

Energy and Power Practice

Physics and Mathematics of Sustainable Energy

College of the Atlantic. January 7, 2021

1. A generator produces 7 kWh of energy over a period of 14 hours.
 - (a) What is the average power the generator delivers during these 14 hours?
 - (b) kWh are a unit of _____.
 - (c) kW are a unit of _____.
2. You leave a 1.2 kW electric heater on for 16 hours. How much energy does the heater use?
3. A refrigerator uses 37 kWh of electricity over a period of five days. What average power is this?
4. An electric toaster draws 1000 Watts. If the toaster is left on for 1 hour, how much energy does it use?
5. An electric toaster draws 1200 W. If I make toast for half an hour, how much energy has the toaster used?
6. An electric dryer uses 20 kWh in 3 hours. What average power does the dryer draw during this time?
7. A typical Maine home uses 520 kWh of electrical energy in a month. **Estimate** the following quantities.
 - (a) The monthly cost¹ of this energy.
 - (b) The average power drawn by the house. Express your answer in Watts, kW, and kWh per day.
 - (c) The average amount of residential electrical energy used per person per day by a Maine resident.
 - (d) There are roughly 10,000 year-round residents on MDI. What amount of electrical power is needed for all year-round MDI residents?
8. Suppose you leave a 1500 W electric heater is on for 8 hours in a day.
 - (a) How much energy does this use?
 - (b) How much would this cost in Maine?
 - (c) Now suppose that you left this heater on for 8 hours every day during Maine's six-month-long winter season. How much energy is this?
 - (d) How much would this cost?

¹The cost of electricity in our part of Maine is 0.168 per kWh.