

Hydroelectric power: Energy from falling water



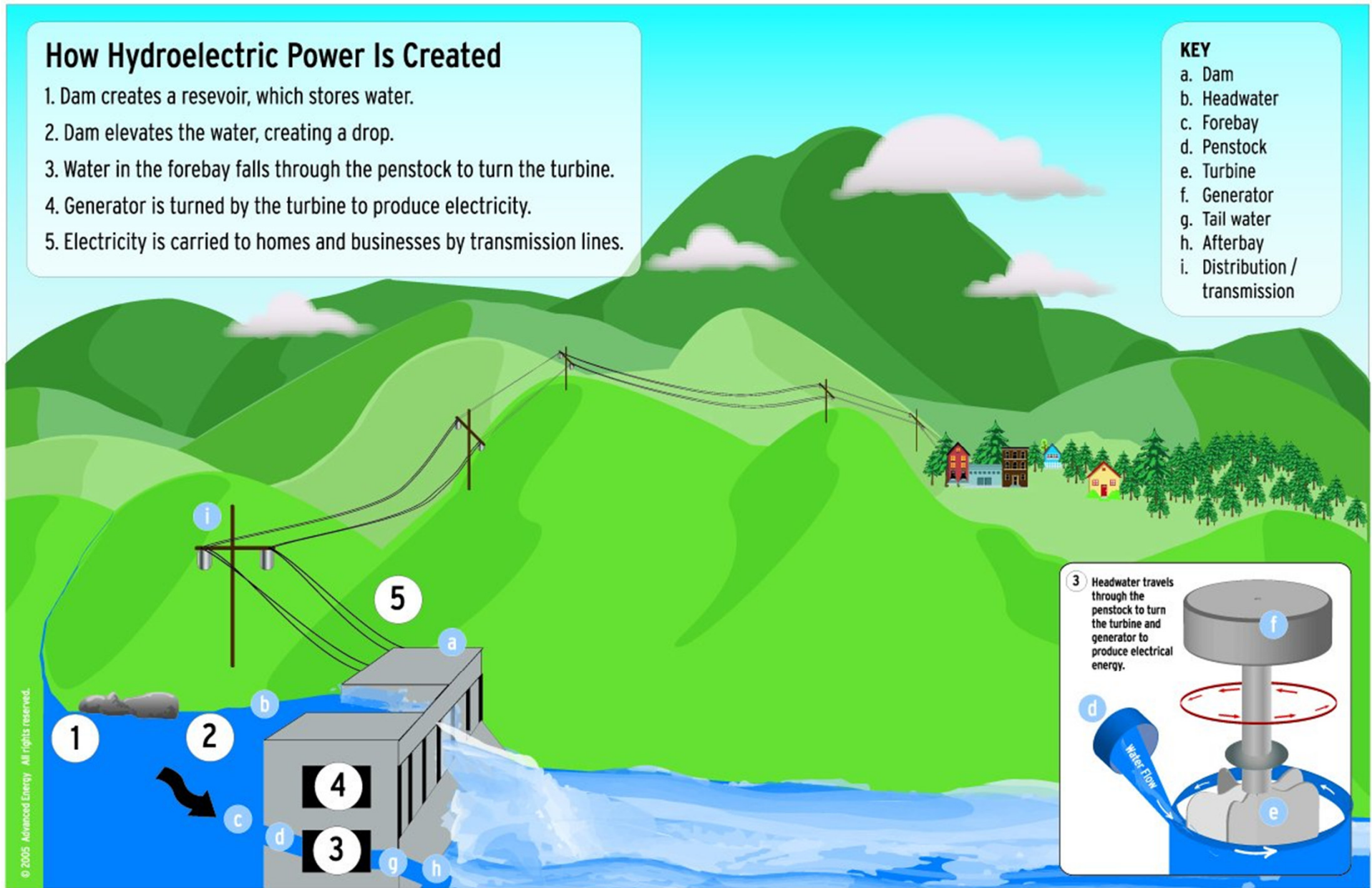
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How Hydroelectric Power Is Created

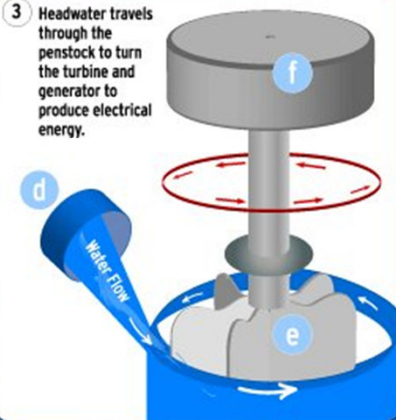
1. Dam creates a reservoir, which stores water.
2. Dam elevates the water, creating a drop.
3. Water in the forebay falls through the penstock to turn the turbine.
4. Generator is turned by the turbine to produce electricity.
5. Electricity is carried to homes and businesses by transmission lines.

KEY

- a. Dam
- b. Headwater
- c. Forebay
- d. Penstock
- e. Turbine
- f. Generator
- g. Tail water
- h. Afterbay
- i. Distribution / transmission



- 3 Headwater travels through the penstock to turn the turbine and generator to produce electrical energy.



We have used running water as an energy source for thousands of years, mainly to grind corn.



- **The first house in the world** to be lit by hydroelectricity was [Cragside House, in Northumberland, England, in 1878](#)



In 1882 on the Fox river, in the USA, **hydroelectricity produced enough power** to light two paper mills and a house.



Nowadays there are many hydro-electric power stations, providing around 20% of the world's electricity.

The name comes from **"hydro", the Greek word for water.**



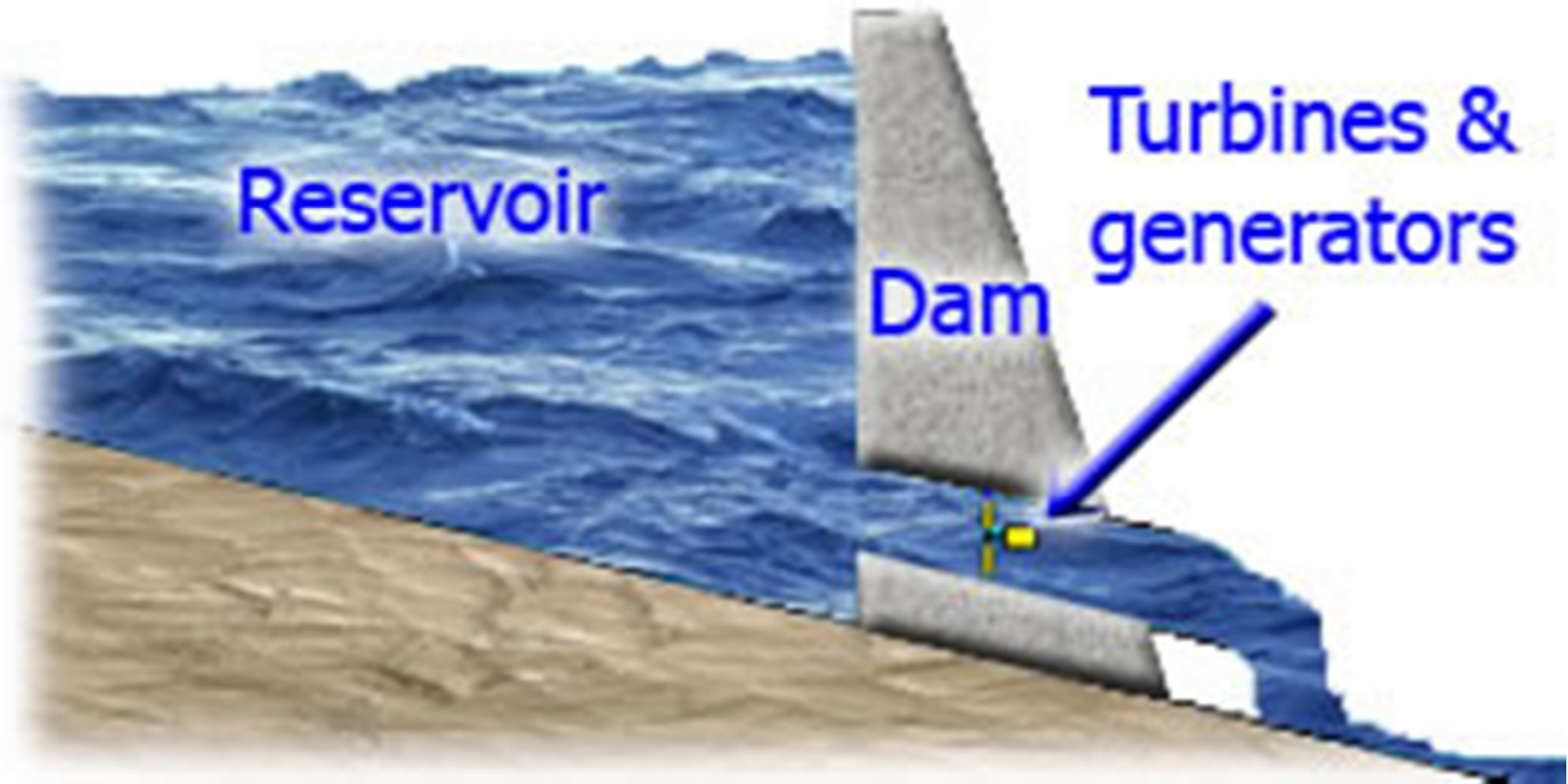
How it works

A dam is built to trap water, usually in a valley where there is an existing lake.

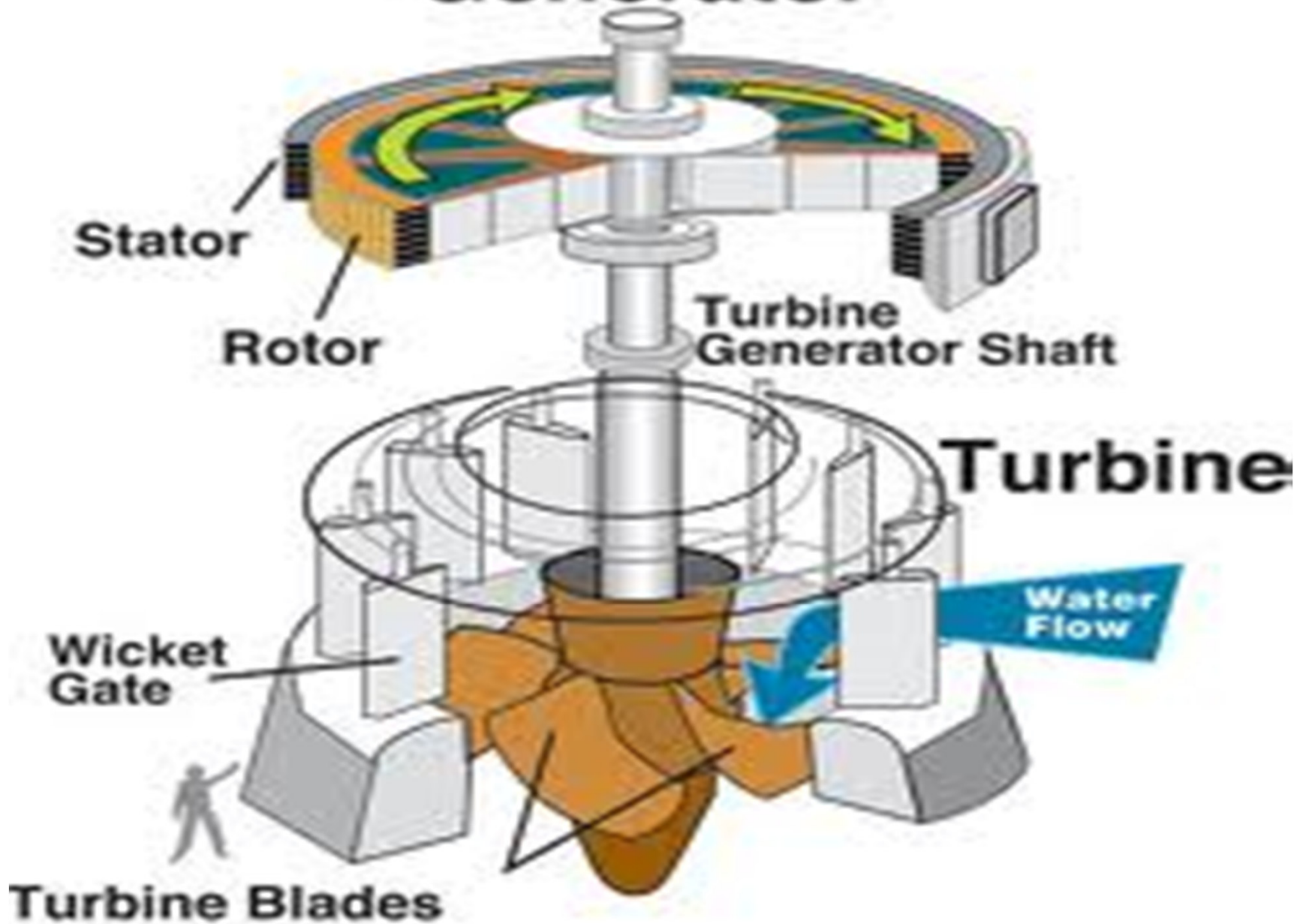
Water is allowed to flow through tunnels in the dam, to turn turbines and thus drive generators.



Hydro-electric power stations can produce a great deal of power very cheaply.



Generator



An alternative is to build the station next to a fast-flowing river. However with this arrangement the flow of the water cannot be controlled, and water cannot be stored for later use.



Advantages

- **Once the dam is built, the energy is virtually free.**

No waste or pollution produced.

- **Much more reliable than wind, solar or wave power.**

- **Water can be stored above the dam ready to cope with peaks in demand.**

- **Hydro-electric power stations can increase to full power very quickly, unlike other power stations.**

- **Electricity can be generated constantly.**



Disadvantages

- **The dams are very expensive to build.**

However, many dams are also used for flood control or irrigation, so building costs can be shared.



- **Building a large dam will flood a very large area upstream, causing problems for animals that used to live there.**

- **Finding a suitable site can be difficult - the impact on residents and the environment may be unacceptable.**

- **Water quality and quantity downstream can be affected, which can have an impact on plant life.**

Gilbert Planche, the father of hydroelectricity

In 1888, his head was full of ideas and his pockets full of bottles.

These he used to measure water flow, under the suspicious gaze of the local population.

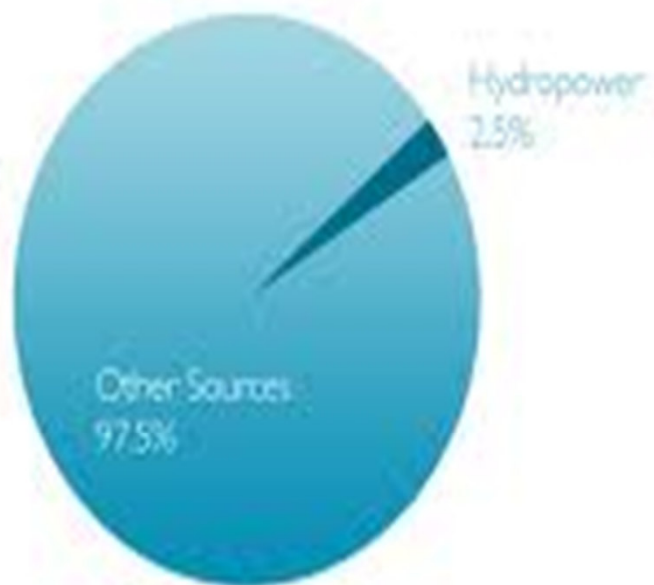
He soon came to the conclusion that he could produce low-priced electricity by using the motive force of the water rushing down the mountainside.

It was a revolutionary concept, a whole century in advance of present-day ideas on clean and renewable energy.



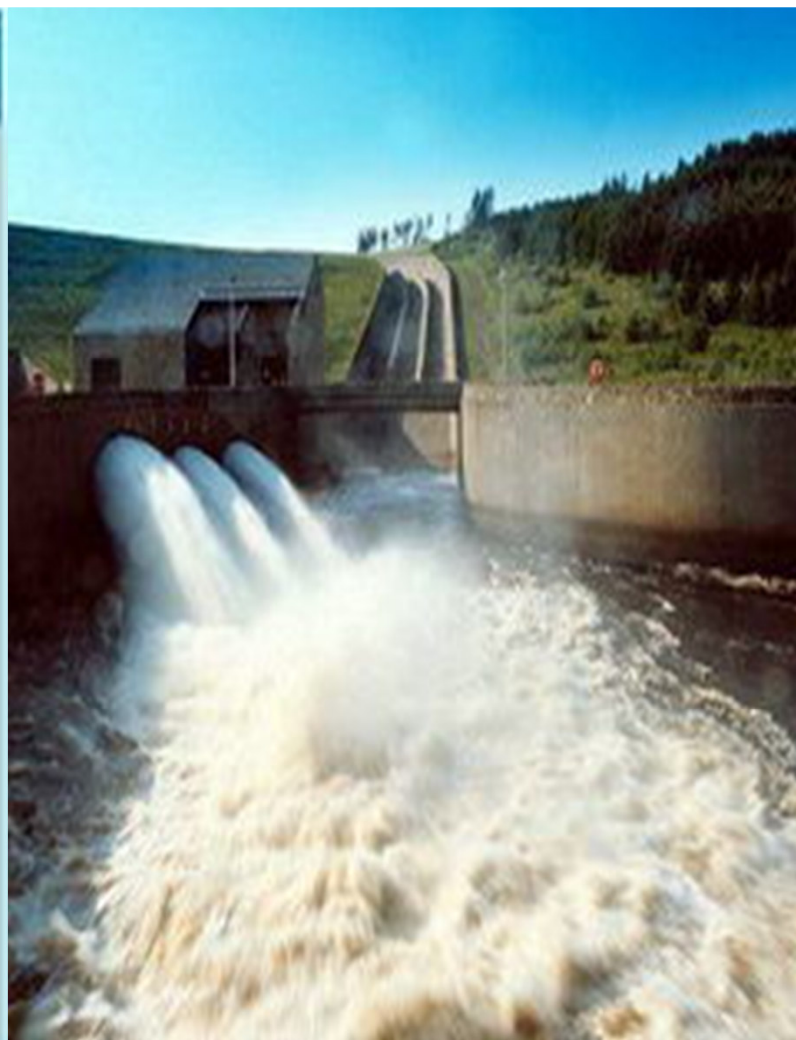
HYDROELECTRIC

PERCENT OF TOTAL US ENERGY CONSUMPTION



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Source: Energy Information Administration, MERA May 2009





WHAT A PITY!!!!!!!



I hope you enjoyed my slides!

THE END

