



AT TIME t_1 :

$$\text{TOTAL ENERGY} = K_1 + K + u_1 + u$$

$$\text{NET ENERGY TRANSFERRED INTO SYSTEM} = F_1 \Delta X - F_2 \Delta X_2$$

AT TIME t_2 :

$$\text{TOTAL ENERGY} = K_2 + K + u_2 + u$$

COMBINO:

$$K_1 + K + u_1 + u + F_1 \Delta X - F_2 \Delta X_2 = K_2 + K + u_2 + u$$

$$\left[K = \frac{1}{2} m v^2 = \frac{1}{2} \rho \Delta V v^2 \right] \left[u = mgh = \rho \Delta V g h \right]$$

$$\left[F_1 \Delta X = P A \Delta X = P \Delta V \right]$$

$$\frac{1}{2} \rho \Delta V v_1^2 + \rho \Delta V g h_1 + P_1 \Delta V - P_2 \Delta V = \frac{1}{2} \rho \Delta V v_2^2 + \rho \Delta V g h_2$$

$$\frac{1}{2} \rho v_1^2 + \rho g h_1 + P_1 = \frac{1}{2} \rho v_2^2 + \rho g h_2 + P_2$$