

Our Ocean Backyard — *Santa Cruz Sentinel* columns by Gary Griggs, Director, Institute of Marine Sciences, UC Santa Cruz.

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Harnessing Offshore Wind**



A Wind Farm off the Southeast coast of England.

Governor Jerry Brown signed legislation in October requiring California to generate ½ of our electricity from renewable energy sources by 2030. This builds on the state's existing standard that requires 33% of our electricity to be produced from renewables by 2020, just five years from now.

Are we even close? We're well on our way, but there are challenges ahead. Today we produce about 28.4% of our electricity from a mix of renewables: hydroelectric makes up 29.4%, wind 24.5%, solar 18.8%, geothermal 15.4%, and biomass 11.7%.

California ranks first in the nation in its installed solar capacity. In 2013 we more than doubled our solar energy from the previous year, and increased wind generation by 37%.

Unlike fossil fuels, which are finite resources with historically volatile prices, and that all produce greenhouse gases, renewables can provide a fixed price and inexhaustible sources of clean electricity.

So where is all of the required renewable energy going to come from? I think it is unlikely that there will be any new large hydroelectric dams built in California in the future. The best sites were used years ago, costs are enormous, and the environmental impacts would make any such projects very unlikely to be approved today.

Because of our active geologic setting, California produces 80% of all the geothermal energy in the United States and significant additional potential exists. Growth has leveled off in recent years, however, for several reasons: 1) a weak demand for new projects, 2) inadequate transmission infrastructure near resources, and 3) permitting delays.

All is not lost, however, we still have two big and the most rapidly growing sources in wind and solar.

California is second in the U.S. behind Texas in generating electricity from wind, unfortunately way behind Texas. Wind in California produces the energy equivalent of powering 1.3 million homes today. Most of that comes from three windy mountain passes: Altamont Pass in Alameda County, Tehachapi Pass in Kern County, and San Geronio Pass in Riverside County.

A few weeks ago, Trident Winds filed a proposal for a wind farm offshore of the small central coast town of Morro Bay. Offshore areas have higher velocity winds and generally don't come with quite as many concerns as do onshore sites. Well, at least there aren't next-door neighbors.

The proposed project would include 100 large floating turbines, placed 15 miles offshore, each standing about 584 feet high. Offshore wind farms were first built on the seafloor off Denmark 25 years ago. Today there are over 3000 large turbines off the coasts of Scotland, England, Denmark and Germany, which produce power for about seven million people.

The use of floating wind turbines is a new idea, although several have been built successfully. This eliminates the costs and any impacts of building large concrete pads on the seafloor and also allows construction further offshore in deeper water,

where they are less visible. A month ago the Scottish government approved construction of a \$236 million floating wind farm 15 miles off the coast of northeast Scotland.

Planning, permitting, funding and construction of the proposed Morro Bay project is a long road, and there is already a huge potential roadblock in the way.

In 2014, a group of Native Americans submitted a nomination to NOAA for the Chumash Heritage National Marine Sanctuary. The proposed boundaries would extend from the Monterey Bay National Marine Sanctuary on the north to the Channel Islands National Marine Sanctuary on the south, which includes the proposed Morro Bay wind farm site.

There is considerable support for the proposed new sanctuary and NOAA has determined that the nomination has met the national significance criteria and management considerations. It is not a done deal, but it is moving forward.

The regulations affecting national marine sanctuaries are very clear, however, in not allowing any offshore wind farms. The road to 50% renewable energy in California is a difficult path. Every new wind or solar site will have impacts and opposition. Unfortunately, we have lost the ability to compromise in recent years, but this is going to be a future necessity.