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16-4 & 16-5: Hydropower and Wind

16-4: Hydropower

How it works:

Hydropower works by water flowing from higher to lower elevations through water bodies. This can be con trolled by dams and reservoirs which are used to produce electricity. The most common way to produce hydropower is by building a dam across a river to make a reservoir. The water stored in the reservoir is allowed to go through pipes which produce electricity by spinning in turbines.

Statistics:

Hydropower is the worlds leading renewable energy source that is used to produce electricity. It is also the third cheapest way to produce electricity when environmental costs are included. Top five producers of hydropower worldwide are Canada, China, Brazil, U.S., and Russia. As of 2006, 16% of the world’s electricity was supplied through hydropower. 99% of Norway used hydropower, 75% of New Zealand, 21% of China, yet only 7% of the U.S. Although hydropower isn’t used much in the U.S., the United Nations believe that only about 13% of hydropower’s potential had been developed.

Advantages and Disadvantages:

Advantages:

* Moderate/high net energy
* 80% efficiency
* Large untapped potential
* Low-cost electricity
* Long life span
* No CO2  emissions during operation
* Can provide flood control
* Provides irrigation water
* Reservoir (fishing/ recreation)

Disadvantages:

* High construction cost
* High environmental impact

(from flooding land for reservoir)

* Environmental costs not included in market price
* High CO2 emissions
* Danger of collapse
* Uproots people
* Decreases fish harvest
* Decreases flow of natural fertilizer to land below down.

16-5: Wind

How it works:

Wind blows a turbine and it generates electricity. Once the wind blows the turbine, the gearbox turns, which moves the generator, which converts the wind into energy, and then it runs down the power cable and is ready to use. Turbines can be up to 30 stories tall and have as many blades as a jet plane. A modern turbine can generate 20 times more electricity than one made in the 1980s.

Statistics:

Wind power has been the world’s second fastest growing energy source since the 1990s. There are also offshore wind farms in addition to on-land farms, which are expected to be used more frequently because they are stronger and steadier. Germany and Great Britain are starting to run out of land spaces for wind farms, so offshore wind farms would be a good option for them.

Advantages and Disadvantages:

Advantages:

* Yield a lot of energy
* High efficiency
* Moderate overall cost
* Low electricity cost
* Low environmental impact
* No CO2 emissions
* Turbines can be made quickly
* Easy to expand farms
* Can be at sea
* Land below turbines can be used for crops or animals

Disadvantages:

* Steady winds are needed
* Backup systems are needed if winds are low
* Plastic parts use oil to be created
* High land use for wind farms
* Visual pollution
* Noise created, especially bothersome near populated areas
* Can kill birds and interfere with migrations