1) $1 \frac{kW}{m^2}$ $\frac{1}{1 \cdot .15 \cdot .75}$

100,000 Lumens = $1 \frac{kW}{m^2}$

60 W = 840 Lumens

$= 8.88 \frac{kW}{m^2} = 8888888.89 \frac{Lumens}{m^2} \cdot 1 m^2$

$\frac{8880 \text{ W}}{60 \text{ W}} = 148 \text{ bulbs}$

$148 \cdot 840 = 124,320 \text{ Lumens}$

$\frac{124,320}{8888888.89} = 13.99\%$

2) PV + Frame $= 2(120) \frac{kWh}{m^2} = 240 \frac{kWh}{m^2}$

$6\% = .06 = \frac{\text{Used}}{\text{Total}} = \frac{x}{1700} \Rightarrow x = 102 \frac{kWh}{m^2}$

$240 / 102 = 2.353 \text{ yrs}$

3. $E = h\nu = \frac{hc}{\lambda}$

$h = 6.625E-34$ JS
$= 4.134E-15$ eVs
$C = 2.998E8$ m/s

$1.1 = 4.134E-15\ \nu$

$\Rightarrow \boxed{\nu = 2.66E14\ s^{-1}}$

$1.1 = \frac{hc}{\lambda} = \frac{4.134E-15 \cdot 2.998E8}{\lambda}$

$\Rightarrow \boxed{\lambda = 1.1267E-6\ m}$

4. .001 W $Ph = 1.7$ eV

$\lambda = 638E-9$ m

$E = \frac{6.625E-34 \cdot 2.998E8}{638E-9}$

$.001 = n \cdot Ph \Rightarrow$

a) $n = \frac{.001}{3.113E-19} = \boxed{3.2122E15}\ \frac{\text{Photons}}{s}$

b) $n = 1.11 / 1.94259$

$= 57\%$

$E = \frac{4.134E-15 \cdot 2.998E8}{638E-9}$