(12.4) In a water power station with a fall height of 20 m and a water flow of 500 $m^3\ s^{-1}$, the electric power output at 100% efficiency can be calculated. If the heavy water in the fall could be extracted and converted in a fusion reactor according to (12.14) with a 25% efficiency, which of the two power sources would yield more energy?

$N_A := 6.022137 \cdot 10^{23} \cdot mole^{-1}$ $\quad MeV := 1.6021773 \cdot 10^{-13} \cdot joule$ $\quad x_D := 0.0155 \cdot \%$

$M_H := 1.008 \cdot gm \cdot mole^{-1}$ $\quad M_O := 16.00 \cdot gm \cdot mole^{-1}$ $\quad M_D := 2.014 \cdot gm \cdot mole^{-1}$

$height := 20 \cdot m$ $\quad flow := 500 \cdot m^3 \cdot sec^{-1}$ $\quad \rho_{water} := 1 \cdot gm \cdot cm^{-3}$

$P_{water} := height \cdot flow \cdot \rho_{water} \cdot g$ $\quad m_{water} := flow \cdot \rho_{water}$ $\quad P_{water} = 9.807 \cdot 10^7 \cdot watt$

$$N_D := \frac{m_{water} \cdot 2 \cdot M_H}{2 \cdot M_H + M_O} \cdot \frac{N_A}{M_D} \cdot x_D \qquad Q_{DD} := 23.85 \cdot MeV$$

$P_{DD} := \frac{N_D}{2} \cdot Q_{DD}$ $\quad \eta := 25 \cdot \%$ $\quad P_{fusion} := \eta \cdot P_{DD}$ $\quad P_{fusion} = 1.239 \cdot 10^{15} \cdot watt$

As seen from this result, the answer is fusion.