

Homework

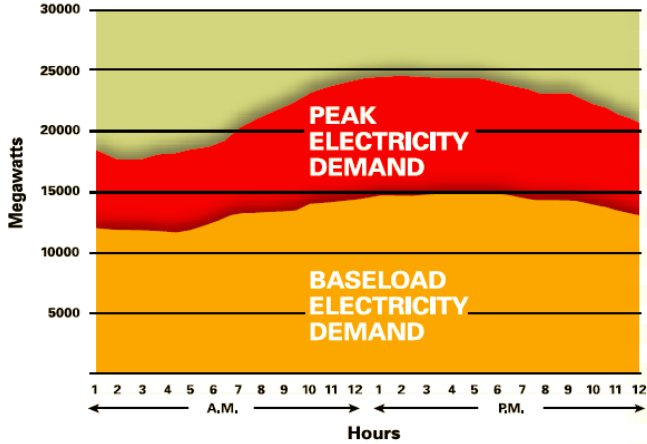
Pg. 487 #1, 2; Pg. 491 #2; Pg. 505 #1a, 4,-7

Date: _____

Meeting the Demand for Electricity (12.3 & 12.1)

Key Concepts (Page 505)

The graph on the below shows how the demand for electricity changes over the course of a day, on a typical summer day.



- _____ electricity demand is the continuous minimum demand for electrical power. It is met by using large generators that run on _____ and _____ fuels, that can produce electricity at a constant, reliable rate.
- The demand for electricity changes throughout the day. **Intermediate load** and **peak load** are met by using smaller generators that can be turned on or off quickly.
- Ontario obtains most of its electrical energy from nuclear, hydroelectric, and fossil fuel-burning stations.

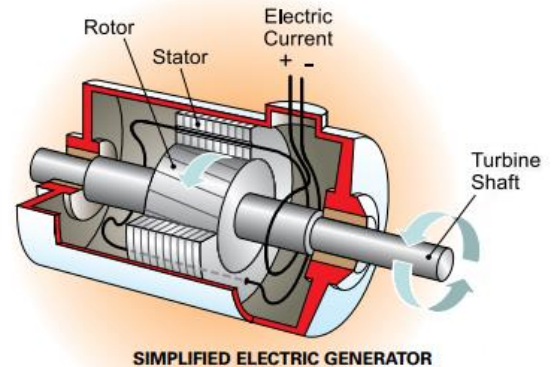
Interpret the graphic:

- a) Describe how the demand for energy changes, throughout the day. _____
- b) At what time is the peak electricity demand reached? _____
 What is this demand, in megawatts? _____

Generating Electrical Energy (12.3)

All power generation plants rely on the same general mechanism for generating electrical potential energy:

- Inside a generator, a _____ (called a **rotor**) spins inside coils of _____ wire (called a **stator**). This pulls electrons away from the atoms in copper wire.
- The electrons are then sent along power lines to wherever electricity is needed.
- Giant _____ called turbines are used to spin the magnets inside the generator.
- It takes a lot of energy to spin the turbine. The different kinds of power plants get that energy from different sources:



Type of Station	Source of Power
	falling water
	nuclear fission
	burning fossil fuels

Alternating Current vs. Direct Current (12.1)

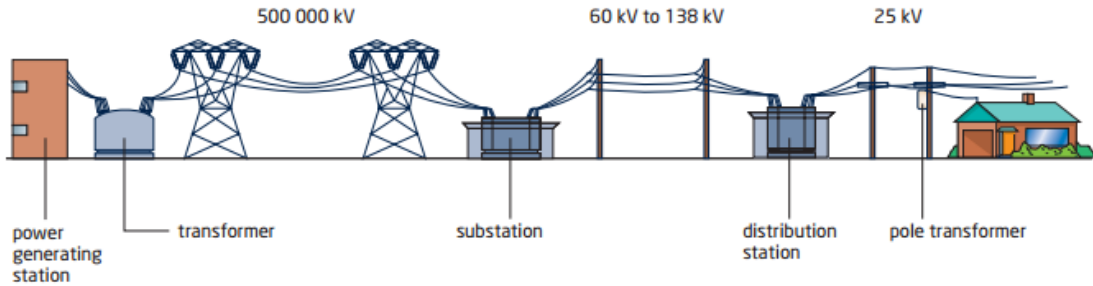
- **Direct Current (DC):** The current from a cell; charged particles travel in _____ direction (- to + terminal).
- **Alternating Current (AC):** Electrons move back and forth, but there is _____ net movement in either direction. This is the type of electricity produced and transmitted by power plants.
 - AC electricity can be transmitted across long distances more easily than DC electricity.
 - The voltage of AC electricity can also be changed more readily, using devices called _____:

Draw the circuit symbols for each type of power source:

DC source	AC source
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From the Power Plant to Your Home (12.1)

- **Transformers** are devices that can change the voltage of an electric current:
 - **Step-up** transformers _____ the potential difference
 - **Step-down** transformers _____ the potential difference
- At the power station, spinning the magnet inside the generator produces potential differences of about 20 000 V.
- A **step-up** transformer _____ the potential difference to values of up to 500 000 V before sending the current to transmission lines.
- After arriving at local distribution stations, a **step-down** transformer _____ the potential difference to about 7 200 V.



Electricity In Your Home (12.1)

- Box or pole transformers in your outside your home step _____ the voltage once more, so that by the time it enters your home, it has a potential difference of 120 V.
- Inside your home, the current passes to a distribution panel.
 - This panel consists of circuit _____ or _____, which are safety devices that are wired in series with the various branching circuits in your home.

How do circuit breakers and fuses maintain electrical safety in your home?



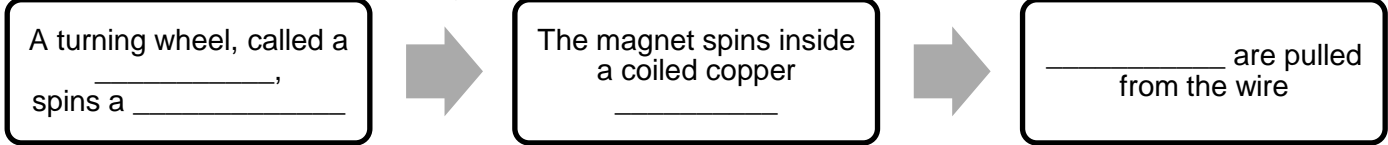
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Power Generation in Ontario

Generating Electrical Energy

Recall that all electrical generating stations function in the same way:



Energy is required to turn the turbine. Different types of fuel can be used to get the energy to turn the turbine. Some fuels are renewable, and some are non-renewable. Define each of these terms:

- a) **Renewable energy source:** _____
- _____
- b) **Non-renewable energy source:** _____
- _____

Power Generation in Ontario

Figure 1 shows how power is generated in Ontario.

List (in order) the top four methods for producing energy in Ontario:

- _____
- _____
- _____
- _____

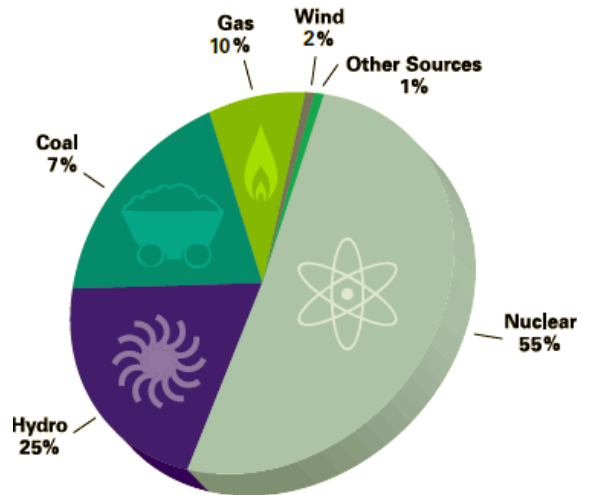


Figure 1 Major methods for producing electrical energy in Ontario.

Use your textbook (section 12.3) and other resources to help you complete this handout.

(1) Hydroelectric Power Generation

HYDROELECTRIC GENERATING STATION

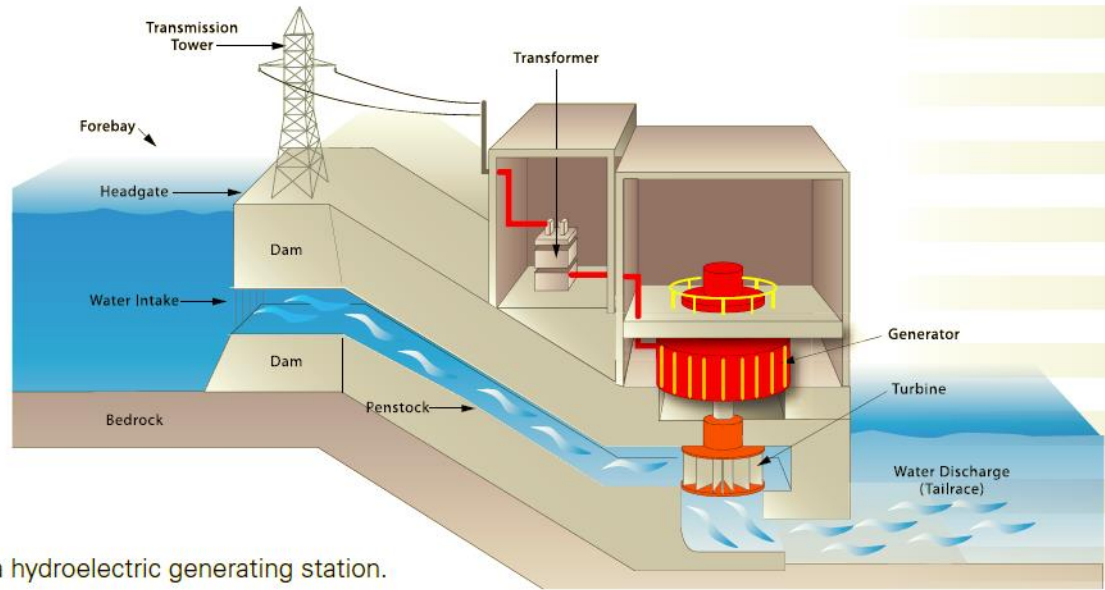


Diagram of a hydroelectric generating station.

a) Source of energy: _____

b) Renewable source Non-renewable source (choose the correct one)

c) How is the turbine forced to spin, in a **dam** station?

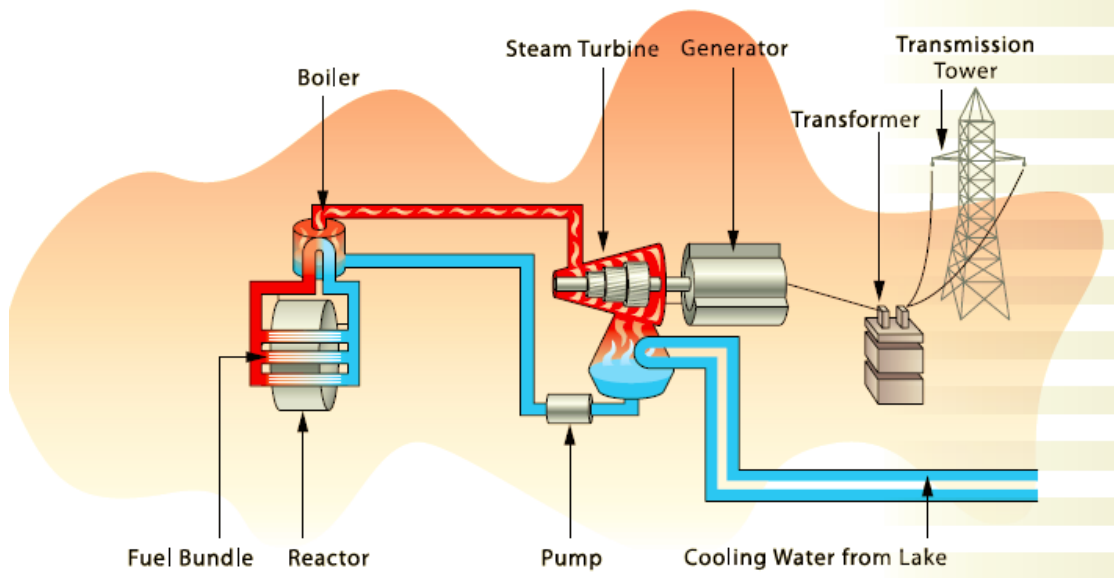
d) How is the turbine forced to spin, in a **run-of-river** station?

e) List two advantages and disadvantages of hydroelectric power:

Advantages	Disadvantages

(2) Nuclear Power Generation

NUCLEAR GENERATING STATION



a) Source of energy (name of the element): _____

b) Renewable source Non-renewable source (*choose the correct one*)

c) How is the turbine forced to spin, in a nuclear plant?

d) List two advantages and disadvantages of nuclear power:

Advantages	Disadvantages

(3) Coal-Burning Power Generation

THERMAL GENERATING STATION

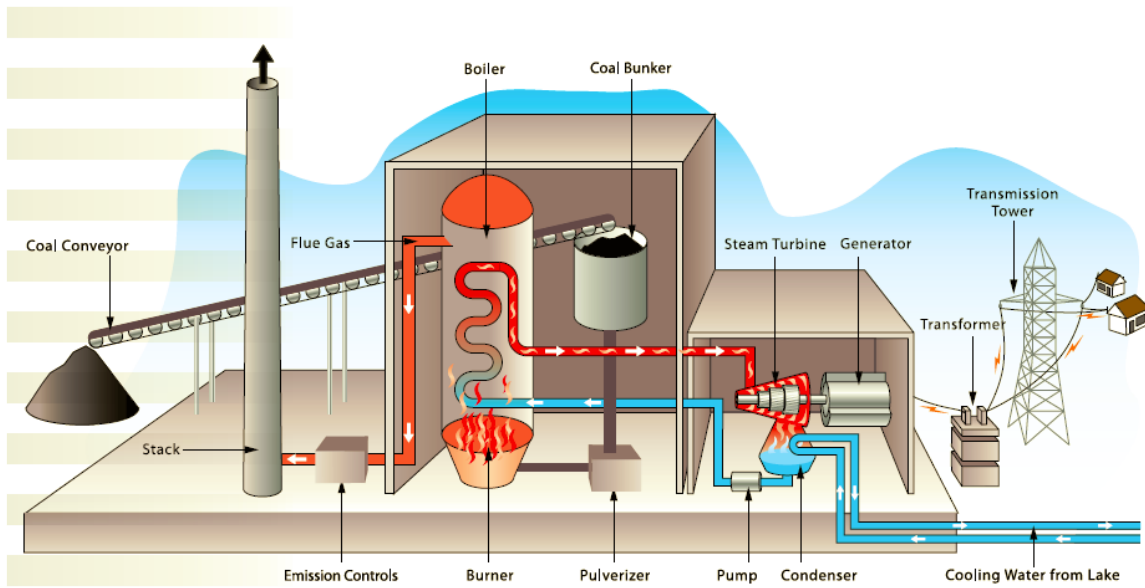


Diagram of a coal-fired generating station.

a) Source of energy: _____

b) Renewable source Non-renewable source (choose the correct one)

c) Write a brief description of how electrical energy is generated, in a gas- or coal-burning plant.

d) List two advantages and disadvantages of coal-burning power:

Advantages	Disadvantages