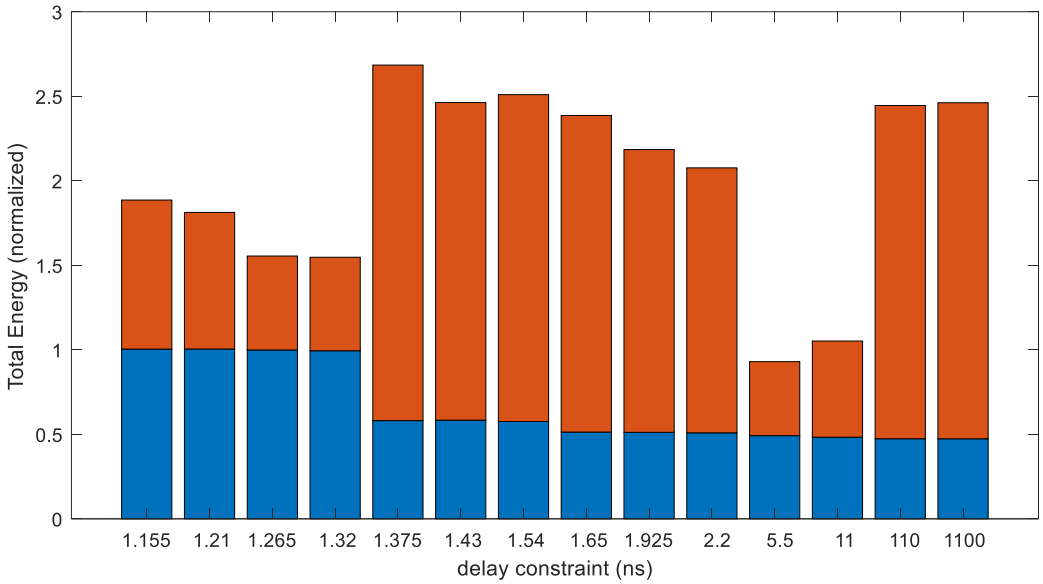
Graph 3 Sizing optimization with all libraries using results from 1V V_{dd}



Library used: RVT, HVT and LVT | 1V V_{dd}

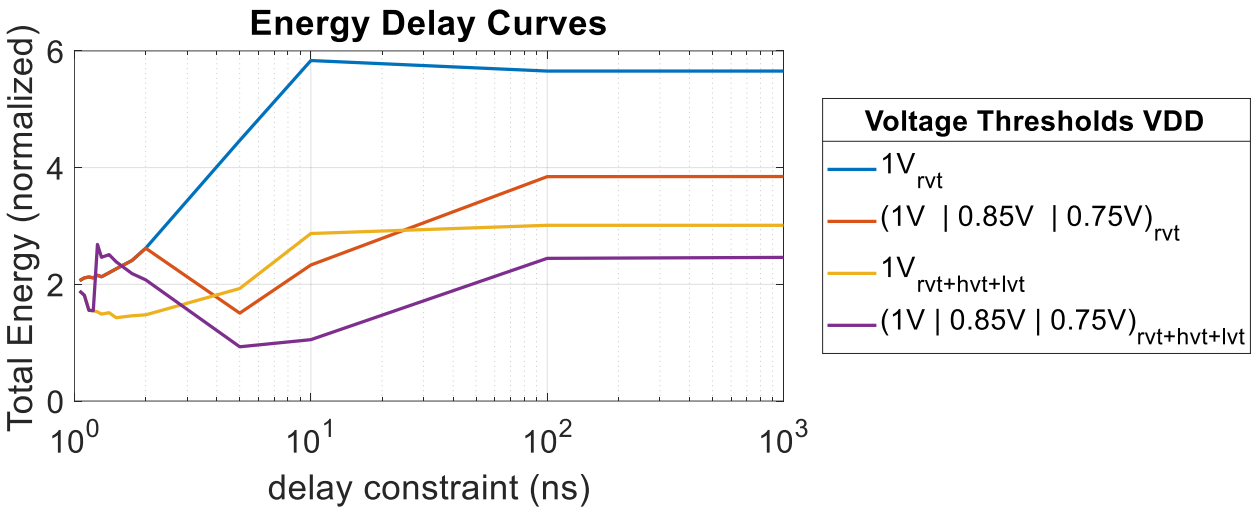
The threshold voltage is inversly proportional to the leakage energy. Due to the availabilty of other threshold voltage libraries for optimization, the leakage energy is reduced until the delay is sufficiently increased.

Graph 4 Sizing optimization with all libraries & using results from 1V, 0.85V and 0.75 V V_{dd}



Library used: RVT, HVT and LVT | 1V, 0.85 V, 0.75 V V_{dd}

As Expected, when the delay is increased, the leakage initially decreases due to the availability of HVT and LVT components, helping in optimization. Then the Dynamic energy leakage starts decreasing after a certain delay constraint due to the lowered $V_{dd.}$



From Graph, it is clear that the least energy is consumed when all the threshold voltage libraries (rvt, lvt and hvt) are used in combination with different Vdd's to decrease the leakage energy and dynamic energy respectively