Altamont Pass Wind Farm

By John Benson

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1. Introduction

This story is deeply personal. I had been stationed in the SF Bay Area in the Army before I went back to Texas to complete my BSEE degree. I graduated from Texas Tech in 1975. After graduation, I accepted a job in Southern California, but after a couple of years, several circumstances pushed me toward the Altamont Pass. My wife had a sister that lived in Livermore, in the Eastern SF Bay Area and on the western side of the above pass. Then I received an offer from GE Vallecitos Nuclear Center (Just west of Livermore) to be their Facilities Electrical Engineer, and our course was set.

We settled in Livermore, and I enjoyed my job at GE. However, a few years thereafter, the nuclear industry started imploding, so I moved to another (non-nuclear) job in Silicon (Santa Clara) Valley. After a brief move to San Jose to be closer to my work, we decided that we greatly preferred Livermore, and moved back in 1985. We have lived in the same house in Livermore ever since.

2. The First Wind Farms

When the first windfarms appeared in 1981, on the Altamont hills alongside the Altamont Pass portion of the I-580 freeway, the appearance of the modern windmill generated media excitement and public interest. This portion of the freeway was an increasingly used corridor for growing the bedroom communities of Tracy, Lodi and Modesto serving the Bay Area of California (through the Altamont Pass to Livermore and on to Oakland, San Francisco, San Jose). Daily commuters crowded past the otherwise barren cattle ranches for several hours each day.[1]

By 1985, the Altamont Pass was crowded with over 26 different windfarms. The increased visibility from the nearby I-580 freeway, which had once sparked the media and community's interest, was now widely regarded as a growing eyesore. Successful windfarms at the Altamont Pass encouraged the development of further industrial wind areas in southern California. These windfarms, in the Tehachapi Pass, led to wider recognition, after windmills played a role as a prominent backdrop in several feature films of the mid- and late 1980s including the 1985 film based on the Bret Easton Ellis novel Less than Zero, featuring Andrew McCarthy and Robert Downey, Jr.

The early wind-turbines were a crazy mix of many configurations and sizes. One manufacturer, US Windpower, built most of the small (< 100 kW) turbines that were in the pass by 1990. Like the multi-MW monsters that are in the pass today, these were horizontal-axes turbines.

[1] Wikipedia Article on Altamont Pass wind farm, https://en.wikipedia.org/wiki/Altamont_Pass_wind_farm

An early 2017 image of part of the Altamont Pass Wind Resource Area showing the many small turbines that populated it then. Image by Marli Miller, Geologic Time Pics.

Origins: *The first wind turbines were installed on the Altamont in the early 1980s by Fayette Manufacturing Corporation on land owned by cattle rancher Joe Jess.*

Wind Turbines: *The wind farm comprised 4930 relatively small wind turbines of various types, making it at one time the largest wind farm in the world in terms of capacity. Altamont Pass still boasts one of the largest concentrations of wind turbines globally, with a total capacity of 576 megawatts (MW). On average, it produces about 125 MW and generates 1.1 terawatt-hours (TWh) yearly*

The Wind: The Livermore Valley is surrounded by mountains and high hills except for two low points. On the west end of the valley is a low point in the hills between Dublin in the Livermore Valley and Casto Valley in the "East Bay." The Altamont Pass is on the East side of the Livermore Valley. California's large Central Valley is east of the Altamont. Since the prevailing winds blow out of the west, there is almost always some wind in the Altamont. However. a common meteorological configuration is when a high - pressure cell sets up off the Northern California's west coast, and a low-pressure cell sets up in Western Nevada. This supercharges the winds in the Altamont.

3. Bigger Wildlife-Friendly Turbines

LIVERMORE – If you've driven through the Altamont Pass lately (as of Sep 2021), you may have noticed a subtle but important change: fewer wind turbines on the surrounding hillsides, and some of those that remain are much taller.[2]

Over the past four years, 569 decades-old turbines have been methodically removed from a 3,400-acre wind farm north of Interstate 580 to make way for 23 strategically placed state-of-the-art machines that reach up to almost 500 feet at the tips of their massive rotor blades.

[2] Joseph Geha, Bay Area News Group via National Wind Watch, "Towering new turbines spinning in the winds of Altamont Pass," Sep 25, 2021, https://www.wind-watch.org/news/2021/09/27/towering-new-turbines-spinning-in-the-winds-of-altamont-pass/

"These wind turbines are going to deliver enough clean energy to power 47,000 East Bay homes annually," Nick Chaset, CEO of East Bay Community Energy, said ahead of Friday's ceremonial ribbon cutting marking completion of the four-year Summit Winds project.

Chaset said the "repowered" wind farm – owned by Greenbacker Renewable Energy Company, LLC, of New York – is a harbinger of a not-so-distant future in which millions of people will be living completely off renewable energy.

Author's comment: The current owner of a major part of the wind farms in the Altamont Wind Resource Area is NextEra Energy, a major player in the renewable energy sector. They also own FPL (Florida).

The latest generation of turbines used by NextEra are GE 1.8 MW Turbines (south of I-580) and Siemens 2.4 MW Turbines (north of I-580). If you take shortcuts on backroads through the Altamont like your author does (I-580 backs up with commute traffic in the morning and afternoon), you drive quite close to these turbines, and they are monsters.

All that clean energy comes at a price, however, and it's not all about dollars and cents.[2]

Though touted as more "wildlife friendly" than their windmill ancestors, the new turbines aren't allaying the concerns of naturalists who have long been concerned about the area's bird population. The spinning blades still are projected to kill dozens of birds each year, including golden eagles.

The Altamont Pass area is a critical breeding and wintering habitat for the eagles, said Glenn Phillips, director of the Golden Gate Audubon Society. And although wind farm developers generally are taking more caution these days to place turbines outside of "the very worst" areas, it's not enough, he added.

In 2010, Alameda County and the Altamont Pass' numerous wind farm investors settled a lawsuit with multiple environmental groups, including the Audubon Society, over bird deaths.

Before then, hundreds and sometimes more than a thousand birds a year were killed in Altamont by dozens of turbines on wind farms, including 75 to 110 golden eagles, according to Phillips.

Under the settlement, the wind farms agreed to take whatever measures were necessary to limit the number of annual eagle deaths to 18, although Phillips says they sometimes have exceeded that number…

Author's comment: The grasslands in the Altamont are packed with California ground-squirrels, a favorite prey of raptors, The cattle grazing in the Altamont make sure the grass is short so flying raptors have a good view of these little critters.

The older small turbines were actually much more dangerous to avian wildlife than the current designs. First of all, many of the older designs used lattice towers which encouraged birds to nest there – the current design use mono-poles. Second, the blades the small turbines spun much, much faster than the average speed of the current turbines, which are variable speed, only spin at their highest speed during very high winds, and even their highest speed is much slower than the old turbines. Finally, the blades are much higher than the old design (see the image below), and note the rotor diameter is around 100 m and the hub height is around 80 m.

As of Spring 2024, the current turbines have been in place for several years, and the maximum size for onshore turbines is around twice the size of the current ones, so I expect that these will be due for an upgrade in about 10 years.

We have had two homes for the last 25 years: our primary residence is in Livermore, and we have a second home in Arnold, at 4,000 ft in the Sierra-Nevada mountains. Thus, I drive through the Altamont about once a week. You can see some of the big turbines there on a clear day in most of the Livermore Valley, and from about 30 miles east of the pass in the San Joaquin Valley, (roughly from Manteca, see map below). Arnold is in the upper right corner of this map.