

# Oceanic Energy

## A Clash of Opportunity and Struggle

Excerpt from *Powering Our Future: An Energy Sourcebook for Sustainable Living*. The text was modified to fit the website.

The world's power-packed oceans cover nearly three-quarters of the earth's surface. This emerging energy option provides innovative engineers and forward-thinking governments with ample opportunities to harness incredible amounts of inexhaustible power. While most of the potential energy cannot be feasibly harnessed, the successful generation of even a fraction of the available energy could significantly contribute to the global energy mix. Although people have been aware of this energy source for centuries, with few exceptions, engineers have only recently begun exploring viable technologies to tap the energy potential contained in the sea's tides, waves, and temperature differentials. At the present time, none of these marine energy technologies has moved beyond niche markets, and few have shifted outside of the research and development stage. They are predominantly immature in their development, providing numerous obstacles for engineers and scientists to overcome, but also ample opportunity for further development.

There are four primary sources of ocean-derived energy: tidal, marine current, wave, and oceanic thermal energy conversion (OTEC). Each source has limited regions where it can be developed, because each uniquely taps a different aspect of the ocean. However, their distinct requirements allow them to collectively maximize the total geographic range of the world's oceans where they can be optimally developed. While these sources will not be able to single-handedly ward off an energy crisis, the development of viable ocean technologies in appropriate geographic locations could contribute to the tapestry of sources needed to reduce global dependence on fossil fuels.

Many of the ideas behind oceanic energy sources have been around for centuries, though the technologies tend to be relatively new. Therefore, the development of these systems is largely in its infancy, unless it is based on a more mature science, such as hydropower or wind generation. The greatest challenge confronting oceanic sources is economics. Institutions and corporations that research and develop ocean-derived energy sources are frequently denied adequate government funding. Ocean energy technologies are considered high-risk investments. Their current status as undemonstrated commercial enterprises, combined with the harsh environments in which they operate, makes financing difficult. Adding to the barriers, the capital costs are substantially higher than conventional technologies. Before the industry can set its eyes upon mainstream integration, it is essential that ocean technologies be successfully demonstrated on a commercial scale, and then become established in niche markets. Several marine technologies may become cost competitive with current energy sources if fossil fuel prices continue to rise. Oceanic sources offer tremendous promise. However, their value and potential must be realized and financially supported before they can significantly contribute to the diverse array of renewable energy technologies.