**Hydroelectric Energy Production**

**How does it work?**

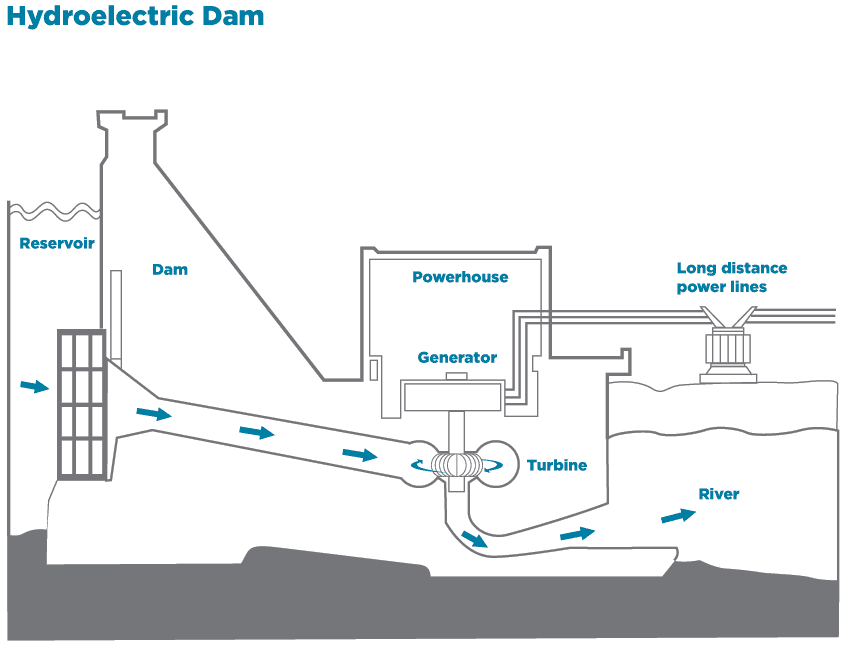
Hydroelectric power stations use the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy of falling water to produce electricity.

The amount of energy that can be generated is directly related to the amount of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ change that the water goes though, called \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Most power plants manipulate the force of the water with \_\_\_\_\_\_\_\_. Man-made dams retain massive amounts of water in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and form drastic drop-offs that enhance the kinetic energy of falling water. These dams, however, require a large amount of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ upriver of the dam.

Dams also allow control of how \_\_\_\_\_\_\_\_\_\_ power is made and \_\_\_\_\_\_\_\_\_\_\_\_\_ it is made.

1. When power is needed the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the dam are opened
2. Water is funneled into a pipe known as the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and it gains pressure as it runs down the penstock’s gradient.
3. The water strikes an electricity-generating \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and forces the blades to turn.
4. The spinning turbine turns the shaft attached to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which moves a magnet through a coil of wire and produces electricity.



Hydropower is extremely efficient; most modern stations can convert over \_\_\_\_\_\_\_\_ of available energy into electricity.

(source: www.energybc.ca/largehydro.html#footnote-4)

Storage in hydropower is easier than in many other forms of energy production. Storing extra \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the reservoir is a simple way to store potential energy. When more energy is needed more water can be diverted into the turbines and more energy is produced.

|  |  |
| --- | --- |
| **Pros and Cons of Hydro Electricity** | |
| **Pro** | **Con** |
|  |  |

**The Largest Sources of Hydroelectricity Around the World**

**China**

* China has many rivers, lakes and mountains. Largest potential for hydro in the world.
* Currently produces the most electricity via hydro in the world
* Hydro accounts for \_\_\_\_\_\_\_\_ of their electricity production

**Brazil**

* Has nearly \_\_\_\_ times the potential of hydroelectric production as Canada
* Second largest producer of hydro in the world
* Has increased small scale hydro generation

**Canada**

* Third highest estimates potential hydroelectric production in the world.
* Roughly only \_\_\_\_\_\_\_\_\_ of possible generation is being used.

(Source: ‘Used by permission of the World Energy Council’ [**www.worldenergy.org**](http://www.worldenergy.org)**)**

**How much is made in BC**

(Source: <https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/accountability-reports/financial-reports/annual-reports/bc-hydro-annual-report-quick-facts-june-2014.pdf>)

BC Hydro reports that nearly the maximum production capability of current resources \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_is produced every second.

It sells slightly over \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of that as trade to other countries and of the domestic product about \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of it is used by residents of BC.

On average we get \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ MJ per day from hydroelectricity in BC.

This means we get \_\_\_\_\_ bricks of butter from hydroelectricity in BC.

**Reflection Questions:**

1. Research how many people live in BC. Use the estimates in our notes on how much energy BC sells away, and the potential untapped hydro resources in Canada to estimate the maximum number of people BC Hydro can provide energy for.
2. Site C dam is a proposed large scale dam in BC that can increase the hydroelectric production in BC by 10%.
   1. Research why some people are in favor of building this dam.
   2. Research why some people are against building this damn.