Vernon Quarterly

WINTER 2013

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WINTER EDITION

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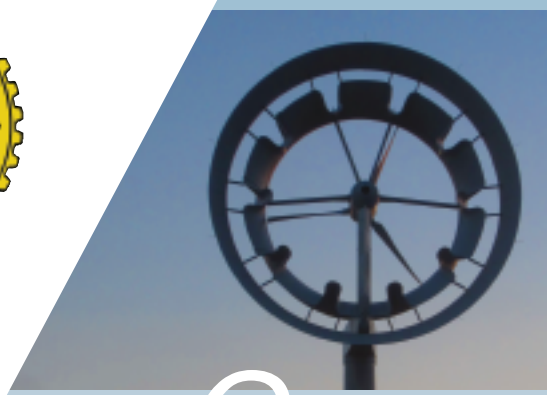

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Vernon Quarterly is a newsletter for the residents, businesses and other community stakeholders in this city that "means business."

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Harnessing Wind and Sun to Power Vernon Business

On tens of thousands of city-owned acres across a sprawling stretch of Jawbone Canyon in Kern County's Tehachapi Mountain region, the Vernon Light and Power Department is considering an ambitious project to harness energy generated by the wind and sun to provide up to a third of the electricity needed to power the city's 1,800 business customers.

While the project may sound futuristic and the technology needed to implement the project may appear to look like something out of the movie "Star Wars," the need for Vernon's Jawbone Canyon Project is anything but light years away. In fact, a significant new element in Vernon's power-producing future is right around the corner.

By 2020, all municipal and investor-owned utilities in California—including Vernon's Light and Power Department—must comply with strict mandates to produce at least 33 percent of the electric power they supply to their customers from renewable energy sources, such as wind, solar, geothermal and bio-methane.

California made a strong move to reduce greenhouse gas emissions when Governor Arnold Schwarzenegger signed the Global Warming Solutions Act of 2006. The law compelled electricity generators to reduce their reliance on coal and natural gas to fuel their power plants. Tougher greenhouse gas compliance rules for utilities, known as renewable portfolio standards (RPS), were enacted as a follow-up when Governor Jerry Brown signed the California Renewable Energy Act in 2011.

For the past two years, every utility in California has been scrambling to comply with the state's RPS. Over the next six years, the scramble by utilities will likely become an all-out sprint as stiff fines and possible operating sanctions await any utilities that fail to comply with their state-mandated RPS requirements.

To meet the greenhouse gas emission reductions and RPS requirements in force today, Vernon Light and Power entered into a long-term purchase agreement for bio-methane gas in partnership with some of the members of the Southern California Public Power Authority (SCPPA), a consortium of 12 municipal utilities. But even using biogas alone will not enable Vernon to meet its state-mandated RPS requirements in 2020.

Vernon Light and Power officials anticipated the approaching era of renewable energy mandates. To position the city as a renewable energy power producer, the City of Vernon approved the purchase of 30,000 acres of land in Kern County's Jawbone Canyon. Vernon's land is approximately 25 miles northeast of Lancaster near the edge of Mojave, not far from Edwards Air Force Base, home of NASA's Dryden Flight Research Center.

Why would Vernon buy hilly, mountainous, undeveloped agricultural land located within a bird's eye view of the former landing spot for NASA's Space Shuttle

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Harnessing Wind and Sun to Power Vernon Business

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program? The short answer is wind. Lots of wind, plus some flat, dry land suitable for solar power arrays.

Most people are unaware of the fact that Jawbone Canyon in the Tehachapi Mountain region in Kern County has been home to an elaborate network of electricity-producing wind turbine generators for the past 30 years. Wind moving through Tehachapi Mountain passes averages more than 20 miles per hour (mph). But add a cold weather front to those same Tehachapi passes, and wind speeds have been known to reach upwards of 100 mph.

Harnessing that wind speed and the energy it generates and converting it into electric power requires some specialized, yet age-old, technology: windmills. Windmills have been in existence for more than 800 years. But today's wind turbine generators bear little resemblance to the windmills in 17th century Europe.

Vernon's property in Jawbone Canyon is a prime location for a wind farm that could generate an inexhaustible supply of electricity to help the city meet a significant level of its RPS requirements by 2020. In 2010, Vernon sold 12,000 acres of its property holdings in Jawbone Canyon to NextEra Energy Resources for the Red Rock Wind Project, a high-tech wind farm that went online and began producing renewable energy for NextEra's customers earlier this year.

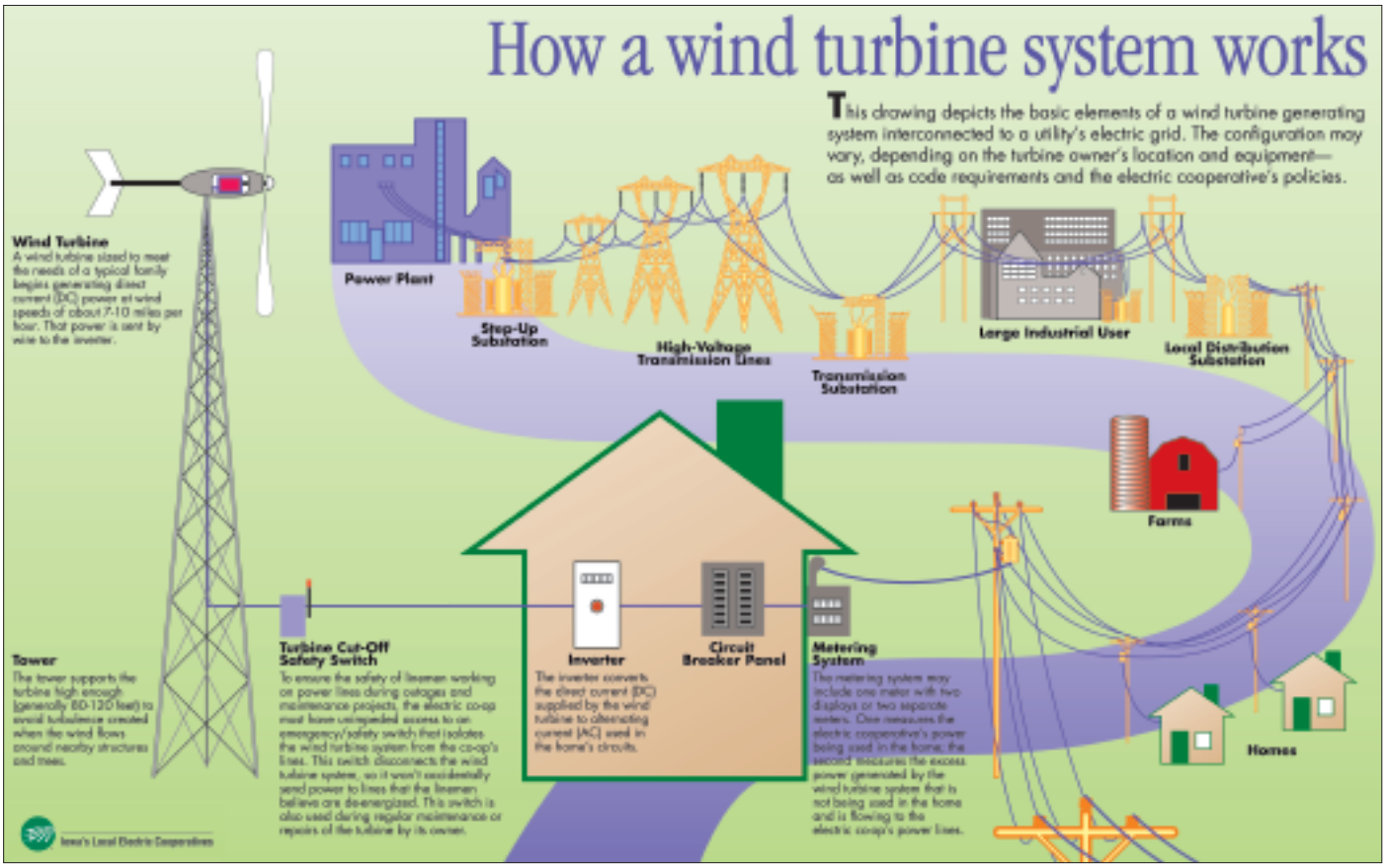
The City of Los Angeles' Department of Water and Power (LADWP) is also in the wind farm business. LADWP's Pine Tree wind farm is situated on 8,000 acres in the Tehachapi Mountains, west of the land owned by the City of Vernon.

LADWP's Pine Tree project contributes 120 megawatts of total output toward Los Angeles' renewable energy goal. In addition, LADWP operates the 102-megawatt Milford Wind Power Project in Utah.

According to LADWP, its project produces enough green power to serve 34,000 DWP customers and reduce greenhouse gas emissions by more than 122,000 metric tons.

Vernon's remaining 18,000 acres in Jawbone Canyon are being eyed by Vernon Light and Power as the future home for a wind power project that could also include a solar array for additional power-generating potential. A wind power project on Vernon's land could produce as much as an estimated 410 megawatts of electricity depending upon (1) the wind turbine generator technology that is deployed, (2) wind turbine siting, (3) constructability issues, (4) environmental considerations and (5) contiguous easements for potential access needs.

There are issues and concerns that any proposed wind turbine project would need to overcome in Kern County. Before Vernon can enter the wind farm business, it must effectively address those issues and allay local concerns.



Military flights from nearby Edwards Air Force Base cross above Vernon's Jawbone Canyon property, raising aviation concerns about the use of high-tech wind turbines that can soar to a height of more than 400 feet and have a blade span upwards of 300 feet, creating a flight distraction at night due to the need for an aviation warning beacon to be placed atop of each turbine generator.

The flight patterns of migrating birds and bat populations—including California's endangered condor—has heightened concerns of Kern County environmentalists who question whether local approval should be granted for any new wind farm project.

For the past three years, Vernon Light and Power has been conducting wind tests and bird and bat migration surveys on its Jawbone Canyon property to address those concerns. Meteorological towers erected at select locations have been gathering data and beaming results by satellite to consulting teams evaluating the feasibility of a wind farm project.

A 5,000-acre portion of flat land situated between the mountain passes has been evaluated for its potential as a site for a proposed solar energy farm, but that property is not owned by the City of Vernon.

Vernon Light and Power is planning to issue a Request for Expressions of Interest and Information (RFI) to solicit responses from developers of wind and solar energy projects that may be interested in constructing wind-generating facilities or a wind-and-solar energy project on the city's Jawbone Canyon land.

Wind Power Technology Options

Ten manufacturers dominate the global wind turbine business. The largest by market share is Denmark-based Vestas. In second and third position are Sinovel and Goldwind, both of which are based in China.

U.S.-based GE Energy (General Electric) ranks fifth among the world's wind turbine system manufacturers. Siemens Wind Power, based in Germany and Denmark, is a familiar corporate name in the U.S. The world's top wind turbine manufacturers built wind energy systems for land-based applications and offshore wind energy platforms.

Modern wind turbine systems are large and complex, featuring aerodynamic designs to exploit the wind energy that exists at a given location. Most conventional wind turbines typically feature large towers capable of rotating massive blades on a horizontal axis to convert wind energy into electricity.

NextEra Energy Resources of Juno Beach, Florida, selected GE Energy wind turbine systems for its North Sky River Energy wind farm in the Tehachapi Mountains built on 12,000 acres of land it purchased from Vernon.

LADWP selected General Electric for its 8,000-acre, 120-megawatt Pine Tree Project in the rugged terrain of Jawbone Canyon.

Emerging wind turbine technologies continue to push the envelope in terms of new system designs to further the capability to create electric power from the wind in our atmosphere.

In the coming months, Vernon hopes to determine its best available option for using wind turbine technology to power the city's hopes of generating renewable energy on its land in Jawbone Canyon.

VQ Conversation – Q&A with CARLOS FANDINO,

Director, Vernon Light and Power Department

VQ – What types of power-generating projects are best suited for Vernon's land in Jawbone Canyon?

CF – Wind turbine arrays and solar photovoltaic arrays will be the best fit for generating power on Vernon's fee land in Jawbone Canyon. You really have to go there to see and feel the capabilities of this rugged area as a renewable power resource. We want to harvest the green power potential that exists, but also protect the local environment to the greatest extent possible.

VQ – How much power could likely be generated from a wind power project?

CF – Assuming we utilize 64 wind turbines (on the western land only) and if we use a 1.5-megawatt GE Energy wind turbine, then we could potentially produce 96 megawatts of electricity. If we use the GE 3.0-megawatt wind turbine system, we could potentially produce up to 192 megawatts of electricity. The decision on which direction we ultimately may go is a direct function of the availability of a given wind turbine system and its constructability in the rugged terrain of our city's property in the Tehachapi Mountains.

VQ – How much power could likely be generated from a solar array project?

CF – 125 megawatts is possible, if adjacent flat lands (previously designated as eastern and western) are used for solar.

VQ – What will renewable power generation mean for the City of Vernon and its business customers?

CF – Wind and solar energy projects in Jawbone Canyon should lower projected energy costs in the future because the City of Vernon would be able to meet its renewable energy portfolio obligations, and do so at a predetermined cost that is manageable. Alternatively, Vernon could establish a power purchase agreement (PPA) with a green power developer at guaranteed costs. The developer would own the project, but the city's business customers would benefit by knowing that their RPS costs wouldn't be subject to the variability of the renewable energy markets. When you know your energy costs aren't going to spike, that helps your business. In addition, lowering Vernon's carbon footprint through the use of renewable energy enables our city to do its part to reduce greenhouse gas emissions that contribute to global warming.

VQ – Are there any lessons that have been learned from renewable power-generating projects that presently exist in Jawbone Canyon that can or will be applied to Vernon's proposed project?

CF – As in the real estate business, it's "location, location, location." Vernon is fortunate to have land holdings in Jawbone Canyon where wind speeds make wind farms viable and flat lands make solar arrays viable. Even with this potential, the location and spacing of wind turbine systems may need to be constrained to meet micro-siting studies based on detailed wind energy patterns, which modulate over the seasons and environmental requirements, including the consideration of private property owners living on adjacent parcels, aviation considerations and bird migration concerns.

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VQ Conversation – Q&A with CARLOS FANDINO, Director, Vernon Light and Power Department

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VQ – Are we looking at a day in the future when most of Vernon's power is generated by wind and solar or are traditional fossil fuel-powered plants here to stay?

CF – We believe that with the low cost and abundant availability of natural gas, coupled with the unmatched efficiencies of new combustion turbine technologies in both the simple and combined cycle configuration—gas turbines can operate 24/7 regardless of climatic conditions—renewable energy will likely remain a secondary source of energy for the foreseeable future. Optimistically, renewable energy is likely to account for about a third of Vernon's customer needs by 2020 and beyond. There are a lot of "ifs" in the wind power scenario for Vernon, but our potential for a successful wind and solar power project that will benefit our customers and our city is clear; there are no "ifs" about the benefits.