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10. There are two primary types of solar systems:
 - a. Grid-tied Photovoltaic Cells Systems – Excess electricity produced by solar systems can be fed back to the grid through a process known as net-metering. When electricity from the grid is used the meter spins forward. The less electricity used from the grid, the slower the meter spins. When feeding electricity back to the grid, the meter spins backwards.
 - b. Stand alone Photovoltaic Cell Systems – This is also called an “off the grid” or “off-grid” system, and it operates independently from the utility grid, providing all of the electricity needed at the site.
11. Going off-grid (no use of electricity) can be done for environmental reasons. It is often done to residential buildings only occasionally occupied, such as vacation cabins. Returning to the grid is usually more expensive because of inefficiencies of the components.
12. The top two of seven reasons for going off-grid according to Nick Rosen’s book “How to Live Off-Grid” are saving money and reducing the carbon footprint.

AGRICULTURE PART I

FACTS:

1. Farming and ranching are energy intensive practices. A majority of the operating costs go to electricity.
2. Having a stable energy source is necessary in agribusiness.
3. The following number of applications have been approved for agricultural solar construction permits:
 - a. 2011 – Six fruit and nut agriculture companies
 - b. 2012 – One fruit agriculture company
 - c. 2013 – Six fruit and nut agriculture companies
 - d. January through March 2014 – Five fruit and nut agriculture companies
4. One of the oldest applications of solar energy in agriculture is using the sun to dry crops and grains. Solar drying equipment can dry crops faster and more evenly than leaving them in the field after harvest. A solar dryer can consist of an enclosure or shed, screened drying trays or racks, and a solar collector, i.e., a south window to let the sun shine into a shed.
5. Commercial greenhouses rely on the sun for lighting and rely on gas or oil heaters to maintain constant temperatures. A solar greenhouse generally faces south, while its northern side is well insulated, with few or no windows.
6. Solar water heaters can provide hot water for dairy operations such as cleaning equipment and pens and for warming and stimulating cows’ udders for milk production.
7. Solar use at a farm located in Tulare County:
 - a. In the summer of 2013, an established farm, installed a one megawatt solar tracking system.
 - b. The unit is capable of producing two million kilowatt hours, the equivalent of powering 186 average homes annually.
 - c. The solar unit is projected to provide ninety-five percent of the electricity required at the dairy.
 - d. The three reasons for installing the solar unit were reductions in energy costs, cost of installation and reduced taxes.

TULARE COUNTY GRAND JURY REPORT 2013-2014

8. Solar use at a vineyard located in Tulare County:
 - a. In January 2014, an established vineyard broke ground for a 1.13 megawatt solar system.
 - b. They have projected to produce 1.7 million kilowatt hours annually, offsetting ninety-one percent of the company's energy needs for the cold storage facility.
 - c. Over the next twenty-five years, the system is projected to save the facility \$5.7 million in electricity costs.
 - d. The use of solar energy at the vineyard is equivalent to preserving 24,000 acres of forests and removing 30,000 metric tons of carbon dioxide from the atmosphere.
9. Solar use at an established dairy located in Tulare County:
 - a. An established family owned dairy operates with 3,200 head of dairy cows. With the drop in milk prices and rise in operation costs, a solar power system was the right solution to provide stability and energy security for the dairy today and for generations to come.
 - b. A contractor installed a 719 kilowatt, \$2.9 million solar system on three and a half acres of land that could not be used for feed production or to house animals. This solar system is among the largest of a handful of dairy solar units in the United States.
 - c. The solar tracking system is ground mounted and automatically follows the sun through the course of the day, improving solar production by twenty-five percent.
 - d. The solar tracking system supplies a minimum of 85% of the dairy's electricity needs with an annual savings of \$145,000.
 - e. The solar power system produces over 1.4 million kilowatt hours annually, providing energy during peak hours of the day, when electricity loads and prices are the highest.
 - f. The system will reduce greenhouse gas emissions by 27,000 tons which is equivalent to permanently removing 192 gasoline powered cars.
 - g. The solar facility produces enough electricity to power up to 130 homes annually.
 - h. The solar installation not only reduces daily operating costs, but it also provides a long-term hedge against rising electricity costs and a strategy toward sustainable energy production.
 - i. In December 2013, the dairy was selected as a Pacific Southwest Region 2013 Environmental Champion, recognition from the Environmental Protection Agency acknowledging the dairy's significant contribution to protect the environment and support communities.
 - j. This particular dairy was the only agribusiness awarded the 'Environmental Protection Agency Environmental Champion.' The Environmental Protection Agency recognized six other projects in California, Arizona, Nevada and Hawaii.

SCHOOLS PART II

FACTS:

1. Visalia Unified School District will be installing solar panels on newly constructed shade structures over playgrounds and carports. There will be no roof mounted solar panels due to permitting and structural roof challenges at the following schools:
 - a. Crowley Elementary School
 - b. Fairview Elementary School
 - c. Green Acres Middle School
 - d. Highland Elementary School
 - e. Houston Elementary School
 - f. Ivanhoe Elementary School

TULARE COUNTY GRAND JURY REPORT 2013-2014

- g. Linwood Elementary School
 - h. Pinkham Elementary School
 - i. Redwood High School
 - j. Veva Blunt Elementary School
 - k. Willow Glen Elementary School
- 2. Visalia Unified School District will realize cost savings the first year of operation.
 - 3. Visalia Unified School District projects an average savings per year of \$454,141 and a twenty-five year lifetime total cost savings of \$11,353,530 with total estimated project costs of \$10,735,610.
 - 4. Of the 3,316,146 kilowatts to be used by the Visalia Unified School District 3,150,329 kilowatts will be provided by solar energy.
 - 5. The solar facilities will be designed and sized such that the District's energy bills are reduced, but excess power will occur through a process called Net Energy Metering.
 - 6. The Visalia Unified School District will own the solar facilities. However, the District will contract with the solar provider for maintenance and service of the solar facilities with the assistance of District maintenance staff.
 - 7. The District will receive \$2,152,233 in solar rebates paid over five years by the California Solar Initiative.
 - 8. The following school districts within the Tulare County Office of Education either have solar facilities or have plans in the future for solar facilities:
 - a. Buena Vista School District – existing solar project built in 2004 and no plans for expansion
 - b. Burton School District – in the bid process
 - c. Farmersville Unified School District – existing solar farm with no plans for expansion
 - d. Liberty School District – exploring future solar projects
 - e. Pixley Union School District – conducting inquiries for the elementary and middle school sites
 - f. Pleasant View School District – in planning stages at either Pleasant View West or Pleasant View Elementary School
 - g. Porterville Unified School District – existing solar facilities at six sites and under contract for ten additional sites
 - h. Richgrove School District – existing solar facilities and no plans for expansion
 - i. Sundale Union School District – in planning stages
 - j. Tipton School District – in process of implementation of solar project
 - k. Tulare City School District – working on implementing solar project at fourteen of fifteen sites
 - l. Waukena Joint Union School District – in planning stages
 - m. Woodlake Unified School District – existing solar facilities with no plans for expansion

FINDINGS:

- 1. There are many benefits to solar energy such as lower energy costs, environmental, renewal resources and clean energy.
- 2. The schools are doing their part to become more energy efficient.

TULARE COUNTY GRAND JURY REPORT 2013-2014

RECOMMENDATIONS:

None

REQUIRED RESPONSES:

None

WATER PLEASE!

BACKGROUND:

“No local economy existed before water and none will be able to survive without it.” This is a quote by a former Visalia City Manager on September 10, 2013, which appeared in the *Visalia Times Delta*.

In the late 1800s, Tulare County obtained its water entirely from rain and floods. Before development of improved water delivery systems, most of the recharge to the Central Valley aquifer system was from rain and mountain snowmelt. Because of the location of the mountains, the discharge was to rivers and marshes near the valley center.

The first wells were Artesian wells which bubbled from beneath the ground. Due to drought conditions in the 1880s, wells began to be developed. At that time, there were more wells in California than the rest of the United States. There were three to four hundred documented wells in the San Joaquin Valley. Wells could only be drilled twenty to thirty feet deep due to the Monterey Shale, a rocky formation beneath the ground’s surface. Those wells did not last beyond 1910. Eventually, development of the centrifugal pump in the early 1900s eliminated the problem of drilling past the Monterey Shale.

The Tulare Irrigation District was formed in 1889. The controversial raising of a \$500,000 water bond for this district (equivalent to \$25 million in 2013) caused many problems: lawsuits, need for Pinkerton Guards, and exporting water.

During the 1940s – 1950s, the Central Valley Project, a state project, provided water to Tulare County from the Sacramento Delta.

Rain and snowmelt flow into channels and basins and become surface water which percolates into the ground. In wet years, surface water flows into cities’ rivers and channels, then into storage basins percolating into the water table, recharging groundwater supplies.

There was a period of stability for water availability from 1971-1976, when due to several very wet years, large scale projects came on-line and surface water was utilized instead of groundwater.

Since the mid 1970s, the use of groundwater has exceeded the ability of the aquifer to replenish itself.

REASON FOR INVESTIGATION:

The 2013-2014 Tulare County Grand Jury initiated an investigation into city and County water wells, the current depth of those wells, the County’s water table, and how the cities and the County plan to sustain water resources for future population growth.

PROCEDURES FOLLOWED:

1. Interviewed relevant witnesses.
2. Researched relevant documents.

TULARE COUNTY GRAND JURY REPORT 2013-2014

FACTS:

1. An acre-foot of water is equivalent to enough water to cover one acre of ground to a depth of one foot. An acre-foot of water is sufficient water to provide for two four person families for one year. The population of Tulare County was 449,253 as of July 2011 according to the United States Census Bureau.
2. The rate of formulation for percolation for recharge basins has an accepted standard formula: A Good rating equals $\frac{3}{4}$ acre foot per day; and a Marginal rating equals $\frac{1}{2}$ acre foot per day and absence of percolation. The percolation ranking for recharge basins in Tulare County varies from one to another and none of the basins are less than marginal.
3. The drinking water for the City of Visalia is obtained solely from groundwater wells. Groundwater for Visalia is obtained from the Kaweah basin, in which the city is located.
4. In Tulare County, more than ninety percent of the groundwater is utilized by agriculture.
5. Water conservation provides a one-to-one direct benefit. An acre-foot not pumped is an acre-foot saved. The Visalia City Council enacted Visalia's Water Conservation Ordinance in 1989. Because the majority of the city's water was being used for landscape irrigation and because of the decline in water levels, the City Council in 2000 implemented Stage 3 which restricted outdoor irrigation, daily watering and other outside water use.
6. The City of Visalia is undertaking a \$140 million upgrade of its Water Conservation Plant to produce advanced treated recycled water which can be used with restriction for agricultural irrigation. A portion will be utilized to irrigate facilities on the west side of Visalia, but a majority will be traded with the Tulare Irrigation District for surface water to be used for recharge on the east side of Visalia. A new piping infrastructure will deliver recycled water to irrigate Plaza Park, Valley Oaks Golf Course and the Visalia Municipal Airport so that wells can be turned off at these facilities. The City and Kaweah Delta Water Conservation District are working together to install structures in the Packwood Creek area, which will enable the pooling of water into nearby basins and channels to increase recharge.
7. Visalia has 4.5 miles of aging pipelines that are over one hundred years of age. Replacing these pipelines could cost in excess of \$6 million.
8. In the City of Tulare, which has thirty networked wells, the water table has dropped more than seventy feet since January 2013. When Tulare has a wet year, excess water flows into groundwater recharge basins. Tulare's goal is to accumulate 10,000 acre-feet per year in the groundwater recharge basins. Unfortunately, the City is using 17,000 acre-feet of groundwater recharge per year. Consequently 7,000 acre-feet of reserve is being depleted each year.
9. The City of Tulare has two wastewater treatment plants: one for people and another for dairies. Three thousand two hundred acres are watered with treated waste water in Tulare.
10. The City of Tulare added water meters in 2006 and the water use decreased fifteen percent, but when the rates were increased gradually to increase the water fund, the residents reduced the amount of water they were using, which reduced the amount of revenue for the water fund. Currently, approximately 150 meters have been placed throughout the city parks.