5.1 TIDAL ENERGY:

★ During the rising period of tides, water is stored in a water reservoir constructed behind dams on shore. The potential energy of stored water body is used to generate electrical energy similar to that in a conventional hydropower plant. For the tidal energy method to work effectively, the tidal difference (difference in the height of the high and low tides) should be at least 4m.

★ Tides are periodic rises and falls of large bodies of water. Gravity is one major force that creates tides. Ocean tides result from the gravitational attraction of the sun and moon on the oceans of the earth.

★ Spring tides are especially strong tides that occur when the earth, the sun, and the moon are in a line. The gravitational forces of the moon and the sun both contribute to the tides. Spring tides occur during the full moon and the new moon.

★ Neap tides are especially weak tides. They occur when the gravitational forces of the moon and the sun are perpendicular to one another with respect to the earth. Neap tides occur during quarter moons.

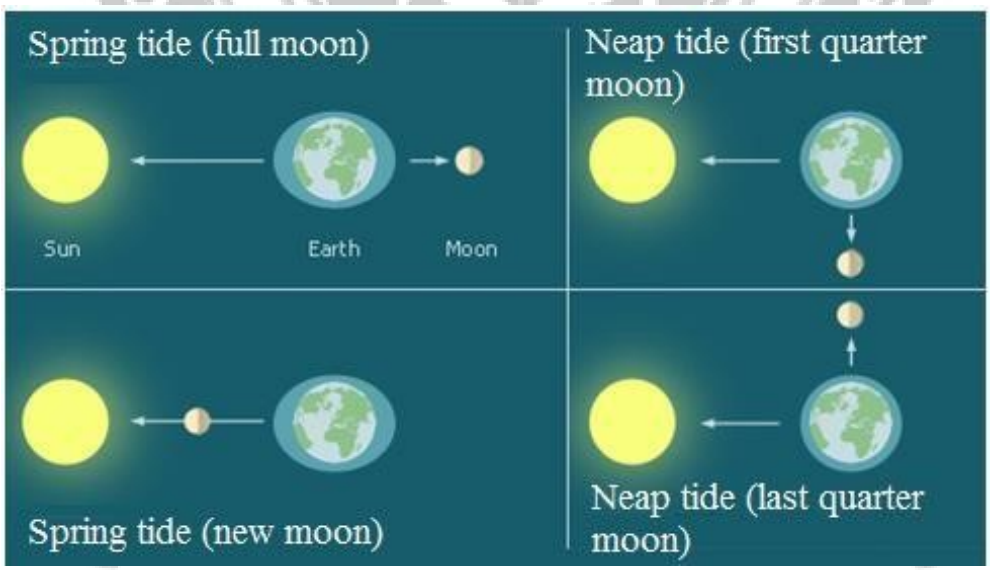

Fig. 5.1. Types of Tide

[Source: "Solar Photovoltaics: Fundamentals,Technologies andApplications" by ChetanSingh Solanki, Page: 375]

- ★ Tidal energy is a form of hydropower that converts the energy of the tides into electricity or other useful forms of power. The tide is created by the gravitational effect of the sun and the moon on
- ★ The earth causing cyclical movement of the seas. Therefore, Tidal energy is an entirely predictable form of renewable energy. Until recently, the common plant for tidal power facilities involved erecting a tidal dam, or barrage, with a sluice across a narrow bay or estuary. As the tide flows in or out, creating uneven water levels on either side of the barrage, the sluice is opened and water flows through low-head hydro turbines to generate electricity. For a tidal barrage to be feasible, the difference between high and low tides must be at least 5m

5.1.1 TIDAL ENERGY RESOURCE

- ♣ Tides are the waves caused due to the gravitational pull of the moon and also the sun (although its pull is very low). The rise of seawater is called high tide and fall in seawater is called low tide and this process of rising and receding of water waves happen twice a day and cause enormous movement of water.
- ♣ Thus, enormous rising and falling movement of water is called tidal energy, which is a large source of energy and can be harnessed in many coastal areas of the world. Tidal dams are built near shores for this purpose in which water flows during high tide and water flows out of dam during low tides. Thus, the head created results in turning the turbine coupled to electrical generator.
- ♣ Tidal energy has been developed on a commercial scale among the various forms of energy contained in the oceans. When the moon, the earth, and the sun are positioned close to a straight line, the highest tides called spring tides occur. When the earth, moon, and sun are at right angles to each other (moon quadrature), the lowest tides called neap tides occur.
- ♣ The water mass moved by the moon‟s gravitational pull when moon is very close to ocean and results in dramatic rises of the water level (tide cycle). The tide starts receding as the moon continues its travel further over the land, away from the ocean, reducing its gravitational influence on the ocean waters (ebb cycle)


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