Estimating Cost of Electricity

It turns out that **in BC**, there's an incredibly easy way to estimate the cost of electricity for devices that are always on 24/7:

- Take the power consumption in Watts (W)
- Divide by 10
- You get the cost of electricity per month for that device

That's right, if something draws 50 W and it's on 24/7, it costs about $5 per month of electricity to run it.

Here's why that works...

In BC, the price of electricity is 10.97 ¢/kWh for the first tier and 14.08 ¢/kWh for the second tier. So let's take the worst case scenario and imagine that we're always on the *tier 2* price. The math is just a string of multiplication to cancel out units:

$$ \frac{365\text{ days}}{\text{year}} \times \frac{24\text{ hrs}}{\text{day}} \times \frac{1\text{ year}}{12\text{ months}} \times 14.08\frac{\text{ ¢}}{\text{kWh}} \times \frac{1 \text{ \$}}{100\text{ ¢}} \times \frac{1\text{ kW}}{1000\text{ W}} = 0.102784 \frac{\text{\$}}{\text{month}\cdot\text{W}} $$

If you look at the units carefully, you'll notice that they almost all cancel out except for $\frac{\text{\$}}{\text{month}\cdot\text{W}}$ [1]

So why is this number useful? If you multiply a power consumption in Watts by that number, you'll get a result in $\frac{\text{\$}}{\text{month}}$, which is the price per month. For example:

$$ 50 \text{ W} \times 0.102784 \frac{\text{\$}}{\text{month}\cdot\text{W}} = 5.1392 \frac{\text{\$}}{\text{month}} $$

The trick to simply divide by 10 instead of multiplying by 0.102784 works because $\frac{1}{0.102784} \approx 9.729... \quad$ So a better approximation would be to divide by 9.7, but dividing by 10 is so much easier to do in your head, and the result is not that far off, specially since we already over estimated the cost of electricity to full *tier 2* instead of a combination of *tier 1* and *tier 2*.

A Concrete Example

At home, I run a bunch of equipment[2] on a dedicated 12V system. The system is fed with a high quality / high power 12 V charger with backup batteries and solar panels. In the winter, the solar panels don't get any sun and the charger puts out a constant 75 W (and goes up when I'm transmitting). In the summer, the solar panels provide about half the electricity needed.

That means that my internet and radio system costs me about $7.50 / month of electricity in the winter, and half that in the summer.

1)
The “hrs” of “24 hrs” cancels with the “h” of “kWh” since kWh means kW \$ \times\$ hr .

2)
Equipment on dedicated 12 V system that's on 24/7:

- Internet modem, switches, and Wifi Boosts
- Echolink radio and computer
- AREDN hAP, two AREDN dishes, one AREDN VOIP Phone