

1.2. Wind energy is used in some areas as a renewable energy source. A wind turbine, illustrated in Fig. 1.7, is used to supply electric energy to a remote farm house. The rotational energy of the blades drives an electric generator through a mechanical gear train. The generator supplies electric energy to the house, where it is used directly or stored in batteries. The house draws water from an artesian well through an electric pump, and stores the water in a tank at the top of a tower. The house draws water from an artesian well through an electric pump, and stores the water in a tank at the top of a tower.

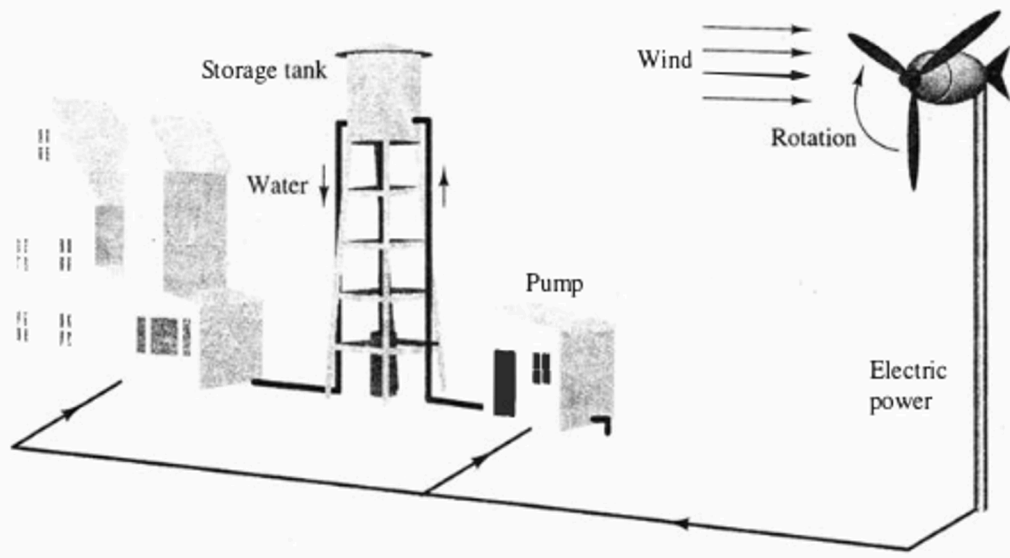


Figure 1.7: A rural wind power generation system.

- Use a sketch to illustrate the energy flow in the wind to electric energy generation system, and identify the system inputs and outputs.
- Identify the major energy conversion and transmission elements that are important in the overall conversion of wind to electrical power.
- Would you expect the system to be 100% efficient? Is all of the available energy in the wind flow converted to electrical energy? Identify potential sites of energy dissipation.
- Trace the flow and conversion of electrical energy through a typical appliance that might be found in the farm house, such as a stove. Where does the energy ultimately end up?
- Discuss the storage and dissipation of energy associated with the water storage system.

b) air shaft shaft wires

