



Thinking Like PNM

By Gary Vaughn, NMSEA Vice-President

It's not easy to think like PNM, but it IS possible – and even useful, if you want to try to understand some of their recent public statements and proposals regarding renewable energy, the environment, and investing.

PNM likes to point out that it has long supported renewable energy in general, and wind and solar PV in particular. For example, in the previous SunPaper, PNM's Roger Larsen stated that "... 10 years ago. That's when PNM brought online the third largest wind farm in the world near House, NM, before there was that thing called the Renewable Portfolio Standard [RPS]." PNM gets lots of PR mileage out of touting its "investments" in wind and solar energy. But when PNM says "brought online" or "investment" they tend to use very different definitions than you or I do.

For example, how many wind generators do you think PNM owns? None. The big New Mexico Wind Center near House that "PNM brought on-line" is owned lock, stock and barrel by Florida Power and Light. FPL invested the money, and they assumed all the risks, and they operate and maintain the NM Wind Center. PNM signed a long-term fixed-price contract to buy the power generated there. The cost of that wind power includes a nice profit for FPL. The NM Public Regulation Commission (PRC) requires PNM to pass the cost of that power directly to its New Mexico customers without a markup, so we're really sending our money directly to FPL. New Mexico wind is generating profits for a Florida utility that had the confidence to actually invest in wind power here. Other companies are also actually investing in NM wind – but not PNM. So PNM's Sky Blue program gives us the opportunity to pay PNM extra for what?

As for PNM being way ahead of the RPS, the NM Wind Center came online October 1, 2003, when there was already an RPS in effect, requiring PNM to supply 5% of its power from renewables by 2006. So, PNM was

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Solar Fiesta Success!

By Rose Marie Kern, Solar Fiesta Manager

This year's Fiesta boasted an attendance of 2,087 people, 46 workshops and panels, and 71 exhibitors. See highlight photos on pages 7 and 8. It was a success both as a fundraising event and an education event. Money from the Fiesta will be used to finance future educational events and the NMSEA office.

In addition to teaching homeowners about the advantages of renewable energy and sustainable living, we brought in professors and engineers from UNM and Sandia Labs to discuss cutting-edge technologies being researched in New Mexico. And we introduced the new Dean of Engineering at the University of New Mexico, Dr. Roman, to the Albuquerque community. The panel discussion on the Future of Rooftop Solar in New

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Preference is given to articles on solar energy topics (PV, passive, technology, performance histories, incentives, cost benefits, etc.), but we will also consider other renewable energy subjects as space allows.

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The Revolution is Underway!

“Revolution from the Heart of Nature” is the byline from the Bioneers website. It was invigorating to be involved with the Bioneers again, this time in “Burque.” The Burque Bioneers conference was held at the National Hispanic Cultural Center in October. After the Friday morning blessing, a screening by Amory Lovins on his new book *Reinventing Fire: Blueprint to the New Energy Era*. He writes that “Business can become more competitive, profitable, and resilient by leading the transformation from fossil fuel to efficiency and renewables. This transition will build a stronger economy, a more secure nation, and a healthier environment.” The largest gain could be made in the transportation sector, where Americans burn 13 million barrels of oil a day, costing drivers \$2 billion directly and \$4 billion in additional hidden costs. By changing over to electric vehicles (EV), non-cropland biofuels, renewable-produced hydrogen, and environmentally-conscious natural gas, \$3.8 trillion could be saved in transportation with \$0.7 trillion net possible savings for buildings and \$0.5 trillion net savings for industry. That would create \$5 trillion in savings and a 158% increase in our economy with zero energy produced from coal, oil, or nuclear by 2050. Read the book for a detailed plan that could revolutionize America.

There were screenings from the recent Bioneers National Conference in San Rafael, California. Then local workshops on multiple interest tracks started at 11:15, and I presented on a panel on alternative forms of transportation. The lunch breaks were great for networking. I also staffed the table that NMSEA had there throughout the two days.

The second day opened with a conversation with Kenny Ausubel and Nina Simons in person in the large theater. As some of you may know, Kenny and Nina originated the first draft of the Bioneers in 1990 in Santa Fe, where they now have an office at the Rail Yard/Farmers Market. After their opening remarks, a lively round of questions were taken from the audience. One of the bits of information Kenny put forward was that just recently investments in renewables bypassed investments in fossil fuels, indicating we could be on a path of possibly winning the energy revolution. Local workshops continued until 4 pm.

There were multiple social events held each evening, as well. It was a nice event, well organized, lots of volunteers, apparently well sponsored, as it was not a cheap event to put on. Tickets were only \$15 per day.

Attendance seemed on the low side and was probably mostly “the choir.”

“National Plug-in Day” for EVs and hybrids was on Oct. 16 with many parades and charging stations being christened across the America, including one near Los Alamos at the White Rock Metzger’s hardware store. Many local EV’rs showed up and the mayor did a ribbon cutting. Another revolution beginning?

Occupy Wall Street (the epicenter of greed) has spread across America, the beginning of a revolution against large corporate greed, wealth disparities, and the wrong path to a sustainable future. This could be America’s second revolution, which the founders knew would be needed. This revolution can and should be non-violent. Unfortunately, the peaceful revolution “will not be televised.” But we don’t need big media; we have all the facets of the internet, cell phones, and progressive organizations.

Concerning our own continuing show-and-tell revolution for a sustainable future, we are thankful to Rose Kern and all the other dedicated NMSEA folk for stepping up to put on another successful Solar Fiesta.

Sincerely,

Monte Ogdahl

NMSEA President



Albuquerque Chapter Meetings

By Athena Christodoulou

Don’t miss out on the final meetings for 2011. November will be at our favorite spot and time at REI, but in December, we will be joining the Green Chamber of Commerce early in the month for an evening guaranteed to get you into the “spirit” of the holidays.

- **November**

Location – REI, 1550 Mercantile Ave NE, 87107

Date, time – Tuesday, Nov 22, 6 – 8 pm

More reasons to be there - door prizes and finger foods.

- **December**, www.greendrinks.org

Location – Valencia Room at Hotel Andaluz (upstairs), 125 2nd Street NW

Date, time – Wednesday, Dec 7, 5:30-7:30 pm

- **Topics** – “Greening” the holidays, but each with a different speaker and focus.



NMSEA Chapter Leaders and Contact Information

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(Thinking Like PNM, Continued from page 1)

certainly not ahead of that curve. An RPS for NM utilities had been actively debated in 1998, and PNM was subsequently involved in RPS negotiations. There was a lot of support for the RPS, so there was little doubt that a standard would soon be approved, although those negotiations were tangled up in an ambitious utility “restructuring” plan, which was soon rescinded. Finally, in September 2001, the PRC approved an RPS requirement. By May of 2002, FPL and PNM were “negotiating” their NM Wind Center agreement. A re-worked RPS was formally approved in December of 2002. PNM deserves credit for paying close attention to which way the wind was blowing, and for agreeing to purchase wind power from FPL sooner rather than later. But the fact is that PNM knew perfectly well long before they signed on the dotted line that they would be required to add renewables.

This year PNM is on schedule to add 22 MW of PV to its system. This is PNM-owned PV, so that certainly qualifies as an “investment,” doesn’t it? Yes - and no. It’s true that PNM owns these systems, but it’s also true that the PRC has guaranteed that PNM will be able to recover every penny of its PV system costs, plus a tidy profit, via rate riders. It’s a zero-risk deal for them, which seems to be at least as important in the PNM way of thinking as just meeting its RPS mandate. And we might note that PNM decided not to buy PV panels manufactured by Schott in New Mexico and not to do business with New Mexico prime contractors. They could have reserved at least a portion of their big PV system purchase for NM-based solar businesses, but they didn’t. PNM’s customers will end up paying for these PV systems, but most of that money will be sent out of state.

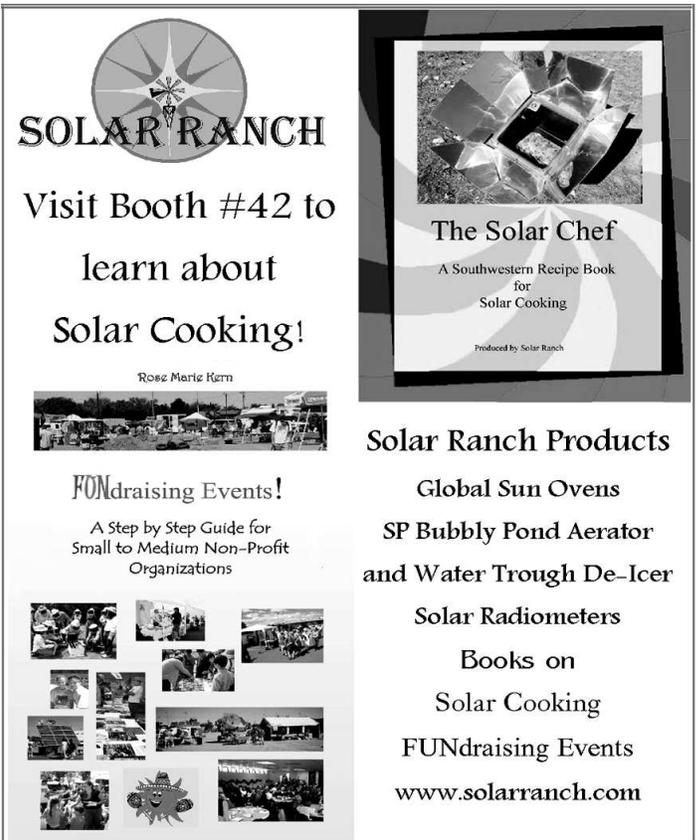
Yes, as Mr. Larsen said, “We [PNM] submitted a plan in 2009 for more large-scale solar and wind, but it met fierce opposition.” That plan, as I recall, proposed that PNM would own and be responsible for the installation of ALL new grid-tied PV systems – thank you very much. Gee, that wasn’t very popular. In 2010, PNM fought hard to prevent third-party financing/ownership of larger-sized (> 10 kW) grid-tied PV systems. They lost that battle, and as a result, third party investment in PV in NM has soared, and NM solar businesses have benefited. As part of the 2010 rate case, PNM proposed an 8 cent per kilowatt-hour surcharge for all power delivered to the PNM grid by any new grid-tied PV system. And this year, PNM is actively pushing for a reduction in RPS requirements, as well as a lower rate cap on RE related costs. PNM is strongly objecting to allowing the rate cost cap for renewable energy to rise to 2%, which is still a low cost to pay for more renewables. (Keep in mind that in 2010 PNM had proposed a 22% increase in electricity rates, including additional rate riders. In case you’re interested, PNM spent about \$2.7

million on that rate case – money that PNM can normally recover from its customers thru additional rate riders.)

Last year PNM asked for PRC approval to add almost 45 MW of PNM-owned PV to their system. The PRC only approved 22 MW. What was that about? Turns out that because PNM-owned PV is still expensive, and because the rate cost cap on RE is so low, PNM would have been able to back away from additional RE “investments,” as well as cut back on Renewable Energy Credit payments for new PV systems. The PRC wisely reduced the PNM PV system purchase to 22 MW, so that the funds would be available to support a much larger amount of non-PNM-owned RE investments. PNM is using the rate cap “limit” to avoid additional “commitments” to RE. But the rate cap doesn’t even prevent PNM from investing in RE; the utility is simply not **required** to obtain more RE if that would necessitate more than a 2% customer rate increase. You would think that PNM would be thrilled that home-owners and third party investors are paying for all these wind and PV systems and feeding electricity into the PNM grid, but you aren’t thinking like PNM.

I was recently informed that a high school class touring a PNM plant was told that “for every 1 MW of PV, PNM has to add 1 MW of natural gas backup.” Natural gas-fired electricity is more expensive than coal-fired electricity. So, now we understand why PNM has

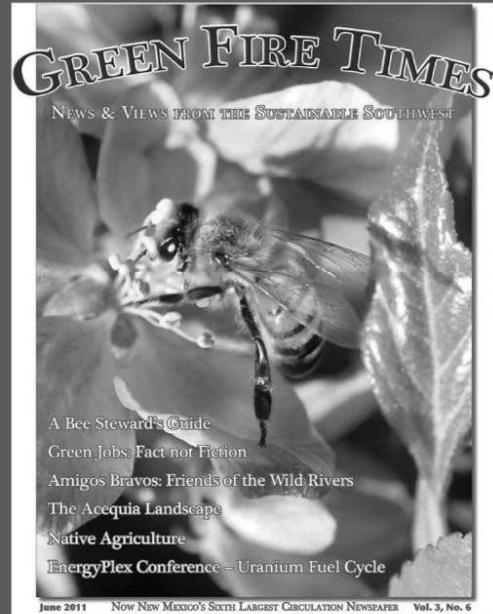
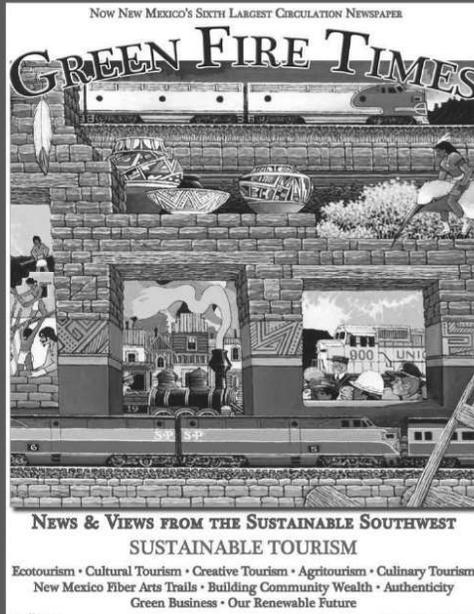
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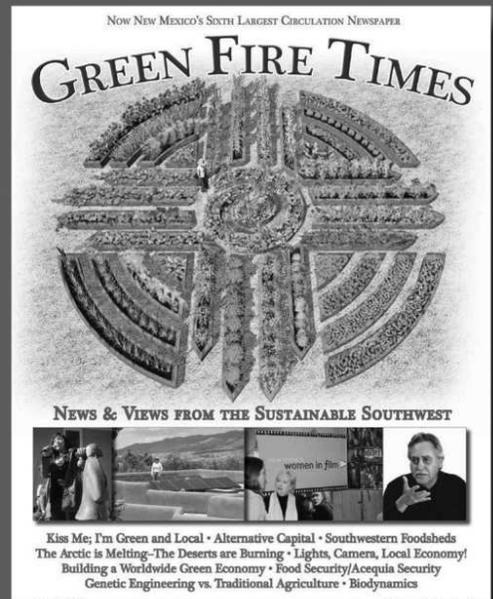
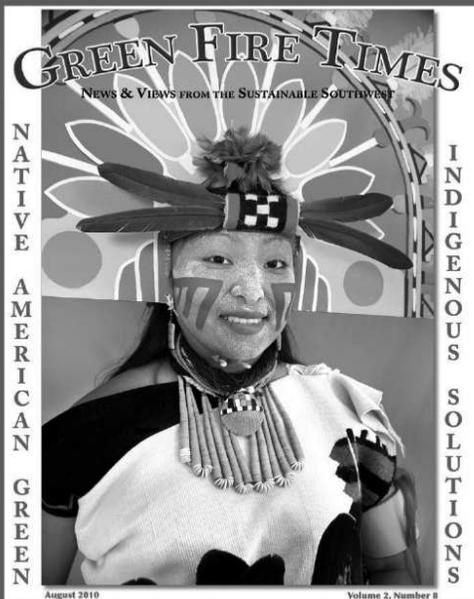
The graphic is a promotional flyer for Solar Ranch. At the top left is a circular logo with a compass rose and the text "SOLAR RANCH". Below the logo, the text reads "Visit Booth #42 to learn about Solar Cooking!". Underneath this is a small photo of a solar cooking event and the name "Rose Marie Kern". The central text says "FUNdraising Events! A Step by Step Guide for Small to Medium Non-Profit Organizations". To the right is a book cover titled "The Solar Chef: A Southwestern Recipe Book for Solar Cooking", produced by Solar Ranch. Below the book cover, the text lists "Solar Ranch Products" including "Global Sun Ovens", "SP Bubbly Pond Aerator and Water Trough De-Icer", "Solar Radiometers", and "Books on Solar Cooking". At the bottom right, it says "FUNdraising Events" and "www.solarranch.com". The bottom of the graphic features a collage of small photos showing various solar cooking activities and people.

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Earth USA Conference

By David Griggs

The NMSEA Big Solar Oven made an aromatic appearance at the Earth USA 2011 conference in Albuquerque recently. Chefs Gary Vaughn and Jim Barrera served up a mouth-watering menu of green chile, corn on the cob, tortillas, beans, and – of course – chocolate chip cookies. The Earth USA 2011 conference was held at the National Hispanic Cultural Center. As usual, a dynamic cast provided a truly international look at earthen architecture and construction. Speakers came from Mexico, Chile, Syria, China, Saudi Arabia, Bulgaria, Germany and Norway, in addition to the USA.

A strong academic presence was provided by speakers from the University of Oklahoma, University of New Mexico, Texas Tech, Northern New Mexico College, Beijing University, Universidad Autónoma de Tamaulipas, and Xi'an University. Historical perspectives were offered on earthen architecture in New Mexico (Bernalillo, Questa, and Ohkay Owingeh), Norway, Chile, Bulgaria, Yemen, and China. Speakers discussed historic buildings and cities, including their stabilization, preservation and conservation.

Other speakers dealt with physical properties of materials and structures, including seismic, flood, and storm resistance and thermal properties. Some of the materials considered were adobe, compressed earth blocks, rammed earth, megablocks, and cob. Here is a sample of the topics: “Foundation Systems for Earthen Building” by Lisa Holliday; “The Dual Footed Foundation: An Alternative to Slab on Grade” by John J. Morony; “Moisture Management in Compressed Earth Block Walls (Beware of the Rising Damp !)” by Charles W. Graham. Dr. Hans Schroeder of Dachverband Lehm in Germany gave two valuable talks on quantification and standardization being done there and throughout the European Union. This work is being used to develop training and certification programs and to achieve recognition by building and code officials.

David Griggs is head of the Los Alamos chapter of NMSEA, the Los Alamos Sustainable Energy Network.



..... (•) / (•) Help Reduce CO2

NMSEA Board Meeting Nov. 12

The next meeting of the NMSEA Board of Directors will be on Saturday, November 12, in the conference room at the NMSEA office, 1009 Bradbury Dr. SE, Albuquerque, 87106, from 12:00 noon to 3:00pm with a potluck before at 11:30am. Members welcome. Call 505-246-0400 by November 8 if you have an item for the agenda.



All kinds of electric cars (above) graced the Solar Fiesta! Vice-President Robert Nelson and Board Member Mars DeLapp answered questions at the NMSEA booth (below).



PRC Commissioner Jason Marks (left, above) and his team spent two days answering questions by Fiesta visitors. Paradise Power Company made the 94 degree weather tolerable with their Solar Misting Canopy (below).



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To learn more please visit us online at: energy.sandia.gov.

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Solar Fiesta Photos: Helen Levin and daughter Sarah Rowe of NM Earth Adobes showed us how to build with those great indigenous blocks; Larry Stewart and his son, Leighton, shared the DJ duties to provide great music.

(Solar Fiesta Success, Continued from page 1)

Mexico that involved government, industry and utility representatives was the best-attended panel of the weekend and allowed many to participate and understand the big picture.

All participants, exhibitors, and speakers were delighted with the venue, and we wish to thank our Albuquerque Academy faculty sponsor, Karen Temple-Beamish, for making it possible. We are grateful to Jeff Morgan, Institutional Advancement Director, and Andy Watson, the Headmaster, for having the vision to align the Academy's environmental goals with ours for the week. John Christensen, Facilities Director, was extremely helpful to the grounds staff, and he furthered our goal of a green event by providing a giant tank of iced drinking water for our use. My direct liaison was Jayne Williams, who managed to stay upbeat and smiling even when things were a tad stressful. Thank you all!

I want to acknowledge the efforts of the Solar Fiesta Committee, all of them were dynamic and energetic in fulfilling their assignments. Athena Christodoulou created a masterpiece in her efforts to coordinate the workshops, speakers, and programs.

Jim Barrera and TJ Scarberry worked miracles with the grounds, signage, and tickets. They brought in Dave Patterson to help them with the onerous chores of set-up and take-down; a big thanks to Dave. Amanda Scarberry took control of the NMSEA tent and Solar Fiesta T-shirts. Ron Herman was patience itself with all the last minute updates to the Solar Fiesta Guide.

Mary McArthur helped out with setting up the Indoor Exhibits, and Polly Ledman acted as both the volunteer coordinator and as my personal assistant. With my

residence changing to Arizona, this could not have gone nearly as smoothly without Polly. She reported 54 volunteers, plus NMSEA board members and others who just showed up to help.

A last minute addition to the team was Sam Swari, who stepped in and took over the Fiesta website, which helped attendees find the information they needed.

Friday night we ordered pizza for the volunteers helping to set up the grounds. A last minute emergency regarding the drink order was abated when one of the volunteers, Ron Webb, ran to the store for drinks and ice – and did not ask to be reimbursed.

Commercials and interviews ran on KABG and KHFM the week prior to the event. Both stations broadcast on site, as did the children's hour for KUNM. We had ads in the *Green Fire Times* and the *Santa Fe New Mexican* and an article in *Countryside Magazine*. In addition to the PNM billboard, we had a flyer made and distributed by email to all members, many of whom then posted it at their jobs and in stores and passed it along to friends. It was also on Solar E-lets, and the NMSEA FaceBook page.

We had sponsorships this year from Consolidated Solar, PNM, Positive Energy, Sandia National Labs, Lexus of Albuquerque, the City of Albuquerque, Sacred Power, Schott Solar, Solar Ranch, Array Technologies, URS, and Green Fire Times.

To celebrate the many hours of time and efforts contributed by our volunteers we held a "thank you" dinner two weeks later – after we'd slept a bit and the sunburns faded.

The picture below shows those folks who made it to the "thank you" dinner, but for those of you who could not make it, thank you mightily, too!!! ☀



2011 Solar Fiesta Volunteers.

(Thinking Like PNM, Continued from page 4)

convinced itself that grid-tied PV systems actually cost them 8 cents/KWh. See, you just have to learn to think like PNM. Scary, but true.

OK, how about the new “PNM Prosperity Energy Storage Project” at Mesa del Sol? That’s a PNM investment in cutting edge solar technology, isn’t it? Yes, and I’m all for it. There are multiple partners heavily involved in this project, including Sandia National Labs. But once again, the PRC has guaranteed that PNM’s “investment” costs, plus a tidy profit, will be covered by customer rate riders - **and** PNM is being handsomely rewarded with federal stimulus fund “incentives.” I know lots of NM businesses that would love to get in on an “investment” deal like that. At the same time, PNM executives have recently been emphasizing that utility-scale wind and PV battery back-up will never be able to replace coal-fired power plants.

So much for some (but not all) of what PNM has been doing lately. How about suggesting some constructive things that PNM **could** do? Well, consider the fact that nuclear and coal-powered generating plants are “on” all the time, whether that power is being used or not. That’s an expensive wasted opportunity for utilities like PNM. The fact is that much of the electricity that PNM generates all night long is for naught – it still contributes lots of pollution, no one uses it, PNM earns nothing for it, and all PNM customers end up paying higher rates as a result.

In general, many of the electrical coops are actually more innovative and progressive than regulated utilities like PNM. Many coops around the country have already installed smart meters that allow time-of-use billing. They can charge more for peak-time usage, and less for low demand-time usage. Time-of-use billing not only encourages energy conservation and power demand leveling, it also gives low income customers a chance to save money by simply “re-scheduling” their electrical appliance use.

Many old and poorly-insulated lower rent apartments in New Mexico use all-electric heat. During last January’s PRC rate case hearings, lots of fixed and low-income folks complained bitterly about their electric heating bills. PNM just shrugged. But one coop is offering its customers an electric heating unit with a lot of thermal mass built in – kind of an electric “Trombe wall.” And they handle the ordering and installation, plus they allow their customers to pay for the unit in monthly installments via their electric bill. In combo with the time-of-use rates, low income customers can “bank” heat during the night, when rates are low, and avoid using so much electricity to stay warm during the day when rates are high. That’s what I call public service.

Like most big utilities, PNM’s strength is in long-term financing, as well as in its sophisticated billing system. PNM could finance low-risk all-electric commercial building energy conservation upgrades, if it wanted to. PNM could finance low-risk all-electric apartment building energy conservation upgrades, if it wanted to. PNM could finance Energy Star appliance purchases, if it wanted to. PNM could finance customer-owned PV systems, if it wanted to. Other investors and companies are starting to get excited about financing energy-saving upgrades. Why not PNM?

I’m dreaming, I know ... but PNM could, if it wanted to, finance PNM customer-owned electric vehicle purchases, along with the pricey home charger installations required, and add the monthly payments to the customer’s electricity bill. Those chargers could be programmed to preferentially recharge those electric vehicles at night, when PNM electricity rates would be lower. The result? “Win-win-win” for PNM’s customers, for the environment, and for PNM’s bottom line. Even relatively low-income New Mexicans could afford to buy an electric vehicle, eliminate their gasoline bills, reduce our dependence on foreign oil, and improve air quality. Now we’re really talking “public service”! And just think of the PR bonanza for PNM! Even NMSEA members would cheer!



Rails Fundraising

By JW Madison, Rails Inc.

We at Rails Inc are still working on the issues of saving and expanding the Rail Runner, taking over the BNSF tracks in our state, and rebuilding our national rail network to the stature of about 60 years ago. But we’d like to start building public desire for rail transit here in the Albuquerque area. Nobody else is. Since most of Albuquerque has been built since the advent of auto-dominated transportation, designing cost-effective rail transit here is kind of tricky. But it’s necessary, and cities all over the North American West are doing it just fine and enjoying the huge benefits rail transit affords. For various reasons, most of our local public does not know what it’s missing. Busses are important transit components, but not by themselves; trains should be included.

So we’re cranking up a media campaign. We plan to start this with My Network TV (Channels 19 and 50), which offers a lot of time and coverage for relatively little money. The deal is this: 50 spots of 30 seconds each per week for a month for \$1,284.00. We would like to repeat this sequence with different spots and expand to radio as money permits. We need your help raising this money. You can go through Pay Pal or send a check (or money order) to Rails Inc, PO Box 4268, Albuquerque, NM 87196. Thank you.



Energy Investments

Closing share prices compared to the DOW index:

<u>10/26/11</u>	<u>08/11/11</u>	<u>10/27/10</u>
First Solar (FSLR):		
\$46.11	\$103	\$150
Market Vectors, Solar Energy ETF (KWT):		
\$4.79	\$8.09	\$12.86

Dow Jones Industrial Average (\$INDU)
11,869 11,143 11,126

Crude Oil/barrel (NYMEX Dec futures)
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Natural Gas/mmBtu
\$ 3.59 \$4.11 \$ 3.35

Gasoline/gal
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NG and gasoline are national averages.

Selected prices provided for relative information, only; NMSEA does not recommend specific investments. All investments involve risk; invest cautiously.



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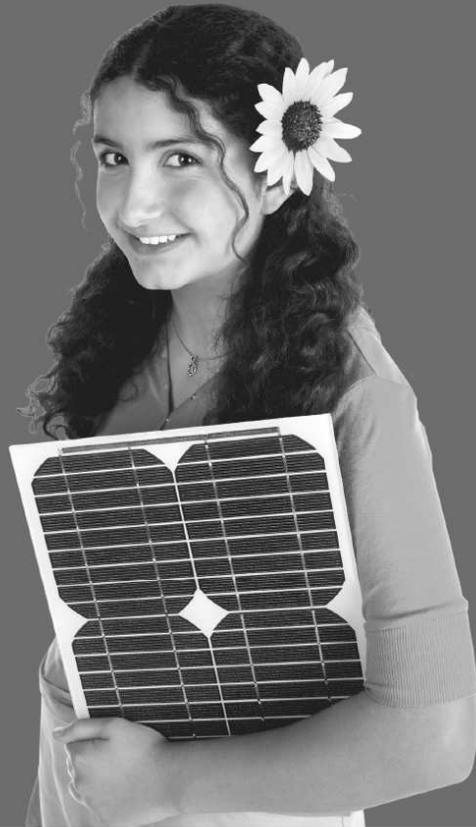
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The power to make life better. Together.



Passing It Forward

by Athena Christodoulou

At a Solar Fiesta session on R&D at The University of New Mexico, I joyfully presented a check for \$400 from NMSEA to a representative of the UNM chapter of Engineers Without Borders (EWB), Adam Roukema. See photo below. This money will go toward their Ramah project to install a solar air heater and insulate their community hogan. A warm Hogan will allow their weavers to ply their trade for a few extra months during the year. "The Solar Fiesta was a tremendous success for us!" declared Adam. Our donation is in keeping with the NMSEA mission statement - "to promote clean, renewable energy and sustainability in New Mexico through education, empowerment, collaboration, and advocacy."

This meeting was also the first opportunity for the new Dean of the UNM College of Engineering to meet and greet the Albuquerque public. Pleased with his introduction to our community, he added a \$1,000 grant from the school to EWB to finish out the funding requirements for their project.

Also, EWB presented their project at the October meeting of the Albuquerque section to educate the public about solar air heaters and to bring our efforts full circle. NMSEA is not often on the giving end, and I personally thank our members who brought about such a fine collaboration with UNM students and staff and those who have been leading and attending our Albuquerque meetings. Bravo NMSEA for passing it forward! ☀

Solar Energy Is the Fastest Growing Industry In the US

Posted by Soulskill July 28

<http://hardware.slashdot.org/>

Hugh Pickens writes "According to Rhone Resch (President and CEO of the Solar Energy Industries Association), the last three years have seen the U.S. solar industry go from a start-up to a major industry that is creating well-paying jobs and growing the economy in all 50 states, employing 93,000 Americans in 2010, a number that is expected to grow between 25,000 to 50,000 this year. In the first quarter of 2011, the solar industry installed 252 megawatts of new solar electric capacity, a 66 percent growth from the same time frame in 2010. Solar energy is creating more jobs per megawatt than any other energy source, according to one study, with the capability of generating over 4 million jobs by 2030 with aggressive energy efficiency measures. There are now almost 3,000 megawatts of solar electric energy installed in the U.S., enough to power 600,000 homes. In the manufacturing sector, solar panel production jumped 31 percent. "The U.S. market is expected to more than double yet again in 2011, installing enough solar for more than 400,000 homes," writes Resch. "Last year, the industry set the ambitious yet achievable goal of installing 10 gigawatts annually by 2015 – enough to power 2 million more homes each and every year.""



Albuquerque Chapter leader Athena Christodoulou presents an NMSEA donation to EWB Project manager Adam Roukema (left) and welcomes UNM College of Engineering Dean Catalin Roman, who also presented grant funds to EWB.

Camping Off the Grid in an RV Without Polluting the Environment

By Dave Bagley

Throughout New Mexico's beautiful forests are many "unimproved campgrounds," where you can expect a campsite, picnic table, a fire pit and some kind of toilet facility at minimal cost. We call this "dry camping," and it means that recreation vehicle users need to provide their own source of electricity to keep all the little comforts of home running in the wilderness. (It's not really "dry," as most campgrounds have good supplies of water.) Many folks bring a generator and run it daily to keep their 12 volt battery charged. If you've ever camped near an RV with a generator, there are no wilderness sounds. Worse yet, gasoline generators are like lawn mowers; they have no exhaust cleaning devices and are terrible polluters. I chose a different route to meet the power needs for my travel trailer and decided to try photovoltaic panels to keep the battery charged up. After looking in the RV stores at fairly expensive "state of the art" PV systems that are installed in an RV, I found a simple, lower-cost alternative at Harbor Freight Tools. I picked a package with three 15 watt PV panels, a controller, and two fluorescent bulbs.

Along with the PV panels to charge up the battery, it's necessary to reduce the electric load wherever possible, and I found that much of my use was simply using the interior lights after dark. Each overhead incandescent light draws 18 watts, and this can really add up when you have one or two of these on for much of the evening. Fluorescent bulbs are about 4 times more efficient than incandescent, but the cost of a 12 volt fluorescent replacement fixture at the RV store isn't good value. But this year, reasonably-priced LED bulbs have hit the market, and this includes 12 volt replacement auto bulbs. A replacement LED bulb plugs right into the existing socket, and simply replaces the incandescent bulb. The LED bulb is ten times as efficient as incandescent, provides the same amount of light, but uses about 1 watt. I

replaced all the ceiling bulbs with LED bulbs for less than \$10. The new bulbs put out more light and will last for 50,000 hours. I figure they'll make it through 25 travel trailers.

After experimenting with these simple changes for a year, I felt confident that I could use my travel trailer to dry camp for an extended period, and I spent two weeks in Yellowstone and Grand Teton National Parks this summer. These parks have many dry campgrounds, which I chose to use. The three campsites I stayed at were heavily wooded, which restricted the time the PV panels were exposed to the sun, and it was critical to be able to place them on my trailer roof where they would get maximum coverage. At one campsite, I placed the PV panels on my tow vehicle with an extension cord to keep them in the sun as much as possible. I found that three to five hours of sun each day was enough to keep the trailer battery well charged. During my 2 week stay, I worried through three days of clouds, but the battery never quit, and I was able to use the lights, water pump, radio/CD, furnace, and everything else.

Most campers could easily make these few changes, save money, and save the environment. Best of all, PV panels make no noise, use no gasoline, and you don't have to change the oil every year. Enjoy your great outdoors!

Dave Bagley is retired from a career in data processing and is a member of NMSEA. He built his own solar heating panels for his house in 1978 and now has commercial hot air panels. ☀



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Keep informed of what's happening through our bi-monthly newsletter, the SunPaper! Actively support education for kids and adults and learn of workshops and classes where you can learn about photovoltaics, hot water, green building, solar rights and all the wide range of sustainable living and building practices.

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| <input type="checkbox"/> Individual and Family, 1 year | \$30 |
| <input type="checkbox"/> Business, 1 year | \$75 |
| <input type="checkbox"/> Individual Lifetime | \$250 |
| <input type="checkbox"/> Business Lifetime | \$400 |
| <input type="checkbox"/> Teacher/Student/Senior (62 & up)
w/copy of ID (circle one) | \$10 |

NMSEA Chapter Options

All NMSEA members are invited to participate in our local chapters around the state. When you register, you will be placed in the chapter nearest to you geographically, or you may contact the office to change your chapter, if you desire. (Note: members are not limited to the chapter in their area and are welcome to visit other chapter events.)

Check if you would like to be affiliated with and/or donate an additional amount to any of the following chapters or to the main office general fund:

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<input type="checkbox"/> Alamogordo Chapter	\$ _____
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<input type="checkbox"/> Las Vegas, Sustainable Las Vegas	\$ _____
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ASES Membership

NMSEA is a chapter of the American Solar Energy Society, and we encourage our members to join ASES as well. ASES members receive SOLAR TODAY magazine, Solar Action Network (SAN) alerts, the Sunbeam e-newsletter, discounts on publications, and more! Five percent of your ASES dues are dedicated to special outreach programs including ASES Legacy Schools, library gift subscriptions and the purchase of Green Tags.

For more information and for ASES business membership categories, please visit www.ases.org.

Check category if you want to renew/subscribe to ASES with your NMSEA membership. Fill in total below:

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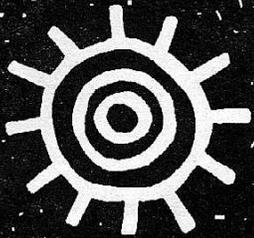
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Mission Statement

We promote clean, renewable energy and sustainability in New Mexico through education, empowerment, collaboration and advocacy.

Please consider investing your time and/or money toward solar energy education through NMSEA.

Vision Statement

We envision a thriving, bio-diverse earth, with civilization powered by clean, renewable and sustainable energy from the sun.

Coming Events

- November 12** **Board of Directors Meeting**, Saturday, NMSEA office, 1009 Bradbury Dr. SE, Albuquerque, 87106. Members welcome. Meeting is 12:00 noon to 3:00pm; potluck before at 11:30am.
- Nov. 22, Dec. 7** **Albuquerque Chapter Meetings** at REI in November, 1550 Mercantile NE, 6:00 to 8:00pm. December in the Valencia Rm at Hotel Andaluz (upstairs), 125 2nd Street NW, 5:30-7:30 pm. See p. 3 for more information.