

Why has hydropower become a leading source of renewable energy?

Escrito por L. B. Woodgate

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Sixty seven percent of the earth's surface is covered by water that has the force of currents, tides and waves which can be transferred as energy to supply many of the electrical grid systems in countries around the world. The more traditional sources of energy, like coal and oil, are not only becoming more dangerous to extract but oil resources are depleting and can no longer meet the growing energy needs of the world while coal continues to pose greater safety risks for miners and their families and is environmentally destructive as mountain top mining destroys animal habitats and removes tons of trees that transfer CO₂ to oxygen. Both sources of fossil fuels are being found by a growing body of evidence that the green house gases they emit are contributing to a rapid warming of the globe and fostering climate changes that threaten the planet's ecosystems and their species.

Unlike coal and oil, water doesn't have to be accessed by ripping the land apart, though developing some forms as a source of energy can come with certain environmental drawbacks. The creation of dams on rivers to create hydroelectric power displaces millions of indigents around the globe from their ancestral lands while altering many river ecosystems. Yet dam-generated hydro-power is not the only means of utilizing our vast water resources to create clean energy. The motion of water itself is what serves as the basis of power. Technology is becoming available to exploit the underwater currents of rivers and seas with very little disruption to the local population and stream ecosystems.

The motion of ocean waves is capable of replacing most of the hydroelectric dams in the U.S. today according to a report from the 7th European Wave and Tidal Energy Conference held in September 2007. An important key point that came out of this conference too is that "the amount of energy that could feasibly be captured from U.S. waves, tides and river currents is enough to power over 67 million homes." And while all modes of hydro-power can serve as an energy source that complements our human activities with the surrounding environment instead of threatening future generations, its technological development can also create opportunities to enhance economic growth and improve long term health. The many diseases associated with fossil fuel waste products in our air and water not only poses serious health risks for the general population but this ill-health factor impacts economic productivity, weakening a nations ability to compete in global markets.

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Dams are the largest source of hydroelectric power and China has taken on the roll as a lead dam builder, not only in their country but as an agent to assist other developing countries address power needs with their growing populations. For example, they have helped with funding for a new 1500 megawatt dam on the Zambezi River in Mozambique. They are funding or building more than 200 dams around the world, especially in poorer underdeveloped countries. But don't mistake this for some humanitarian act or even reducing the carbon foot print of that nation. According to one report, such efforts by China are done "in exchange for access to natural resources, such as metals, fossil fuels, and even farmland—as well as lucrative construction contracts." (The Dam Building Boom: Right Path to Clean Energy?, by David Biello, earth360, 2/23/09)

Such self-serving actions are understandable and will be difficult to repress in free market systems where profits often supersede the welfare of the general public. But capitalist interests can work successfully with cultural and societal considerations to meet the rapid future needs in countries where populations are exploding. Overall the global population increases by 80 million people each year. Most every country has numerous flowing rivers that can be utilized to create power for their populations and the largest percentage of the world's population live along coastal areas that would benefit from tidal and wave energy.

Though still in its nascent stage, wave energy technology is seeing some strong interests develop to increase this clean energy source that could ultimately create 1300 MW (100 MW = 8760 watt hours in a year) of power for the U.S. and would have the effect OF removing 15.6 million CO2 spewing cars off the road by 2025. The advantage of wave hydro-power over hydroelectric dams on rivers is that very little if any disruption to local environments and cultural land use will occur.

Wave energy output is determined by wave height, speed, wavelength, and water density. Some of the more common technology being advanced to exploit wave and tidal energy are float devices known as wave energy converters (WECs), an Oscillating Water Column (OWC), the Point Absorber, Attenuator and the Overtopping Device. With the exception of the Point Absorber, they are positioned on ocean surfaces at distances that are practical and economical to generate the greatest power. "Beyond the sheer size of the resource, hydrokinetic energy is attractive for its predictability; wave patterns can be predicted days in advance, and tides for centuries. Additionally, while waves and ocean currents are variable, they can provide continuous power." (Union of Concerned Scientists - How Hydrokinetic Energy Works)

Hydro-power has been a source of energy that extends back to the times of the ancient Greeks who used the force of falling water to turn wheels that ground their wheat harvests. Its resurgence today as a force to meet and exceed the demands we have relied on from coal and oil enable economies to supply their grid systems with a source of energy that is home based, requiring no armies to invade foreign lands for and without fear of toxic elements entering air and water supplies.

With CO2 emissions exceeding what scientists consider controllable levels of 350 parts per million(ppm), the earth's climate activity in the form of floods, droughts, tornadoes, earthquakes and hurricanes have become elevated due to the warming effects of CO2, nitrous oxides,

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methane and other toxic elements that form in our atmosphere from the use of fossil fuels. The increased levels of carbon dioxide will not only damage our quality of life through such acts of nature but will also poison the sea waters that support all marine life.

Without reversing this trend by finding alternate sources of clean energy, the generations who will succeed us will have to contend with our immoral consumptive habits with fossil fuels. Water and its potential to generate the energy needs of the future will not only avert this crisis but provide a clean and efficient source of energy now that promotes jobs and improves the quality of public health.