

# The *NMSEA* SunPaper

Newsletter of the New Mexico Solar Energy Association

March/April 2003

Published Bimonthly

Volume X, Number 2

## NMSEA MOVES TO NEW OFFICE

As a result of the small fire in our building a few weeks ago, our office has moved down the hall in the same building at 1009 Bradbury to Suite #35, to a slightly smaller office, but one with a window and closer to the receptionist area. The phone number (505-246-0400) and facsimile number (505-246-2251) remain the same.

### *Calendar of Events – Spring 2003*

*\*All NMSEA members are invited  
to attend board meetings*

**April 5**– NMSEA Board Meeting, 10am-2pm, NMSEA Offices, 1009 Bradbury SE, Albuquerque, NM. (across from the Pit at UNM) - (potluck lunch)

**April 13** - Earth Day Environmental Fair at La Montanita Coop in Albuquerque

**April 16**—Career Day at Bernalillo High School sponsored by Pueblo of Santa Ana with SunChaser

**April 22**—Earth Day, Sandia National Labs

**April 26**– Earth Day, Los Alamos, NM

**April 25-27** GreenBuilt Tours, Albuquerque  
For more information, please contact Susie Marbury, Alliance Executive Director, at Green Alliance, 924 Park Avenue SW, Albuquerque, NM 87102, 505-242-6484. Visit the website at /GreenAllianceNM.com.

**May 16-17** Solar Radiant Floor Heating Workshop, Albuquerque, contact USA Solar (928-282-5140)

**June 27-29** Taos Solar Music Fest and



## Monte Ogdahl's Toy Solar Cars Featured in *Solar Today* Magazine

An article on NMSEA member Monte Ogdahl's toy solar cars appeared in this month's *Solar Today* (March/April 2003 issue - Vol. 17, no. 2 - page 16). *Solar Today* is the nationally distributed magazine of the American Solar Energy Society (ASES, [www.ases.org](http://www.ases.org)). NMSEA is a chapter of ASES. )

Two photos, taken by Matt Chalom -son of passive solar architect Mark Chalom - appeared with the article: One is close up of the one of Monte's new "Micro" Solar Cars, and the other a photo of several kids playing with the cars at last summer's Solar Fiesta. Monte has been making toy solar cars for several years now, many of which have or are traveling with the SunChaser education program and have been a great hit with kids. His new Micro Solar Cars, are radio controlled, durable, easy to make, and relatively inexpensive (about \$50). Monte can be contacted directly at 505-422-2268.

**The NMSEA SunPaper**

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The NMSEA SunPaper  
NMSEA  
1009 Bradbury SE  
Albuquerque, NM 87106  
NMSEA's phone numbers are 1-888-88NMSOL  
Or 505-246-0400 (Albuquerque)

If you wish to submit an article you may do so by mail or send it by e-mail to [Info@nmsea.org](mailto:Info@nmsea.org)

**ADVERTISING RATES**

All advertising must be submitted with original, camera ready, art (all we have to do is paste it on our master). Use the following dimensions for the maximum space allowed for each size.

Quarter page (3.5" by 4.5").....	\$20.00
Half page (4.5" by 7.5").....	\$35.00
Full page (7.5" by 9").....	\$50.00
Business Card (2" by 3.5").....	\$12.00

Find NMSEA on the World Wide Web at:  
<<http://www.nmsea.org>>  
or  
<<http://www.nmsolar.org>>

The views expressed in the New SunPaper are not to be considered an endorsement by the staff or board of directors. We strive for an open platform.

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# Flare From The Chair!

By Benjamin Luce

## Greetings!

In this month's flair I will discuss two separate, but ultimately related topics: 1) Recent evidence connecting the 1998-2002 drought with climate change, and 2) Some startling data about the current growth of wind and solar technology production rates and it extrapolation to the future.

**The connection between the recent drought and climate change:** An article in Science Magazine called "The Perfect Ocean for Drought", by M. Hoerling and A. Kumar (Science, Vol. 299, p. 691-694), presents the first strong case that the droughts of 1998-2002 are indeed highly anomalous and consistent with global warming caused by emission of greenhouse gases. This is an important scientific milestone, and underlines the urgency for a dramatic reduction in CO<sub>2</sub> emissions. Here are some highlights of the study:

- **The 1998-2002 droughts were extreme and widespread:** As little as 50% of the annual average precipitation fell during this period in an extensive swath of mid-latitudes spanning the US, the Mediterranean, Southern Europe, and Southwest and Central Asia (so our drought is part of something much larger, and much more ominous).
- **Global Warming appears to be at fault:** The droughts appear to be caused by the simultaneous occurrence of two events: Unprecedented warm sea surface temperatures in the Western Pacific, and an unusually strong (but not unprecedented) La Nina event which caused cold —

-Continued on Page 3

sea surface temperatures in the Eastern Pacific. The unprecedented warming in the Western Pacific is, besides being statistically unlikely and unprecedented, highly consistent with greenhouse gas induced warming.

- **The results suggest an “increased risk” for further “severe and synchronized drying of the mid-latitudes” if these anomalous sea surface patterns persist.**

This reinforces the growing awareness that global warming is not something off in the future – its already well under way and having costly impacts.

**On the current growth of wind and solar technology production rates:** One commonly hears these days of how both wind power and solar are taking off (especially wind). It's true! **Figure 1** shows two things: The evolution of world wind power *generating capacity*, and the world annual pv *manufacturing rate* (both referred to somewhat confusingly as “production rates” on the Figure's heading). The vertical scale on the left is “gigawatts” (1 billion watts): You can interpret a gigawatt to mean one large power plant. The world would need *thousands* of gigawatts from renewable to solve its problems completely. The graph shows that we are still very far from that, but it also shows that the growth rate of wind is accelerating greatly, beginning in about 1995, and that substantial amounts are now in place (equivalent to the power consumption of about 7 million US homes).

In the first graph, **Figure 1.**, pv doesn't look so good. But on the next graph (**Fig.2**) we see that

When pv manufacturing rates are plotted on their own scale (hundreds of megawatts per year), then they too show great acceleration starting in about 1995. (**Fig.2**)

Just how great is this acceleration? Is it exponential? Most definitely yes! When this data is plotted on a log-linear plot (**Fig.3**) we find something remarkable: Since 1995, *both* “production rates” have been growing at almost exactly 30% per year! (these exponential regimes are fit with the dotted lines in **Fig.3**—note the lines are parallel). This is both an astounding rate and a remarkable coincidence, given the differences in cost and application between the two technologies. (Moreover, in the period 1985-1995, it is interesting to note that both rates were then too increasing at a lesser but also approximately equal rate.)

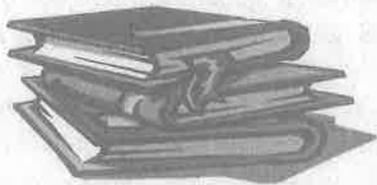
What do these exponential growth rates imply for the future? There are many variables, and other factors will enter as renewable reach truly large scales, so it is very hard to predict what will happen. But if we assume that the 31% growth rates persist, we find the following (**Fig. 3**): By 2015—only 12 years from now, wind power generating capacity would reach 1000 gigawatts—which is equivalent (when the intermittency of wind is factored in) to about 333 gigawatts of conventional generation—about one third of US generating capacity. PV, on the other hand, despite its relatively small rates now in comparison to wind, will hit the big time by 2030. --Continued on Page 4.

## Upcoming Presentation on UNM's NMSEA Archives

Over the past year, the Center for Southwest Research at the University of New Mexico has been processing the NMSEA archival collection that has been accumulating there over the past decade or so.

NMSEA is happy to announce that this process is nearing completion, and that Alicia Brown, who has been carrying out the archival work under the Juan and Virginia Chacon Fellowship, will make a presentation on the collection on Wednesday, April 9, at 10:30am, in the Willard Reading Room in Zimmerman Library. The presentation will last 20 minutes, and will occur along with several similar presentations: it is not yet decided who will speak first, but the entire event should last no more than one hour.

Brown is in the master's program in Architecture. She holds an M.A. in Women Studies from San Francisco State University and a B.A. in Studio Art from the University of California, Irvine. Researching in the area of sustainable architecture, she focuses on solar strategies. During her fellowship she has processed the records of the New Mexico Solar Energy Association: The association was formally organized in the summer of 1974 with 55 members to provide to provide for the increasing public demand for assistance in design strategies.



During her fellowship she has processed the records of the New Mexico Solar Energy Association: The association was formally organized in the summer of 1974 with 55 members to provide for the increasing public demand for assistance in solar design. NMSEA was set up as an outreach program that included demonstrations of projects, tours of solar buildings; information dissemination, publication of *SunPaper* and *Southwest Bulletin*; and energy conserving practices. NMSEA provided low cost, unbiased technical advice to owner-builders and building professionals alike. The Association gave (and still gives!) educational workshops, classes, tours, and training programs to groups of all kinds.

### FLARE Continued from Page 3—

These rates demonstrate, at very least, that it is not "pie in the sky" to suppose that renewable energy sources could replace conventional sources in the relatively near future.  
- Ben Luce, President

### SEE FIGURES ON PAGES 5-6

**Tools:** Calculations were carried out with the **Matlab** interactive mathematics platform. Fits to log-linear plots were accomplished using the Matlab "polyfit" function (which uses a least squares algorithm) applied directly to the natural logarithm of the production rate data in question. Growth rate percentages were computed as  $100 \times (e^{(c)} - 1)$ , where  $e$  is exponential constant (2.71828...) and  $c$  is the annual exponential growth parameter. Data Sources: Wind capacity data from Earth Policy Institute update of Worldwatch Institute, "Wind Energy Growth Continues," in *Vital Signs 2001* (New York: W.W. Norton & Company, 2001), with data from BTM Consult, American Wind Energy Association, European Wind Energy Association, and *Windpower Monthly*. PV data from P. Maycock, *PV News*, February 2001, and the Worldwatch Institute.

Figure 1.

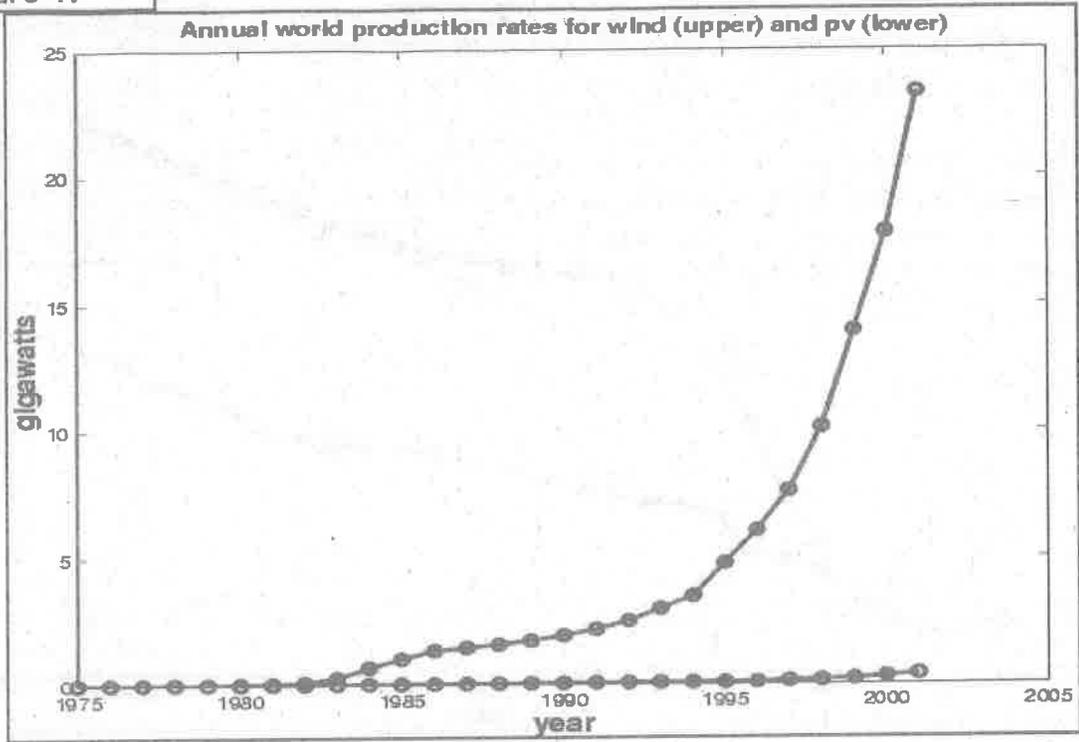


Figure 2.

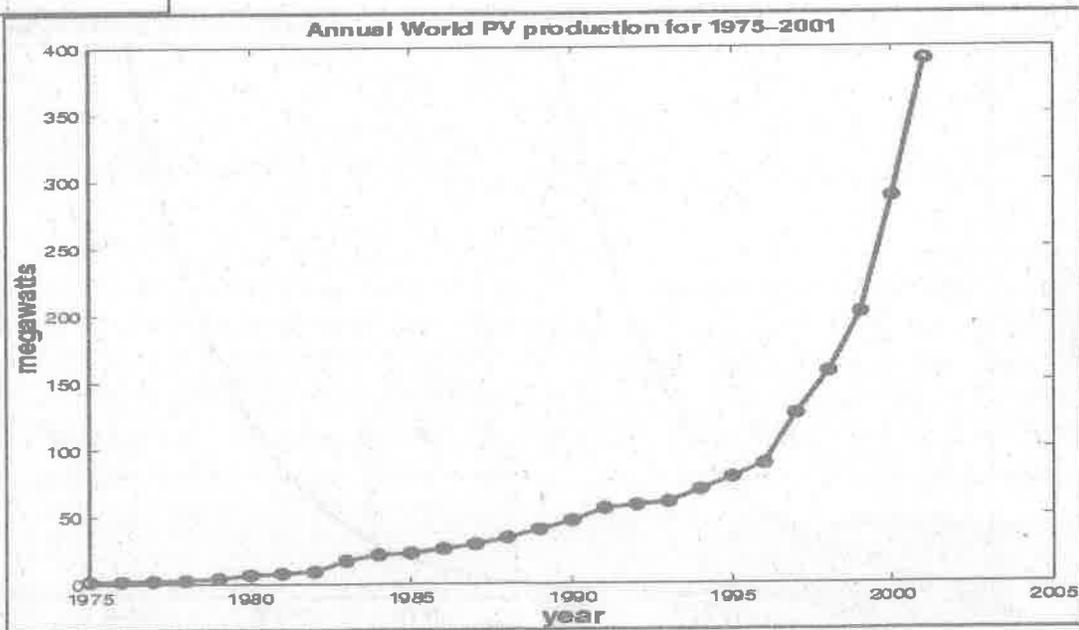


Figure 3.

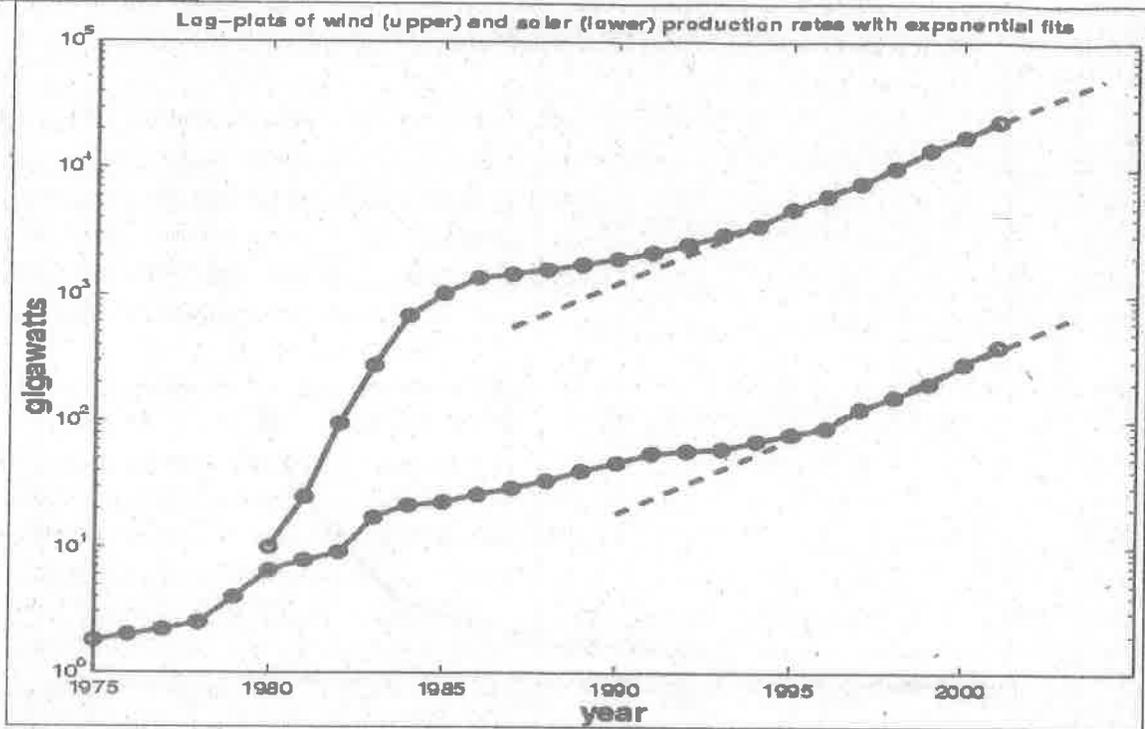
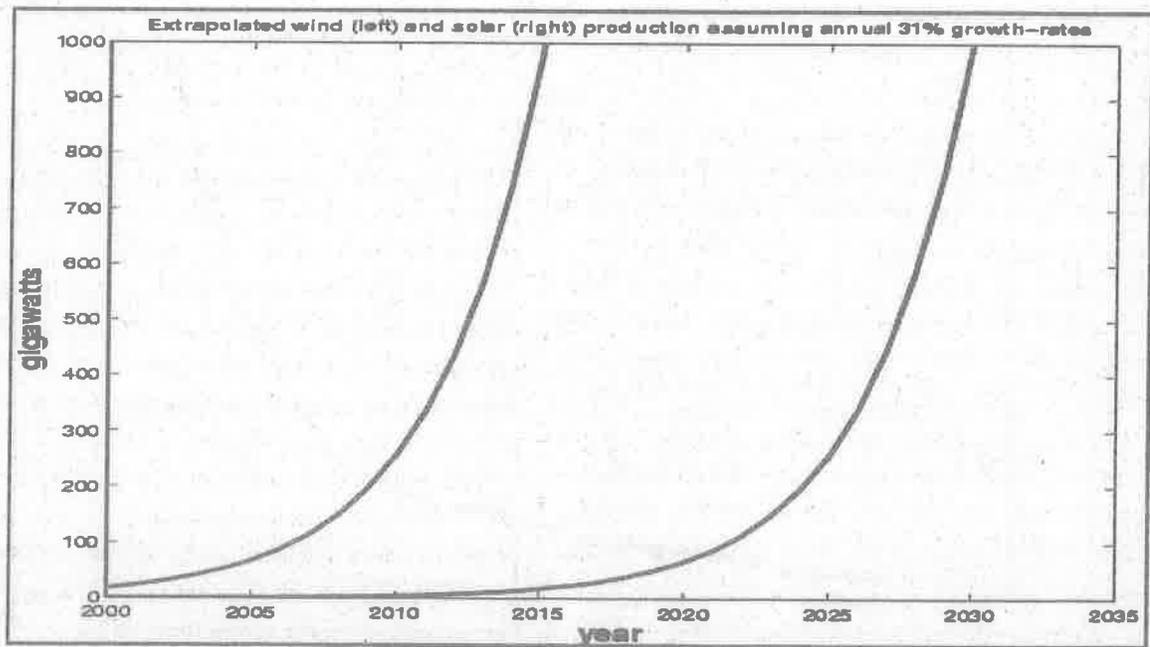


Figure 4



## UNGLAZED SOLAR COLLECTORS FOR SOLAR WATER HEATERS

Article by Steve Baer  
Zomeworks Corporation

For years I have tested solar collectors by using them to heat water for my shower. (Reference: Fig 1 Energie Solaire's selective surface collector. Caption: *Energie Solaire absorber on top of retired glazed collector; plumbed with 3/4" un-insulated hose.*)

I have a 30-gallon plastic drum set above the shower with a float valve and gravity feed to the showerhead. Lines drop outside to the collector, which thermosiphons to the tank. This year I have tried something I should have tried thirty years ago; leaving the glazing off the collector. I couldn't have been more surprised to find that during icy clear January weather (high 46° F), and without glazing, two of our 32" x 48" blow molded, polypropylene Skymat™ radiator absorbers (10 square feet each) gave me a warm shower the next morning. Not hot, as I didn't need to mix with cold. (Reference Fig. 2 Zomeworks Skymat™ radiator absorber. Caption: *Three 32" x 48" Skymats plumbed to 50 gallon low pressure tank.*)

I used these absorbers for weeks of warm showers until a defective Skymat™ ruptured. Then I switched to something even more astonishing, a single, unglazed 10 square foot collector made by a Swiss company, Energie Solaire. I had already seen this absorber, made of selectively coated stainless steel, stagnate above boiling with no glazing on a cold, partly cloudy, breezy November day. The selective surface absorbs visible light (it looks black) but doesn't radiate infrared. (White paint is a selective surface in reverse. It reflects visible light and radiates infrared.) Sure enough, I have continued to get warm (sometimes even hot) showers during these last weeks.

Energie Solaire doesn't advertise their absorbers as

After my experience these last months I am more convinced that solar water heaters can save money.

Once the glass is off the collector, the absorber can't set fires. If the house has flat composition shingles we can lay the bare absorber directly on the roof, which serves as back insulation. We don't need a collector box with sides, insulation and a back-plate. An unglazed absorber is much less expensive than a boxed collector. If the roof angles are not ideal, we can use a larger absorber.

Thirty years ago at Zomeworks we built a number of solar collectors that were spirals of black polyethylene pipe housed in glazed boxes. We pumped water through them with Bell and Gossett circulating pumps. These were freeze tolerant (I don't remember for how many winters) but not tolerant of the high temperatures that occurred in the boxes if the pump failed. The plastic bloated like a snake that's eaten a rabbit. I recall that we found high molecular weight polyethylene more rugged than regular polyethylene. I wonder today if we'd have been more successful had we removed the glazing from the collectors.

The stagnation temperature drops when glazing is removed. However, don't forget what the pool heater people know so well: unglazed collectors are more efficient than glazed, at temperatures close to ambient. While the glazing stops airflow past the collector and blocks radiation to the cold sky, it also reduces sun reaching the absorber.

Which to bet on; glazed or unglazed? Bright sun, still weather and a selective surface raises the temperature where unglazed picks up the most heat. Wind, cloudiness and the readiness of the surface to radiate lowers this temperature.

-Continued on Page 8

## Unglazed Solar Collectors Continued

Energie Solaire posts excellent information on their web site [www.energie-solaire.com](http://www.energie-solaire.com). This includes performance charts for the absorber I have on my water heater, both glazed and unglazed. In New Mexico's strong sun - 1,000 Watts/M<sup>2</sup> the charts show unglazed collectors to be more efficient all the way to a temperature 36° F above ambient. If the afternoon high temperature is 50° F the selective surfaced unglazed collector works better than the glazed as it raises 45° F water to 85° F. Only the last 30°, bringing the water temperature to 115° F are more difficult for the unglazed collector with a selective surface. In Albuquerque, over the course of a year, the unglazed selective surface is more effective than the glazed. Plain black non-selective collectors have a tougher time in winter, but still function.

The skeptic, who has no back-up water heating, is right to ignore my arguments and glaze his collector because it will out perform the unglazed collector during very cold, windy and hazy weather, the times when you really need it. Never-the-less, taking into consideration expense, having to protect glazed collectors against overheating and the shorter life of tanks full of very hot water, I believe the unglazed solar water heater to be a better choice for Albuquerque. This is true especially if you have a back-up water heater (I don't) that you can get a final boost from during cloudy weather.

I recommend buying an infra red thermometer that gives surface temperatures by merely pointing and clicking a button. Radio Shack sells a small IR thermometer for \$30. With this invaluable tool, a walk through a parking lot is a lesson in the effect of colors and orientations on stagnation temperatures. At stagnation the temperature neither increases nor decreases, for the sun supplies heat to the surface at exactly the rate the surface loses heat to its surroundings. This happens quickly with the thin sheet-metal body of a car,

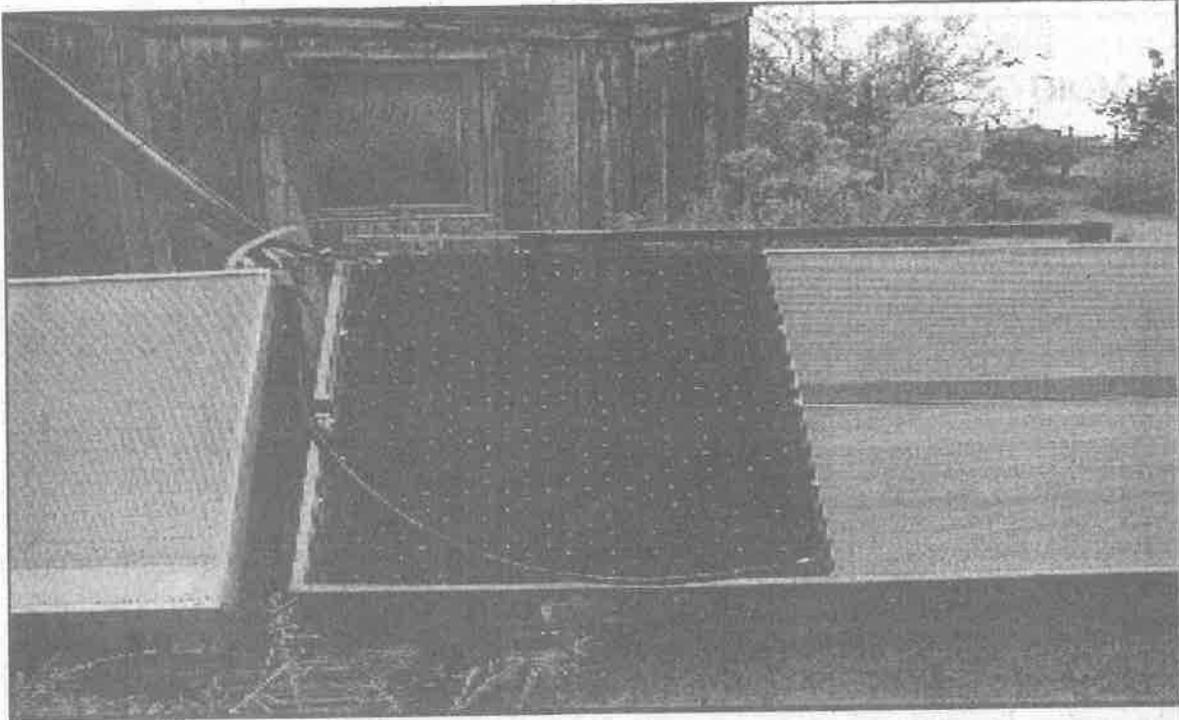
and also the fur of a cat or a dog. I have found surface temperatures of black cars and cats 90° F above ambient. Green gets almost as hot as black. The stagnation temperature is the upper limit of what one can get from a collector.

Even in bright sun, white shaded surfaces facing the cold sky will drop considerably below air temperature. On clear nights the tops of cars of all colors can drop 20° F below air temperature. How are you to find air temperature? At what can you point your thermometer? Take a business card and wave it rapidly in the air somewhere out of the sun. This gives air temperature a chance to dominate the card's temperature rather than distant sources (or sinks) of radiation. You have to catch its temperature quickly. Of course, you could also drive 40 mph and hold the thermometer out the window, pointed at a shaded door panel. You would soon get close to ambient temperature.

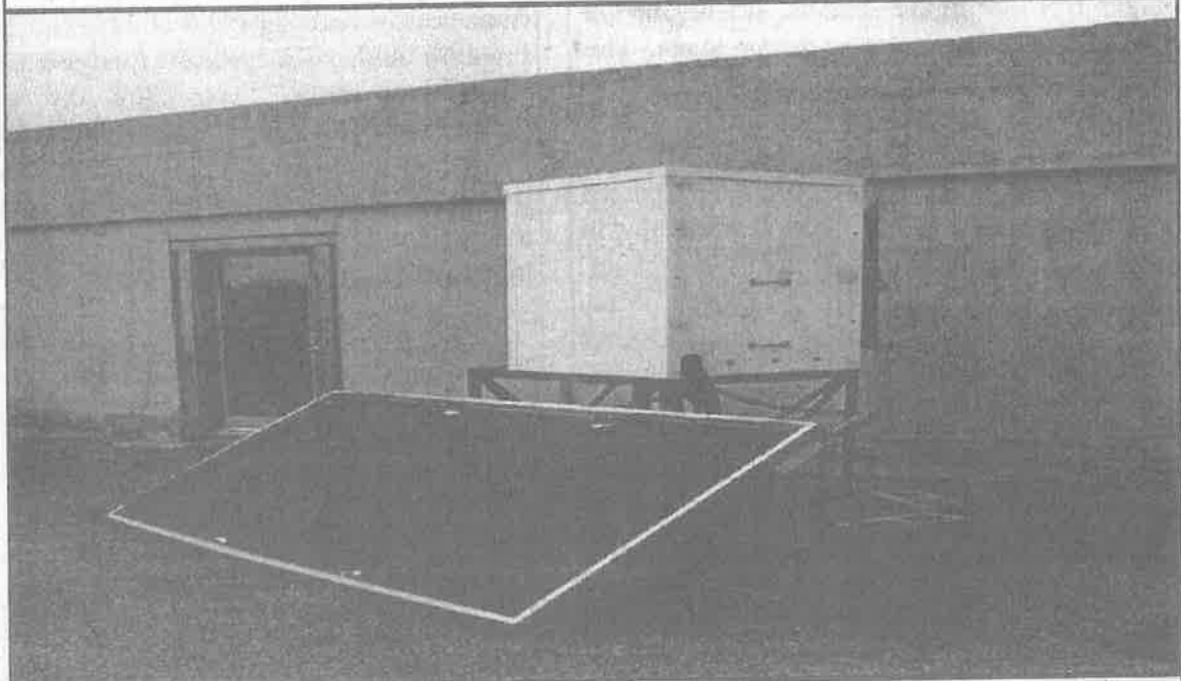
Summer nights with an IR thermometer are just as exciting for the energy prospector as winter days. Just as you were delighted to find free heat in the sun, you will find free cool in surfaces pointed at the night sky - cool that you can gather and use on hot days.

None of this is new. Decades ago solar pioneers, including Harold Hay, Ray Bliss and Harry Thomason, built heating and cooling systems that exploited this. Somehow their work was ignored. Giant budgets and brilliant minds moved in other directions. Their work was rarely cost effective, but they always had numbers to prove they were right. Let us hope that today, when each of us can arm himself with a cheap Radio Shack handgun that spits out digital temperatures as fast as you can click, we can fight back and defend low budget, cost effective projects.

- Steve Baer, Zomeworks



**Fig. 1** *Energie Solaire* absorber on top of retired blazed collector; plumbed with 3/4" un-insulated hose. Photo by Steve Baer, Zomeworks



**Fig. 2** *Three 32" x 48" Skymats* plumbed to 50 gallon low pressure tank -Photo by Steve Baer, Zomeworks

## ENERGY EFFICIENCY MORTGAGES—SOLAR ACCESS

Washington, D.C. - February 6, 2003  
[SolarAccess.com]

According to a new report, Clean Energy Financing, mortgage lenders can make 10 percent more profit per mortgage while making solar homes affordable for 46 percent of Americans by promoting Energy Improvements Mortgages.

Fannie Mae and Freddie Mac created Energy Efficiency Mortgages, which allow homebuyers to qualify for a larger mortgage to pay for energy efficiency and clean energy projects in homes. Consumers qualify for this mortgage if the projects save enough money to pay for the increased monthly mortgage costs.

Fannie Mae and Freddie Mac purchase mortgages from mortgage lenders, freeing up the lenders money to offer as other loans. This makes offering this clean energy mortgages virtually risk free for lenders.

"Freddie Mac's guidelines have recognized the value of improving energy efficiency in housing since 1983," said John E. Hemschoot, Director of Credit Policy for Freddie Mac. "Our guidelines allow lenders to finance more buyers of energy efficient homes by considering the expected utility savings in their qualifying ratios. We also permit lenders to finance the costs of Act Credits and, according to Power Shift, provide banks with a green edge over competitors.

The report concluded that 46 percent of average American homeowners could save money by purchasing a new solar powered, energy efficient homes using Energy Efficiency

are burned to generate electricity. Scientists agree that CO2 forms an unnatural blanket above the earth, which traps in heat and causes global warming.

Solar panels and energy efficiency prevent CO2, the pollution produced when coal, gasoline and natural gas. These savings are realized by installing solar panels, high quality insulation, compact fluorescent light bulbs, Energy Star appliances and other products during home construction. These investments reduce the amount of electricity that homeowners "This report is part of Power Shift's ongoing work to urge banks to invest more capital in clean energy," said Philip Radford, Executive Director of Power Shift. "Power Shift has focused much of its attention on Citibank, which Bloomberg L.P. reports is the largest financier of oil and gas infrastructure projects and coal projects worldwide. Right now banks like Citigroup are bankrolling global warming by financing fossil fuel projects. This is their chance to make clean energy affordable and available to the average American homeowner while making money.

*Submitted by Marlene Brown*



**STATEWIDE POLL ON THE  
RENEWABLE PORTFOLIO  
STANDARD RELEASED—  
Standard Under Fire From Utilities**

The New Mexico Renewable Energy Portfolio Standard (RPS), which was recently passed by the New Mexico Public Regulatory Commission and requires that utilities provide 10% renewable energy by 2010 to their customers, is under fire from both utilities and their allies in the New Mexico State Legislature. Several articles have appeared in local media with negative statements by the utilities about the RPS, and competing legislation, both for and against, is making its way through the Legislature (see the summary of Happenings at the Legislature elsewhere in this issue). Ben Luce, NMSEA president and chair of the Coalition for Clean and Affordable Energy (CCAIE - of which NMSEA is a member organization), has met with the Governor about the issue, and CCAIE has been actively working with the Legislature to support the RPS.

On Thursday, February 27, in response to this opposition, CCAIE released the results of a scientific, statewide poll that found an astounding **85% of New Mexican's support the RPS rule**. This percentage decreased to 82%, still extremely high, when subjects were exposed to strongly worded negative statements about the RPS, such as that it might increase bills substantially, lead to a loss of jobs in conventional energy industries, etc. The Poll was funded by the National Resources Defense Council (NRDC), and conducted by GQR Research, the same firm that conducts polls for Bill Richardson, Bill Clinton, and many other prominent politicians. ***This is the largest and most comprehensive poll on interest in renewable energy in New Mexico***

***conducted to date***. Results of the poll, which also covered the use of dry-cooling technology for power plants and global warming, can be found here: <http://www.sric.org/NRDCNM022503m2.pdf>. A representative of GQR Inc., Mike Bocian, said the very high percentage of support found by the poll was “unheard of on environmental issues” in general.

**HAPPENINGS AT THE 2003  
STATE LEGISLATURE:**

Presently there are many renewable energy bills making their way through: A 15% solar tax credit - applicable to both pv and active thermal systems - (Dede Feldman - SB 348); A systems benefit fund that would fund about \$6 million of renewable energy demonstration projects per year (Cisco McSorley - SB 865); A renewable energy and fuel cell demonstration bill (Miguel Garcia - HB 172); An increase of the net-metering threshold to 100 kilowatts (Gail Beam - HJM 21); Extension of the corporate renewable energy tax credit to biomass (Anna Crook- HB 146 & Carlos Cisneros - SB 813); Expansion of a previously passed gross receipts exception for wind to be used with more than just projects funded by industrial revenue bonds (Brian Moore - HB 548); A bill to repeal New Mexico's 1998 electricity deregulation plan (Michael Sanchez - SB 718); Several bills related to the Renewable Portfolio Standard recently passed by the PRC (Michael Sanchez - SJM-51 & Ben Lujan - HJM 97, which both recommend suspension of the RPS, and Richard Romero - SB-836 & SJM 79 - which both recommend supporting the RPS). The Legislature's Website is located at <http://legis.state.nm.us>. More can also be found on the Coalition for Clean Affordable Energy: [www.CFCAE.org](http://www.CFCAE.org).

*-Ben Luce, President*



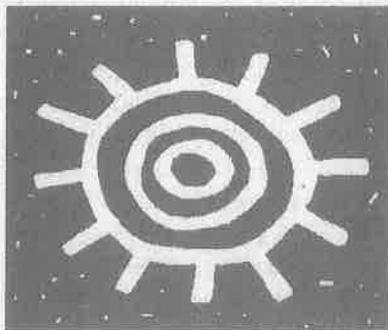
**GREENBUILT TOUR SCHEDULED  
FOR APRIL 26-27, 2003**

Come tour innovative examples of sustainable architecture at the fourth annual GreenBuilt Tour. The tour is on Saturday and Sunday April 26th and 27th, from 10 am - 4:00 pm. Tickets are \$5 and may be purchased at local First State Bank branches, both LaMontanita Coop locations, or on our website: [www.greenalliancencm.org](http://www.greenalliancencm.org)

This year the tour will showcase twenty-two projects along with GreenCentral, Albuquerque's first trade show focusing on ecologically sound principals and energy efficiency in building and living. Come tour the sites, talk with building professionals, and learn about great building techniques practiced right in your own backyard! For more information contact:

HEATHER WEIR  
505.242-6484

[heather@greenallianceNM.org](mailto:heather@greenallianceNM.org)



**Alternative-Fueled Vehicle  
Tour Scheduled May 1-14,  
2003**

A cross-country caravan and media tour demonstrating the latest advances in alternative-fueled vehicles will take place from May 1-14, 2003. Additional information may be obtained from the IOE, Box 500, Ridgway, CO 81432 or at [www.economics.org](http://www.economics.org) (970) 626-3820. The tour map is on their website.

The Institute of Ecolonomics is revving up its engines for the Drive to Survive, May 1-14, 2003. A cross-country journey will start in Los Angeles with a convoy of hybrid and alternative-fueled vehicles and roll across the finish line in Washington DC. On an 11-city media and publicity tour they will promote clean-burning, renewable energies, emphasize a decrease in our dependence on fossil fuel and "Drive Hydrogen Home."

When they arrive on Capitol Hill, they will deliver a petition with thousands of signatures to President Bush and the US Congress illustrating commitment to help change for the better the future of this country.

From their webpage: "For our environment and for our national security, it is imperative we change the energy that supports our economy to one that is clean, inexhaustible, and more economically feasible, in other words, hydrogen! To begin to achieve this goal we will start by spreading the word in neighborhoods all across the na- tion."



## A Tremendous 5-Year Run

The past five years for NMSEA have been energizing and electrifying. Beginning in 1998 with our sponsorship of the American Solar Energy Society National Convention in June, NMSEA volunteers have raised the energy level of the organization to parallel its early days in the 1970's. After Solar '98 NMSEA began its new push into school and community education under the leadership of Karlis Viceps. The Sunchaser program was born and the trailer and Suburban have logged many, many miles.

Rose Kern helped raise the organization to another level through her excellent leadership. Her dedication of time, treasure, and talent created three Solar Fiestas that really put NMSEA's message out into the community. She tapped just the right volunteers to make them successful and built community connections bringing us financial support to allow us to purchase two vehicles and another SunDog educational trailer to expand our school outreach program.

Under the leadership of Ben Luce NMSEA has put a professional polish on our educational mission and has made a huge impact on State government and policies. Through his work with the Coalition for Clean, Affordable Energy, NMSEA is becoming one of the "go to" organizations when legislators need professional information about renewable energy and sustainable living. Finally, through the creation of the NMSEA website and the establishment of our office, our efforts are taking on a "national outreach" flavor. We get calls from all over the United States.

NMSEA could not exist without its generous and hard-working volunteers. We have a core group who work very hard, but every one of our members has something to offer the organization. Please let us know how you might be able to help through **your volunteer efforts.**

Look for notices in the upcoming SunPapers for jobs that you might be able to help do. *"Many hands make light work.."*

## \$\$ FINANCIAL REALITIES \$\$

The financial realities of volunteer service organizations like NMSEA are that our programs exist primarily as a result of the generosity of others. NMSEA has been fortunate in the past few years to receive several grants to fund the expansion of our educational and outreach programs. Individuals, foundations, businesses, and a couple of State agencies have made all our work possible.

Unfortunately, with the drop in the economy and the hit that investment portfolios have taken recently many grantors have reduced or eliminated their funding efforts this year. NMSEA volunteers like Teri and Paul Neville and others are actively soliciting donations and writing grants, but it has not been easy. We have received approximately \$20,000 in donations for 2003, but we need twice that much to continue our school and community programs at their current levels. (These do not include the Solar Fiesta.)

Perhaps you know someone who would like to contribute to our programs, or **perhaps you would like to make a personal donation to help NMSEA** become more self-supporting. Several members make regular cash donations, and one member recently donated some shares of stock. Members of the Board can work with you if you have other ways you might like to financially support the organization. Again, our goal in this area is to become more self-supporting.

**Thank you in advance for your generosity.**

## Solar Sites in New Mexico

Arrange your own New Mexico Solar Tour!  
Check out Web Page [NMSEA.org](http://NMSEA.org).

Here are some of the sites that one can see and learn about, organized by area:

### Santa Fe:

- [Amy Bunting Home](#)
- [Balcomb Home](#)
- [Genoveva Chavez Community Center](#)
- [Grid Tied \(Net-Metered\) Photovoltaic Systems](#)

### Albuquerque:

- [New Mexico's largest grid tied PV system \(10kw\)](#)
- [Rio Grande Botanical Garden Conservatory](#)
- [Virtual Tour \(based on actual "GreenBuilt" tour in 2001\) by the Green Alliance](#)

### Taos:

- [KTAOS Solar Powered Radio Station](#) (This is one you *listen to* by simply tuning to 101.9 FM in from Pojoaque and north).
- Visit an "Earthship": [Solar Survival](#): Call Solar Survival and ask about visiting hours/location.

### Farmington

- [San Juan College PV Educational Trailer](#)

### Alamogordo:

- [White Sands National Monument](#) Features a Visitor Display with a visible 1080 watt PV system and 800 watt inverter (At the Center of the Park). More info in supplied at the Park on the System.

## Some Environmental Benefits of

### Renewable Energy

•**No mining or drilling for the fuel source - the energy is provided from the sky, not the ground (with the exception of geothermal)!**

Keep in mind that we must still obtain materials for manufacturing the *collection devices* for renewable energy, and this may include mining. But these materials are much less than the amount of fossil fuel we extract. For example, photovoltaic solar cells are very thin, so the volume of material relative to the energy they produce is very small. Related to this is the fact that they pay back the energy used to manufacture them in 2 to 3 years in sunny climates. Moreover, they're recyclable and therefore can be used indefinitely!

•**No paying for the fuel source - The energy is free!** All that one must pay for is the initial construction and maintenance of the collection devices.

•**No net emissions from burning a fuel - There are either no emissions associated with fuel at all (solar, wind, hydropower), or the emissions from burning fuel are compensated by photosynthesis initially (biomass, landfill gas), so that the emissions are closed-cycle (at least to a large degree).** Thus we avoid many of the environmental problems associated with nonrenewable energy (Keep in mind that there may be emissions, or other pollution associated with manufacturing the collection devices. Some of these emissions will be avoided in the future if new collection devices are manufactured using renewable energy in the first place. Careful attention will always be necessary, however, to minimize the impacts of least several times as many jobs than traditional energy sources (some estimates suggest even 10 times as many). These jobs would include both manufacturing jobs and the maintenance of collection and energy storage devices.

•**Renewable energy is flexible!** Because renewable energy generation can be de-centralized - that is, many small collection devices can be widely distributed instead of having only a few large centralized power plants, the need for transmission lines can be reduced, and the resulting system will be more robust with respect to civil disturbances, natural disasters, etc.