

GREENSTONE

Norris Geyser Basin

Yellowstone National Park “...for future generations”

3 for YES! And 1 for Unilever

In addition to Michael Harris and Angela Rice mentioned last issue, interns Kate Truesdell and Tristan Hall are working in the park this summer to assist Yellowstone’s Environmental program. Kate Truesdell is a participant in the Student Conservation Association-Unilever National Park Congressional Internship Program. Designed to foster a multi-faceted understanding of natural resource issues, the program assigns participants to three-month details working in a National Park and three-month terms of service in a congressional office in Washington, D.C. working on environmental policy. Throughout the summer, Truesdell will be working on a number of projects related to the Park’s messaging of sustainability efforts to visitors, including helping draft the first-ever Yellowstone Annual Sustainability Report. Truesdell is also involved with the re-organization of the Park’s



Green Team. Another project on her agenda includes evaluating environmental compliance issues related to sustainability. Tristan Hall is a recent graduate of the master’s program of architecture from Georgia Institute of Technology and has professional experience working at firms located in Indiana, California, and Georgia. Currently, Hall is working in conjunction with the National Park Service and Andersen Windows Inc. to

develop short term and long term plans for replacing windows throughout Yellowstone. This is an effort to make the buildings more energy efficient, particularly addressing heat transfer in the winter while retaining the historic identity of the preexisting structures, by utilizing the American Recovery and Reinvestment Act stimulus funds and possible donations from Andersen Windows Inc.

Shedding Some Light on Renewable Energy

The Lamar Valley Buffalo Ranch has put into practice what the plant life around us has been doing for years—turning sunlight into energy. The difference however is that the facilities in Lamar use photovoltaic arrays to accomplish this feat, not chlorophyll. The first of two arrays was installed

in 1996 with a power capacity of 60 Watt per solar cell. The second array was installed 9 years later with a capacity of 75 Watt per cell. Each array has a total of 108 cells for total potential power production of 14.5 kilowatts. However, this potential is never reached due to the angle of the sun, the presence

of clouds, and the general inefficiencies associated with the energy conversion process. During a sunny summer day, the solar arrays, in spite of inefficiencies, can produce nearly 100% of the ranch’s energy requirements. Refer to diagram on page 2 for “How Solar Panels Work.”

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Special points of interest:

- More environmental interns in Maintenance this summer
- Green House Gas Emissions from Various Energy Sources
- Renewable Energy Usage at Lamar Buffalo Ranch
- How Solar Panels Work
- Xanterra Exceeds Waste Diversion Target



Green House Gas Emissions from Various Energy Sources

Energy source that is converted to electricity	gram C _{eq} per kWh produced (stack emissions)
Coal	216-278
Fuel	195-215
Natural Gas	99-157
Water Power	0
Solar Power	0
Wind Power	0

Source: <http://www.iaea.org/Publications/Magazines/Bulletin/Bull422/article4.pdf>, Spider J, Langlois L and Hamilton B (2000), "Greenhouse gas emissions of electricity generation chains-assessing the difference", *IAEA Bulletin* 42 2.

Yellowstone National Park “...for future generations”

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Comments and feedback on the newsletter are welcomed. If there are stories or topics that interest you, please let us know. Collaboration and communication are prerequisites for change.

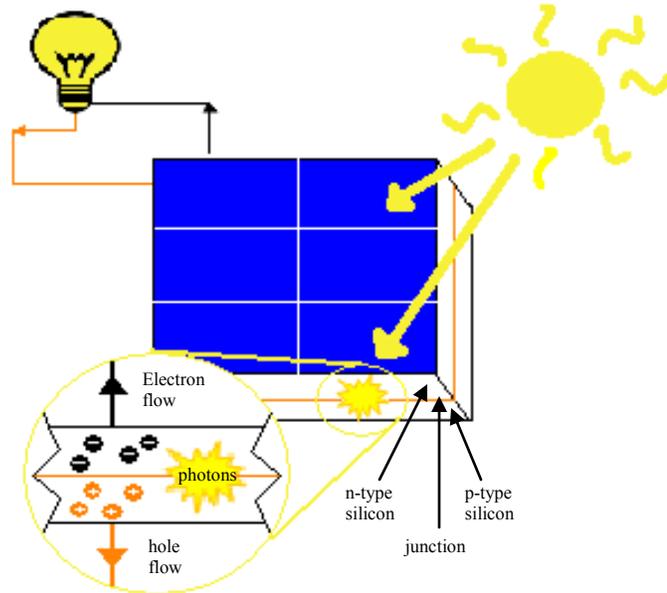


Yellowstone's Environmental Program “Growing into Something Big”



Don't let your car idle for more than 10 seconds... it's more cost efficient and fuel efficient to turn your car off!

Most solar arrays are made of silicon molecules that are in a crystalline structure. In order for the sun's energy to be converted to electricity, a current of electrons must be formed. This happens when the silicon crystals are “doped” with molecules that either have free electrons or an electron deficit (or “hole”), such as phosphorus (n-type) and boron (p-type) respectively. When photons from the sun strike the solar arrays, free electrons in the crystalline structure are excited and travel to a where there is an electron “hole” (based on charge). This creates the current necessary to generate electricity.



XANTERRA Earns the Right to Talk Trash



Xanterra employee in front of compost at the West Yellowstone Compost Facility.

“When people actively and thoughtfully protect and preserve our planet's beautiful places, they have made a moral investment in that destination's continued success... When our guests and our employees start making lifestyle changes because of the initiatives they undertake or observe at our parks and resorts, then we will know that we have been truly successful.”

Andy Todd, CEO, Xanterra, Inc.

Xanterra provides hospitality in some of the most beautiful places on earth, and takes its role of environmental stewardship very seriously. Protecting the irreplaceable resource of Yellowstone drives its environmental management program, and one of the primary areas of focus has been the management of solid waste. During a strategic session with noted environmentalist Hunter Lovins, the company developed a series of ambitious 2015 Environmental Vision Goals, which included a waste diversion target of 50%.

In 2008—seven years before the target date—Xanterra's Yellowstone operation not only achieved, but also greatly exceeded this goal. The concessioner diverted a remarkable 72% of its solid waste from landfill disposal through aggressive efforts in recycling, composting, material reuse, green procurement, and donations. Strategies for diversion encompassed a broad scope across all departments and activities; a focus on employee education

and participation proved key to the success of the endeavor.

Over 1.5 million pounds of material was recycled, reused, or donated. Along with the typical recycled materials such as paper, plastic, cardboard, aluminum, and glass, Xanterra expanded its efforts to encompass a broad spectrum of materials. For example, the company shipped over 600,000 pounds of manure for reuse in agriculture, distributed 42,750 pounds in mattresses for refurbishment for low-income housing, donated over 17,000 pounds of linens to non-profits, and constructed bags from discarded shower curtains for use in its laundry. Additionally, initiatives in green procurement and a comprehensive waste sorting program enabled the West Yellowstone Compost Facility to convert 2.2 million pounds of Xanterra's waste into a usable soil amendment.

