Our Ocean Backyard — *Santa Cruz Sentinel* columns by Gary Griggs, Distinguished Professor of Earth and Planetary Sciences, UC Santa Cruz.

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Floating Windmills

At some point in the not-to-distant future, everyone – regardless of their political affiliation - will realize that we will have to convert completely to renewable energy sources. Fossil fuels still provide about 80% of our energy in the USA, but they are finite and will eventually be gone- used up.

This isn't going to happen this year or next, but the sooner we make that transition, the healthier all life on the planet will be. And it goes without saying that we don't have another planet to depend on when we run out of things here. There are resources we can and do make an effort to recycle (aluminum, steel, rare metals from computers, etc.) but fossils fuels are a different story. What we have now is all we will ever have.

California is out in front in renewable energy and under Governor Brown has set some ambitious, but attainable energy goals. By 2020 (just a year and a half away) the state is required to generate 33% of our electricity from renewable sources, and 50% by 2030.

Are we close to reaching these targets? Counting hydroelectric power (which is as renewable as any of the others, but isn't usually included as a renewable), California produced 40.3% of our electricity from renewable sources in 2016.

Leaving out large hydroelectric dams, we generated 25.8% of our electricity from renewables.

So we are making great progress towards this goal. Due to the sustained efforts of a number of dedicated local and regional leaders, we now have Monterey Bay Community Power, which starting July 1 will provide us with the ability to make decisions on what clean energy sources we will use.

Of our state's 2017 renewable sources of electricity, solar provided 36%, wind 31%, geothermal 17%, biomass 9% and small hydropower stations 7%. I want to focus on wind here as I opened the door on this topic four weeks ago. Land-based wind farms today provide 7% of all of California's electricity, enough to power more than two million households (5,454 megawatts). This represents a tripling of wind energy capacity since 2002.

In striking contrast to coal, wind is renewable, its clean, its growing, and it generates well-paying jobs without health hazards. The coal mining industry employs just over 50,000 people in the entire USA with employment in the wind power industry now over 100,000. For comparison the solar industry employs about 375,000 people. This is all good news for the Earth and for us.

Nationwide we are behind Texas, Iowa, Oklahoma and running neck in neck with Kansas for total electricity generated by wind turbines. California does have bragging rights to the largest wind farm in the nation, however.

We have made huge strides in developing wind energy on land, but the offshore situation has moved slower for many reasons, even though the potential is very

large. Two projects are presently in the planning stages and both would be floating wind farms. If and when they are successful they would be the first in U.S. waters and both are being planned for the ocean off California.

Redwood Coast Energy Authority is an intergovernmental agency in Eureka on the northern California coast, which buys its power from various renewable sources along the west coast but wants more local electricity. They have recently selected a consortium of five companies for a public-private partnership to develop a 100-150 megawatt floating wind farm 20 miles offshore. Eureka is in a good location with some of the best wind resources anywhere off the California coast.

There is a major difference between a floating wind farm and almost all of the existing offshore wind turbines. Traditional turbines are supported on the seafloor, whereas the proposed Eureka project would be floating. This means they can be anchored further offshore in deeper water where there are less visual impacts and almost always more wind.

The very first floating wind farm anywhere just went on line in October 2017 off the coast of Scotland, so there is still much to be learned. If all goes as planned, which it rarely does, the Eureka project could come online in 2024 and be the nation’s first floating wind farm.