

This is false. Consider a graph with nodes s, v_1, v_2, v_3, w, t , edges (s, v_i) and (v_i, w) for each i , and an edge (w, t) . There is a capacity of 4 on edge (w, t) , and a capacity of 1 on all other edges. Then setting $A = \{s\}$ and $B = V - A$ gives a minimum cut, with capacity 3. But if we add one to every edge then this cut has capacity 6, more than the capacity of 5 on the cut with $B = \{t\}$ and $A = V - B$.