

POWER:

Some Numbers for Calculations

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For some reason everyone seems to like the pseudounit “kWh/y” to quantify electrical **power** usage.

Let’s disassemble this construct: in Physics we measure *energy* in **Joules** (J) and the *rate of energy use* (or production) in **Watts** (W) where $1 \text{ W} = 1 \text{ J/s}$ (one Joule per second).

A **kilowatt** (kW) is $1,000 \text{ J/s}$ and if that rate of energy use (or production) is maintained for an **hour** (3,600 s) we have a total energy (used or produced) of $1 \text{ kWh} = 3.6 \times 10^6 \text{ Joules}$.

If we only use 1 kWh in a whole **year** ($1 \text{ y} = \text{about } 3.1536 \times 10^7 \text{ seconds}$) we get a power of about **1 kWh/y = 0.114155 Watts**.

Now, a typical big reactor generates around 1 gigawatt (GW) = 10^9 Watts . that’s 8.76 billion kWh/y if you prefer those ridiculous units.

Meanwhile Google says a typical Canadian household uses 11,135 kWh/y, which is the same as 1.271 kW.

So a typical “big” nuclear reactor will power about 787,000 Canadian homes.