

Energy and Power Practice

Physics and Mathematics of Sustainable Energy

College of the Atlantic. September 24, 2024

- A generator produces 7 kWh of energy over a period of 14 hours.
 - What is the average power the generator delivers during these 14 hours?
 - kWh are a unit of _____.
 - kW are a unit of _____.
- You leave a 1.2 kW electric heater on for 16 hours. How much energy does the heater use?
- A refrigerator uses 37 kWh of electricity over a period of five days. What average power is this?
- An electric toaster draws 1000 Watts. If the toaster is left on for 1 hour, how much energy does it use?
- An electric toaster draws 1200 W. If I make toast for half an hour, how much energy has the toaster used?
- An electric dryer uses 20 kWh in 3 hours. What average power does the dryer draw during this time?
- An electric car has a 50 kWh battery. A level-two charger charges the battery at a rate of 8 kW.
 - If the car is charged for three hours, how much energy has the battery gained?
 - How long would it take to charge the car's battery from 10 to 40 kWh?
- Suppose you leave a 1500 W electric heater is on for 8 hours in a day during Maine's six-month-long winter season.
 - How much energy does this use?
 - How much would this cost?
- An electricity bill of mine from several years ago is on the other side of this handout. How much did I pay per kWh?
- A typical Maine home uses 583 kWh of electrical energy in a month. **Estimate** the following quantities.
 - The monthly cost of this energy. (Currently electricity in our part of Maine is \$0.212 per kWh.)
 - The average power drawn by the house. Express your answer in Watts, kW, and kWh per day.
 - The average amount of residential electrical energy used per person per day by a Maine resident.
 - There are roughly 10,000 year-round residents on MDI. What amount of electrical power is needed for all year-round MDI residents? (Why might this estimate not be reasonable or meaningful?)