$$\left(\frac{V}{V_0}\right) = \left(\frac{H}{H_0}\right)^{0.15}$$

$$\frac{6.5}{V_0} = \left(\frac{10}{70}\right)^{0.18}$$

$$\therefore V_0 = 9.226 \text{ m/s}$$

$$P_0 = \frac{1}{2}\rho A V^3$$

$$= \frac{1}{2}(1.225) \cdot A \cdot (9.226^3)$$

$$\frac{P_0}{A} = 481.00 \text{ W/m}^2$$

$$P = \frac{1}{2}\rho A V^3$$

$P_R = 500\,kW$

$D = 40\,m$

$\bar{v} = 7.5\,m/s$

Annual $P_{out} = ?$

$\eta = 0.31 = \frac{P_o}{P_i}$

$$\frac{\bar{P}}{A} = \frac{6}{\pi} \cdot \frac{1}{2} \rho v^3$$

$$= \frac{6}{\pi} \cdot \frac{1}{2} (1.225)(7.5)^3$$

$$= 493.505\ W/m^2$$

$$P_{in} = \bar{P} \times 8760 = 493.505 \times 40^2 \times \frac{\pi}{4} \times 8760$$

$$= 5.4326\ GWh/yr$$

$$\eta = \frac{P_{out}}{P_{in}} \Rightarrow P_{out} = 0.31 \times 5.4326$$

$$= 1.684\ GWh/yr$$