

Water as Energy

Water energy resources include hydroelectric power from lakes and rivers, ocean energy in its various forms, and energy technologies that take advantage of saline water.

Hydroelectric Power

Hydropower makes use of the kinetic energy water gains when it drops in elevation. Typically, water dammed in a lake or reservoir is released through turbines and generators to produce electricity. Hydropower has been a staple of electricity since the beginnings of the electric age. However, very little of this potential is currently slated for development. Significant legal and regulatory impediments, such as land acquisition and environmental protection, will be a part of any major hydro project. Additionally, reservoirs are typically built and managed as municipal water supply and flood control systems and secondarily for power production. This fact lowers the potential impact of hydro development on the energy picture.

Ocean Energy

Three distinct types of ocean resource are commonly mentioned as possible energy sources: tides, waves, and ocean temperature differentials (ocean thermal energy conversion, or OTEC). For example, tidal energy schemes capture water at high tide and release it at low tide. Wave energy generation devices fall into two general classifications, fixed and floating. In both cases, the oscillating motion of an incoming and outgoing wave is used to drive turbines that generate electricity. Tide energy systems traps high tides in a reservoir. When the tide drops, the water behind the reservoir flows through a power turbine, generating electricity. Ocean thermal energy conversion uses the difference in temperature between warm surface water and cold deep ocean water to make electricity.

Saline Water

Saline and brackish water is common - normally it poses a problem for fresh water supplies. Several technologies, however, can take advantage of saline water for energy production. These include solar ponds and algae production. Solar ponds use the salt water in such a manner that heat from sunlight is effectively locked in the pool and can be used for a number of process heat applications or electricity production. The ability of the pond to store solar thermal energy is unique and overcomes the resource variability that is a drawback of traditional solar development. Salt water algae grow prolifically under cultivated conditions and can be pressed to extract biodiesel feedstocks or dried and burned for power

production. Although neither technology has been demonstrated beyond pilot levels, Texas is fortunate in that regions with saline water resources also tend to be very sunny. If coupled with ongoing fresh water chloride control efforts, exploitation of the saline water resource for energy production may be possible for modest additional investment.

