



## Readers Respond Regarding PNM

By Ron Herman, Editor

The article titled “Thinking Like PNM” in the previous issue of the SunPaper reminded us how complex the implementation of renewable energy (RE), particularly photovoltaics (PV), by utilities has been. The author, Gary Vaughn, attended several PNM hearings and presentations and did an extensive amount of research for that article. Gary hoped to get some comments on the points he raised, but so far those have been few and brief. As an engineer, he was looking for a discussion of the basic facts and counter-points.

One member wrote that she was happy to see some positive suggestions on what more PNM could be doing and suggested a wider distribution of the article. Another member expressed appreciation for the independence that NMSEA maintains, in spite of having received substantial support from PNM and providing them an opportunity to advertise and present their side of the story, as well. A veteran member offered the perspective of a friend close to PNM who thought the article was pretty accurate. That member suggested more emphasis on passive solar as opposed to PV.

Rose Kern, a past president of NMSEA and 2011 Solar Fiesta Manager, saw the article as perhaps too harsh and critical and offered the positive side of PNM’s success in RE, writing as follows:

In this era, progress is made through positive cooperation and collaboration. In general the government and the utilities have been moving in the direction WE want them to go. Renewable energy is no longer only spoken in whispers in living rooms and seen as a noble but wishful goal. RE is a fact of our lives. For decades, NMSEA has worked with other RE organizations around the country to educate children and adults about how RE is the best way to go. As a whole

*(Continued on page 4)*

## NMSEA Board Elections

Ballots for the NMSEA Board of Directors went out to members in early December, and the election closed on December 23<sup>rd</sup>. Incumbent candidates were Jim Barrera and Gary Vaughn, who have both been outstanding leaders over the past few years. Athena Christodoulou has contributed to Solar Fiesta organization and leads the Albuquerque chapter meetings. Mandy Scarberry, who was an interim appointee in 2011, has been an active volunteer. Write-in candidates were also welcome.

All four were candidates for a two-year term, and (unofficially at this time) all four were elected to office. Congratulations Mandy, Athena, Gary, and Jim. We appreciate your dedication and welcome your leadership. All are well-qualified to support our mission and vision. Jim is a civil engineer with expertise in energy and environmental issues. Gary is an electrical engineer who

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# The NMSEA SunPaper

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Las Vegas: Lloyd Goding, Emelie Olson  
Los Alamos: David Griggs  
Santa Fe: open  
Silver City: Teri Matelson  
Taos: Scott Evans, Larry Mapes

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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.

## Advertising Rates

All advertising is in black and white, and photos and graphics must have a resolution of at least 250 dpi in JPEG, TIF, or PDF format. Text-only ads may be provided in MS Word format. Ad copy must be e-mailed by February 15 for the March/April SunPaper. Circulation is typically 700 copies. The size requirements and prices for individual ads are as follows:

|               |               | <u>Mar/Apr</u> |
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| Full Page:    | 9½" H X 7" W  | \$122.00       |
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## Words of Sol

### Coming Golden Age or Dark Age?

2012 and the countdown to 12/21/12 begins. Oh, if all we had to be concerned about was such things as the Mayan calendar. After all, if a big change happens, who's to say it wouldn't be for the better. Maybe a good shakeup would wake some people up.

So, what is one of the largest obstacles obstructing the vision of a thriving, bio-diverse earth, with civilization powered by clean, renewable and sustainable energy from the sun? The root of the problem is the people in our government who have been significantly manipulated by large corporations since the beginning of the civil war, and each war or threat of war since then just amplifies the mistrust and corruption.

To mention a few examples, corporations having the rights of "personhood" through misinterpreted decisions ranging from the 1886 case Santa Clara County vs. S.P. Railroad to the recent Supreme Court ruling on the Citizens United case codifying money in politics as free speech rights for corporations and entities. Just when renewable energy (RE) is closing in on parity with fossil fuels and nuclear, we are going to have to face this anti-progressive world corporation "money for speech voice" in our upcoming elections (something not allowed in our industrial competitors' nations). We just squeaked out another year of assistance for solar and wind with the extension of tax grant 1603 that passed and was signed just before it was to expire. While keeping an eye and ear on the "corrupt root" problem and providing collaborative support to those spearheading solutions, NMSEA can stay true to its mission and expand its vision for the future.

NMSEA's main mission of promoting renewable energy and sustainability through educating youth and adults since 1972 has been quite successful. Whether it was as much our doing or we were just ahead of the "wave," now RE is at least seriously in the lexicon with many groups promoting and educating on its advantages as a major energy solution. Moving forward with progressive empowerment can probably be best achieved by collaborating with organizations and businesses that are working on parallel aspects for a greener sustainable future.

NMSEA also promotes electric vehicles (EVs) and plug-in hybrid vehicles re-charged by RE. As Amory Lovins, head of the Rocky Mountain Institute, states, "the largest gain for getting off fossil fuels is in the transportation sector." Electricity is available virtually everywhere, including off-grid systems. The current bottle-neck for

do-it-yourself EV and commercially produced EVs and hybrid plug-ins is a network of convenient charging locations. In the early part of January, NMSEA's transportation committee will begin a collaborative discussion with the New Mexico Electric Vehicle Association and others on how we can expedite the plug-in charging stations in Santa Fe, Albuquerque, Los Alamos, and beyond.

New charging stations basically have three "levels." A Level One "grass roots" basic station typically for a residence or small business would have one or two 120 volt 20 amp GFIC receptacles each on dedicated breakers. These would be capable of delivering about 1.8 kwh per circuit. This basic version requires the EV to have a on-board charger and would typically be for overnight charging, but it can also be useful for a refresh charge of an hour or so. This basic charger receptacle could be installed for about \$50 in parts plus an hour or two for an electrician. A more powerful version of the Level One station could be 230 volt at up to 50 amps (about 9 kwh) allowing for a much faster charge. This Level Two charger (considerably more expensive) would typically use a J-1772 or equivalent receptacle, a standard for commercial EVs like the GM Volt, Nissan Leaf, etc. The Level Three would use high voltage and current at commercial locations, enabling a full charge in about an hour or minutes for a partial charge.

If you or your business are interested in providing a charging station location, please let us know, and we will help however we can. Watch for plug-in locations in your neighborhood - some partially powered by PV - at a business, a car dealership, etc., and go support them. It's another way to create a cleaner grassroots positive revolution.

There will also be a need for an offset of the renewable energy tax breaks when they expire, essentially at the end of 2012. By switching to RE-supported electric transportation the payback period on the RE investment could be shorter, even without tax subsidies, creating a larger base of support for both RE and EV.

2012 certainly is going to be an interesting time. Will progressives win most of the elections leading us to the Golden Solar Age, or will we stagnate and regress back to the Dark Ages? Not to fear; we can deal with it. Search the Internet for "Udall Citizens United rollback" and see [www.celdf.org/democracyschool](http://www.celdf.org/democracyschool). But it might be good to have a couple of plans in place, just in case.

Sincerely,  
*Monte Ogdahl*  
NMSEA President



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*(Readers Respond, Continued from page 1)*

the nation now agrees. Legislation and funding for RE research and production is available. PNM has been installing fields of solar panels across the state. True, 22MW of solar isn't a lot, but it is a beginning, and it does help with the peak loads that would otherwise require a greater spooling up of coal-powered electricity production. Standing next to acres of solar panels [at a recent field dedication] I felt as though the decades I've spent working with NMSEA have been validated.

So, while PNM and other utilities have aided the implementation of solar energy systems in some ways, it is apparent that they have other interests and constraints that make it difficult for them to change as much and as fast as most of us would like.



**THIS IS THE 20TH YEAR FOR THE SUNPAPER!  
THANKS FOR YOUR SUPPORT.**

## **Saving Money, Saving the Earth Las Vegas (NM) Solar Homes Tour**

**By Cheryl Zebrowski**

Sustainable Las Vegas, a local chapter of NMSEA, will hold its Fourth Annual Sustainable Homes Tour on Saturday, January 14, from 9 a.m. to 12:30 p.m. and from 1 to 4:30 p.m. at the Las Vegas Arts Council building at 140 Bridge Street. Since the homes are outside of the city, the tour includes van-pooling to the sites. A guide will describe the features of the homes and encourage discussion. A donation is requested to cover transportation costs. Space will be limited, so reserve your place by contacting Emelie Olson at 505-454-3920 or by email at [eolson@desertgate.com](mailto:eolson@desertgate.com). Reserved places will be held until 15 minutes before departure. You may sign up on the day of the event at the Arts Council.

The event is co-sponsored by the Conservation Club at NM Highlands University and Community First Bank.

Sustainable Las Vegas wants to give area residents ideas for how to save money and conserve precious natural resources by improving their homes. The tour will feature local homes that show how electrical and heating bills can be reduced or even eliminated by using the energy of the sun and various conservation measures.

Different designs and approaches are showcased in the homes chosen for the tour. The first home uses a passive solar approach. This architect-designed home constructed in 2004 gets most of its heat from the sun using 13 south-facing patio door-sized windows. Winter sun (which drops low in the sky at this time of year) penetrates deep inside, while appropriate roof overhangs exclude summer sun, which is higher in the sky. Successful passive solar design also requires a massive internal structure to absorb the sun's heat. A concrete floor with radiant heat, as well as massive walls and plaster, provide the mass here. The backup propane-fired boiler is rarely used, but a wood stove is used most evenings.

A solar water heating system was added in 2007 and provides all of the home's hot water. Two glycol-cooled panels send heat to an 80 gallon storage tank. Because the home was designed to be energy efficient with a tight building envelope and uses energy-efficient appliances, the home uses almost no fossil fuel and consumes only 200 kW hours of electricity per month.

About one year ago a 1.8 kW grid-connected PV system was installed. During its first year in operation it has provide all the electrical needs of the home and sold over 1,300 kW hours back to the grid.

Rainwater is collected from the roof and used for landscaping. A vegetable garden employing drip

*(Continued on page 8)*

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# NMSEA's Education Mission

By Ron Herman

When the New Mexico Solar Energy Association began in the 1970s, there was a great need to research the operation and performance of photovoltaic (PV) cells. There was a need to develop practical systems for mounting collectors and delivering grid-compatible electricity and efficient solar hot water for home, commercial, and industrial use. Passive solar techniques were an exciting topic of discussion and investigation. Providing public information about solar energy was a priority. The early mission of NMSEA was given in the January 1980 issue of the NMSEA newsletter, called the Southwest Bulletin at that time, as follows:

The purposes of this Association shall be to further solar and related arts, sciences, and technologies with concern for the ecologic, social, and economic fabric of the region. This shall be accomplished through exchange of ideas and information by means of meetings, publications, and information centers. The Association shall serve to inform public, institutional, and governmental bodies and seek to raise the level of public awareness of its purposes.

Our current mission statement, which can be found on the back page of this SunPaper, is very similar, but more concise. The SunPaper newsletter over the past few years has described the deployment of PV systems in New Mexico. It has touted our Solar Fiestas, which we instituted twelve years ago as educational opportunities and a chance for dealers to market and make sales. Our SunChaser school visitation program teaches energy basics to the younger generation. We have participated in International Green Ideas Showcase events, and we have spoken out at hearings held by PNM, the PRC, and energy code approval agencies.

Unfortunately, over the past few years the SunPaper has been short on covering passive solar energy systems, which seem to have faded in popularity, but were once the heart of NMSEA. They are still "out there," as the article about the Las Vegas solar home tour on page 4 shows. New housing developments, once seen as fertile land for passive solar implementation, have gone up with no consideration for the possible benefits of southern glass or massive walls. Concerns for design and construction costs, owner lifestyle, solar degradation of furniture and fabrics, and overheating have trumped the possibilities for fossil fuel energy savings. In a recent e-mail, Gary Vaughn pointed out the following:

The classic passive solar home is almost impossible to build these days. One of the biggest obstacles is windows. Codes require at least double pane low-E (emissivity, a physical

property between 0 and 1 indicating how much heat is radiated from the glass) - and the typical spec for their solar heat gain is well below 50%. I had only one choice for the window replacements that I got a few years ago - manufactured locally - a solar heat gain of 36%. That means more than twice the south facing window area to get the same solar gain as in the good old days - and as a result, more loss at night. All the rule-of-thumb passive solar design guidelines are now seriously in error, and Trombe walls built with these "modern" windows are a joke.

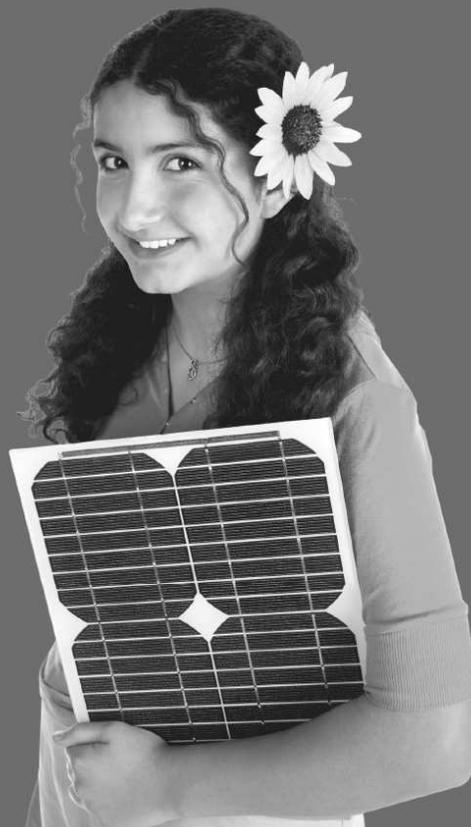
Apparently these windows were mandated to reduce summer solar heat gain in an effort to reduce air conditioning requirements. Optimally, there should be a consideration for climate zone and window orientation, however. South windows get very little direct sun here in the summer, although east and west windows get a lot. So, low-E double-pane glass is great for east and west windows, but wrong for natural solar heating through south-facing windows in the winter.

NMSEA hasn't done a passive solar workshop in a long time. The article on page 7 describes one that was reported in the NMSEA newsletter back in 1980. However, the Southwest Solaradobe School has taught courses throughout the Southwest and Latin America on adobe construction and passive solar design since 1978.

NMSEA has held short-courses on solar PV, water heating, and electric vehicles. However, our educational niche has been increasingly co-opted by the Internet and traditional educational institutions. Just recently the Central New Mexico Community College (CNM) received a \$500,000 federal grant for job training for solar energy installers, project coordinators, and designers. (Albuquerque Journal, Oct. 27, 2011.) This grant will provide training for more than 150 students and allow CNM to expand their solar and renewable energy job certification programs. We cannot compete with the kinds of resources available to trade schools and colleges, and perhaps we shouldn't try.

Now solar energy technologies are mature and PV is commonplace. In spite of the growth of the PV industry in New Mexico, those businesses still struggle to sell systems that must conform to utility company policies, require an initial investment, and payback only over many years. Plumbing problems and expenses plague solar water systems, and passive solar requires some design or remodeling expertise. Solar energy in this country is facing new challenges from foreign hardware imports and renewed marketing by the fossil fuel industry. It is unclear whether or how NMSEA should address these challenges. We welcome your suggestions - and participation in existing or new activities that you might want to lead. Contact the office, a Board member, or attend our next Board meeting on January 14. ☀

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## Workshop Report Convective Air Wall

by Erik Aaboe

*Editor's note: the following is a reprinted article from the January 1980 NMSEA newsletter, the Southwest Bulletin.*

The days got shorter and colder as time crept towards the winter solstice of 1979. And nowhere was the drop in temperature more evident than in the office of the NMSEA workshop crew. A training workshop in the Jemez Pueblo had been postponed, so we found ourselves with some free time to rescue ourselves from our plight. Thanks to an understanding landlord, an unobstructed south facing wall and some generous donations of materials, we were able to spend that time building our own convective air wall.

The convective air wall is an inexpensive solar retrofit applicable to structures built of a variety of materials. Essentially, it is a solar collector built onto an existing wall which uses air as the heat transfer fluid. Vents through the wall allow a circulation of air from the building through the collector where it becomes heated and circulates back into the building. It does not have the thermal storage capabilities of a Trombe wall, yet it can often adequately heat a space during the daytime. Thus

far, the most popular designs have utilized either the darkened wall or a sheet metal plate as the collector surface. In the first type the heated air rises in the space between the wall and the two layers of glazing, while the air channel of the latter is usually behind the absorber plate. With this second configuration, often only one layer of glazing is used, and in those areas where glass is the only glazing material available, this type of collector would be much less costly. The relative effectiveness of these two collector types has not yet been measured, so we decided to build one of each to monitor and compare them. Identically sized collectors were designed for the offices of the workshop crew and the technical backup crew, both of which are on the same south-facing wall.

The wall is of hollow block construction with plaster on both the interior and exterior. We constructed one convective air heater with the wall as the collector surface as follows. After we chalked out the position of the 8'x8' collector on the outside of the workshop office wall, the first step was to open vents through it. Two low and two high vents were planned to allow free circulation of the heated air. Each of the vents is the size of one cinder block. Once the first block was removed, the other three could be located more exactly. A few hours work with hammer, cold chisel, and safety glasses to the cadence of  
*(Continued on page 14)*



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*(Board Elections, Continued from page 1)*

has taught our short courses in many local schools as leader of our SunChaser program. Gary has conducted research on utility company policies and programs. Athena is a civil engineer with expertise in environmental and safety issues, as well as residential construction. She has taught high school mathematics. Mandy has a Bachelors of Science in Biology with strong interests in environmental protection and organizational management.

They will join continuing Board members Janet Bridgers, Mars DeLapp, Barbara Menicucci, and Monte Ogdahl. Thanks to all.

Unfortunately, NMSEA has lost Board members Robert Nelson and Carl Axness. Robert is very busy with other non-profit obligations, and Carl has retired and is moving to Spain. Thanks to both of you for your fine contributions to our cause over the past few years. ☼

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*(Saving Money, Tour, Continued from page 4)*

irrigation was very successful. Greywater from laundry, shower, and bathroom sinks is distributed to landscaping.

The second home featured is an Earthship. This owner-built home was undertaken as an experiment in conservation and simplicity. According to its originators an Earthship creates its own utilities, including electricity, water, and climate, and is made using readily available and sustainable materials.

Heating and cooling of the home are provided entirely by the sun. South-facing glass and a tight, massive building envelope do the job here as well. The home is earth-bermed and partially earth covered. Ventilating skylights help keep the home comfortable in summer.

Electricity is supplied by a 1.5 kW off-grid PV system capable of producing about 250 kWh/month. Even this seemingly small system provides enough power for a conventional refrigerator, two desk-top computers, a washing machine, as well as lights, water pressure, and small appliances. With a set of replacement batteries the system is performing even better.

Central to the owners' experimentation was reliance on catchment as their only source of water. Could it be done in the arid Southwest? The answer is yes, but not without some adjustments in life-style. Rainwater is collected from all roofs, including out-buildings. Water used for drinking is purified using filters and ultraviolet light, but apart from that the plumbing is the same as for any home.

The home was built by its owners, and they can tell you how labor intensive Earthship construction can be. But sweat equity can be its own reward, and using

recycled materials such as tires and bottles met their conservation objectives.

Additions to the home are built with highly insulating straw bales. However, lacking passive solar they do not heat nearly as well as the sunlit central home, which shows the added benefit of capturing the sun's heat.

The third home on the tour is a conventional home upgraded by its owners to conserve energy and water. This home in Ojitos Frios will give tour participants great ideas on simple strategies to improve the performance and comfort of their current homes. Built in 1996, this home formerly used an inefficient boiler to heat the radiant concrete slab floor. The owners replaced it with five glycol-cooled solar panels to supply space heat and domestic hot water. The system was expanded to seven panels recently and does the job for a family of six. A converted garage serving as a guest house is warmed by solar air heaters and requires little additional heat.

Severe water shortages afflicting the area were addressed by an extensive rainwater catchment system. The family has relied solely on rainwater for all its needs for 2 1/2 years, including 4,500 gallons reserved for live-stock and pets. Twenty thousand gallons of above and below ground tanks store water from the roofs. Water for the household is purified by passing it through a series of filters followed by ultra-violet light treatment.

An addition to the home currently under construction has a concrete floor placed over four inches of rigid Styrofoam. Greywater from the bathroom will be sent to an aeration tank before distribution. A composting toilet will be installed. This entire project shows how careful water management can be accomplished; the family, including teenagers, uses 500 gallons per week. ☼

## **ABQ Chapter Happenings**

**By Athena Christodoulou**

Put the "Happy" in the New Year and join us in our monthly chapter meetings. In January chapter co-leader Jim DesJardin let's us in on what's new in solar for 2012 - pricing, PNM incentives, new technologies, Then in February NMSEA president Monte Ogdahl "transports" us to a future with electric vehicles - our progress, new technologies, and what's on the horizon. More reasons to be there - networking, door prizes and finger foods. Both meetings will be held at REI, 1550 Mercantile Ave NE, 87107.

- **January 24**

  - Date, time** – Tuesday, Jan 24, 6 – 8 pm

  - Topic** – "What's New with Solar in 2012."

- **February 28**

  - Date, time** – Tuesday, Feb 28, 6 – 8 pm

  - Topic** – "Getting to the \_\_\_\_ on Time; Electric Vehicles and Other Transportation Issues." ☼



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## Adiós, Solyndra

by Gary Vaughn

Solyndra is gone – bankrupt that is – being sold off piece by piece. What should we make of that?

Just in case you haven't heard, Solyndra was a U.S. solar panel manufacturer that made a big bet on a clever but complicated kind of “tubular” thin film PV panel. It attracted quite a lot of buzz and serious early-stage funding from high-profile investors, including Sir Richard Branson, the Walton family, and Goldman Sachs.

In 2006 Solyndra manufactured and deployed several dozen of its systems around the world for evaluation and testing. By 2009, the company had a fully functional fabricating facility (Fab1) and \$100 million in revenue and was projecting a market of up to 2 billion dollars. Major investors included George Kaiser Family Foundation, U.S. Venture Partners, CMEA Ventures, Redpoint Ventures, Virgin Green Fund, Madrone Capital Partners, RockPort Capital Partners, Argonaut Private Equity, Masdar and Artis Capital Management. In 2010, revenues had increased to \$140 million.

Following up on earlier steps made by the Bush administration, on March 20, 2009, the United States Department of Energy made a “conditional commitment” to a \$535 million loan guarantee to Solyndra. That was to support construction of a commercial-scale manufacturing plant for its proprietary solar photovoltaic panels. Federal reviewers gave final approval on September 2. Solyndra also received a \$25.1 million tax break from California's Alternative Energy and Advanced Transportation Financing Authority.

The new \$733 million state-of-the-art robotic facility in Fremont, California, opened in September 2010. Fab 2 was built with the support of the \$535 million federal loan guarantee along with at least \$198 million from private investors.

The company announced on November 3, 2010, that it was mothballing its older plant, Fab 1, and postponing expansion of recently opened Fab 2. Market conditions were cited, with conventional solar modules manufactured in China by low-cost producers such as Suntech and Yingli offering stiff competition.

On 31 August, 2011, Solyndra announced it was filing for Chapter 11 bankruptcy protection, laying off 1,100 employees, and shutting down all operations and manufacturing.

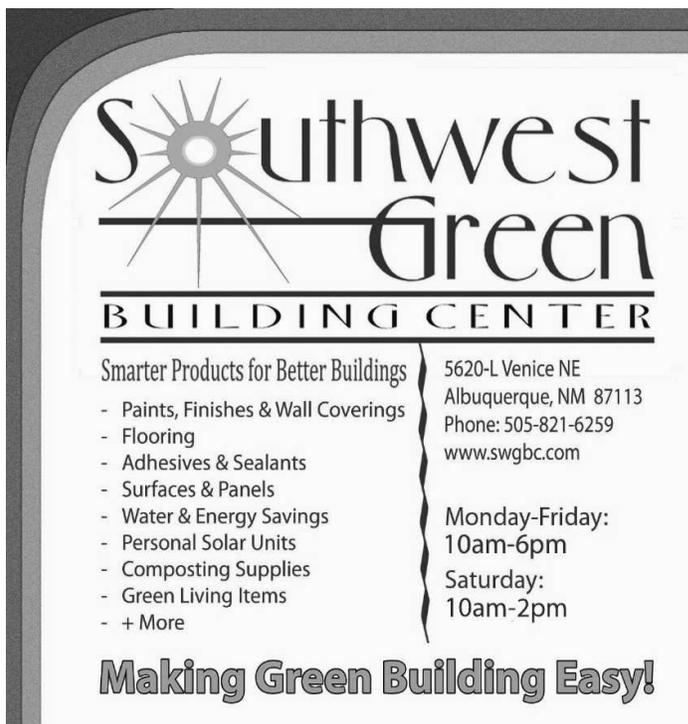
Needless to say, this set off a firestorm of criticism of the U.S. government “investing” in the private sector in general, and of government support and subsidies for RE in particular. There have been high profile congressional hearings, and lots of heated editorials and talk show harangues. How did so many “seasoned” investors and

technical gurus and government officials make such a mistake?

In the past 5 years there's been a sea change in the PV panel business. The cost of feed stock for silicon panels has dropped by 90%. China has emerged as the world's biggest manufacturer of silicon PV panels. And due to the problems in the world economy, governments are reigning in their subsidies for PV installations. Right now, world supply of silicon-based PV panels exceeds world demand – and prices are plummeting. Solyndra's novel design didn't use silicon. That was a big plus just a few years ago. The basic explanation for Solyndra's plight is that the game changed MUCH faster than ANYONE could have anticipated.

“Industrial Policy,” as government involvement in business is referred to, is a hard sell in the U.S., especially right now. The obvious exceptions are massive long-term tax breaks and loan guarantees for coal, oil, natural gas, and nuclear-related industries - and of course for defense related projects. The \$1.5 billion in “emergency stimulus” investments that the Obama administration gave to RE projects was “outrageous” in the view of almost all political conservatives. But contrast that \$1.5 billion with the approximately \$40 billion of loans and support that the Chinese government offered to Chinese RE companies in just the past 2 years. Or, just for fun, contrast the \$535 million Solyndra loan guarantee with the over \$950 **billion** that the Pentagon has invested in just 3 of many failed defense project boondoggles.

*(Continued on page 12)*



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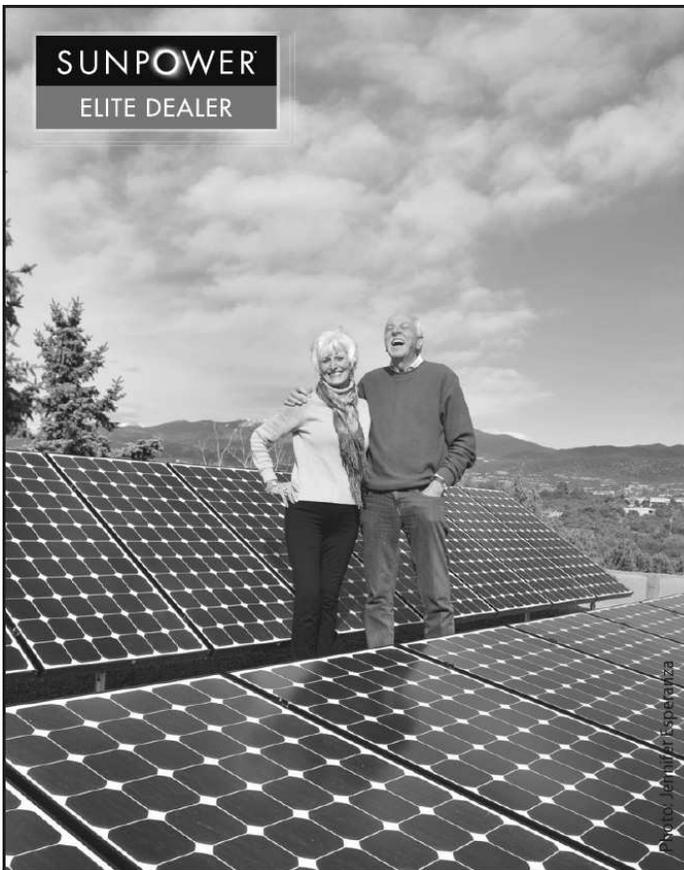
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(Adiós, Solyndra, Continued from page 10)

A national renewable energy standard is not likely to be approved in the U.S. Many states, including NM, have passed RE portfolio targets (i.e., 10% RE by 2012, 15% by 2015, etc), but many of those, including NM's, are currently under attack.

At the end of 2010, China had less than 1 GW of installed PV. Earlier this year it increased its 2015 target to 10 GW. In mid-December 2011, given the challenges of the world economy, China's response was to modify its 2015 national targets. They were boosted to 15 GW of PV and 100 GW of wind!

As reported in the Nov/Dec 2011 edition of Solar Today, in 2010 the US had a positive trade balance of almost \$2 billion dollars in solar-related products. China exported more PV panels, but in every other category from manufacturing equipment to polysilicon feedstock and cells to inverters, the U.S. was firmly in the black. How long do you suppose that is going to last? Stock prices for U.S. PV companies are tanking (see "Energy Investments" at right), and even the cream of the crop of U.S.-based RE companies are struggling to get loans.

It's difficult to see how U.S. RE companies can compete on the world stage without some synergistic cooperation between the private and public sector. We desperately need major breakthroughs in the energy arena. Investing in start-up and early stage technology companies is a high risk venture, no matter who does it. The vast majority of companies backed by the best private venture capital firms fail – that's just a fact. As Will Rogers said, "Buy stocks that go up; if they don't go up, don't buy them." So don't invest in Solyndra, but never stop investing in the future.

[General information sources for this article include the two Solyndra articles in the ASES Solar Today magazine, a Solyndra facts summary at <http://en.wikipedia.org/wiki/Solyndra>, and a New York Times piece (The Pentagon's Biggest Boondoggles, John Arquilla and Gogelson-Lubliner, March 12, 2011) summarized in the Sierra Magazine, Jan/Feb, 2012.] ☀

### NMSEA Board Meeting Jan. 14

The next meeting of the NMSEA Board of Directors will be on Saturday, January 14, in the conference room at the office at 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 January 10, if you have an item for the agenda.



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### Energy Investments

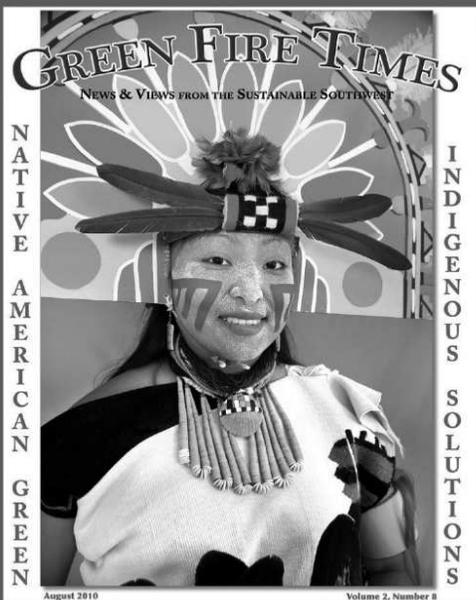
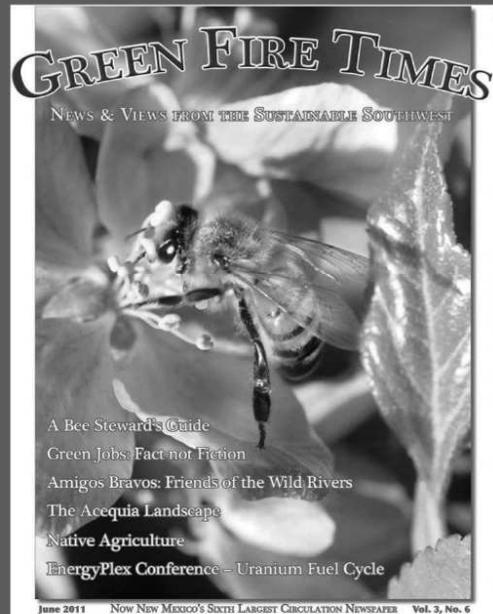
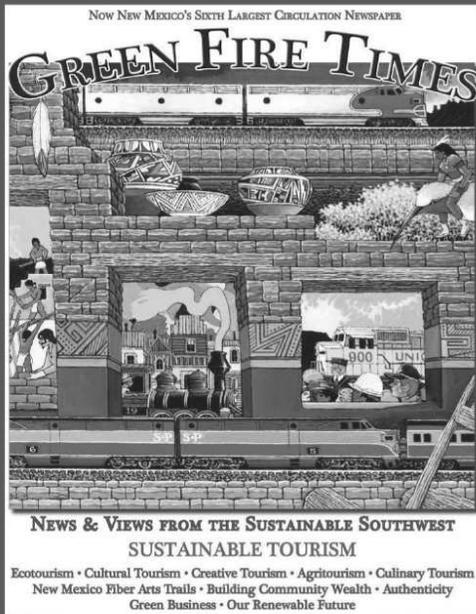
Closing share prices compared to the DOW index:

| <u>12/28/11</u>                         | <u>10/28/11</u> | <u>12/28/10</u> |
|---|-----------------|-----------------|
| First Solar (FSLR):                     |                 |                 |
| \$32.12                                 | \$53.99         | \$129           |
| Market Vectors, Solar Energy ETF (KWT): |                 |                 |
| \$3.63                                  | \$5.37          | \$10.91         |
| Dow Jones Industrial Average (\$INDU)   |                 |                 |
| 12,151                                  | 12,231          | 11,573          |
| Crude Oil//barrel (NYMEX Dec futures)   |                 |                 |
| \$101.34                                | \$93.96         | \$91.00         |
| Natural Gas/mmBtu                       |                 |                 |
| \$3.11                                  | \$3.52          | \$4.11          |
| Gasoline/gal                            |                 |                 |
| \$2.70                                  | \$2.74          | \$2.42          |

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.

# GREEN FIRE TIMES

News & Views from the Sustainable Southwest



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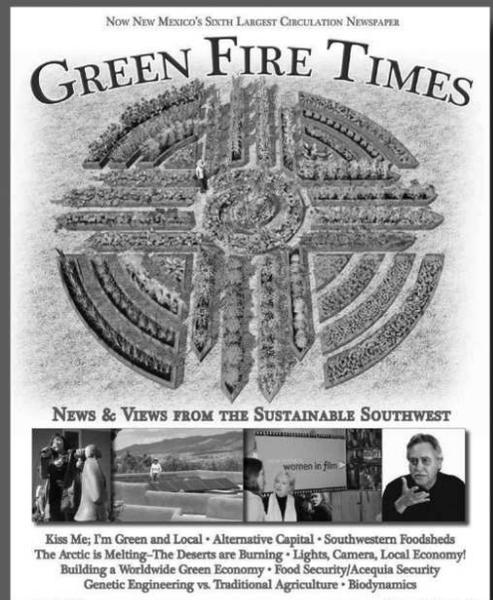
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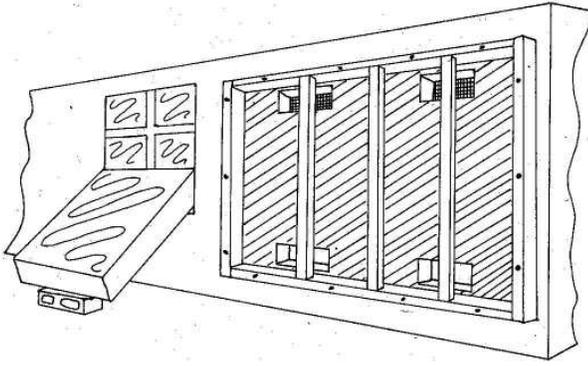


Figure 1. Convective air wall before glazing, next to window box collector.

*(Convective Air Wall, Continued from page 7)*

the rock music blaring from the radio and we had four nice neat holes through the wall. These openings were then framed in with snug fitting boxes built of 1/4" plywood. We stuffed fiberglass insulation between the boxes and the openings to isolate the air inside the block wall from the air of the convective loop. A bit of plastering work will soon improve both that seal and the interior appearance. When that dirty work of opening the vents was completed and the cinder block dust had settled, the outer surface of the wall was painted within the 8'x8' borders using a temperature resistant flat black latex paint (Sherwin-Williams Tri-Corn A-100).

Construction of the framing was straightforward and went smoothly. The simple frame consisted of a perimeter of on-edge 2x4s with vertical 2x2s mounted on two foot centers. The 2x2s were attached flush to the south edge of the 2x4 perimeter to create nailing surfaces for the glazing, yet still allow lateral air movement within the collector. The white painted frame was mounted to the wall with toggle bolts through the 2x4s into the block. Fiberglass was stuffed between the 2x4s and the wall and that space caulked with silicone to create an air and watertight seal.

We decided to use 5 mil Lexan, a polycarbonate, for both the inner and outer glazing. It is very resistant to the high temperatures possible with such a collector and so is a good choice for the inner glazing. Its low cost (15¢ per square foot) suggested its use as an outer glazing, also, where we will examine the effects of the weather upon it. Probably a "greenhouse quality" fiberglass like Lascolite (65¢ per square foot) would make a better outer glazing. The inner layer of Lexan was stapled to the frame over a bead of silicone caulk. White painted 1x2 spacers were screwed to the frame, and the second layer was stapled to them. The seams of the outer layer were caulked, and another set of 1x2s were attached. Screwing on the 1 x2s will permit their removal, if access to the glazing is necessary. Flashing and roofing tar along the top surface of the collector were applied to keep it watertight. When

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the weather warms up this spring, a properly sized overhang will be added to prevent overheating in the summer months.

The wall was now functionally complete, except that reverse thermosiphoning was cooling the room at night. By attaching screening to the inside of each of the upper vents and stapling the upper edge of a piece of thin polyethylene (from a dry-cleaner bag) inside of it, we fashioned some simple and effective backflow dampers.

Thus far, the convective air wall works well to heat our office. Admittedly, it is slow to start working early in the morning, but then aren't we all? The monitoring of both types of collector will begin as soon as we finish the second. We will compare the delivered air temperature and overall system efficiency of each one. All that we can state so far is that the office of the workshop crew is more often than not full of hot air. ☀

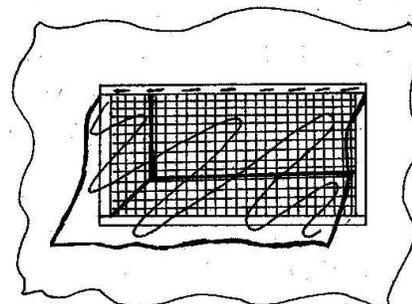


Figure 2. Simple backflow damper.



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|--|-------|
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| <input type="checkbox"/> Individual Lifetime   | \$250 |
| <input type="checkbox"/> Business Lifetime   | \$400 |
| <input type="checkbox"/> Teacher/Student/Senior (62 & up)<br>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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## 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](http://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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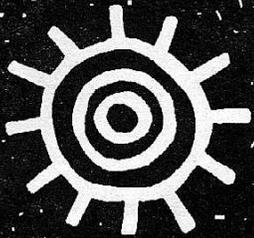
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We envision a thriving, bio-diverse earth, with civilization powered by clean, renewable and sustainable energy from the sun.

**Coming Events**

- January 14**      **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.
- January 14**      **Sustainable Homes Tour**, Las Vegas, NM, morning and afternoon, at the Las Vegas Arts Council building at 140 Bridge Street. See page 4 for details.
- Jan. 24, Feb. 28**      **Albuquerque Chapter Meetings** at REI, 1550 Mercantile NE, 6:00 to 8:00pm. See p. 8 for more information.
- March 17-18**      **Ultimate Home Showcase**, Green Home Show, EXPO in Albuquerque, see advertisement page 9.