New Mexico Solar Energy Association

SunPaper

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Time-of-Use Electric Meter: Appropriate with PV System and Electric Car?

By Wayne Evelo, Advisory Board Member

After attending an NMSEA Monthly Meeting on Electric Cars, I decided to research the cost and benefits of requesting a time-of-use (TOU) electric meter from Public Service Company of New Mexico (PNM). I figured it would work well with my small PV (solar electric) systems. The results were very interesting and are discussed below. Hopefully, some of the companies producing electric cars or plug-in hybrids could engage PNM to improve the costs benefit analysis, but I'm getting ahead of myself.

The typical residential user in PNM's territory is charged the same price (retail rate) per kilowatt day or night, because they are on a standard meter. In fact, over 99% of residential users are on standard meters. However, PNM produces and buys power around the clock at different prices (wholesale rates). Typically, night time power is the cheapest for PNM, because they are running their "base load" power plants. These are power plants, such as coal and nuclear, that run all the time. Additionally, the wind generally blows at night in New Mexico. Off peak nighttime power is the cheapest wholesale power and typically contains a lot of renewable energy. The most expensive power comes from peaking plants, which are usually natural gas that run in the afternoons to help with the peak loads. These plants generally only run 2-4% of the year. Additionally, since these plants only run a limited number of hours, they are not required to have the same pollution controls as base load plants. The dog days of summer (June, July, and August) are the peak electric times of the year. Consequently, both standard rates and TOU rates are higher during these months. The higher rate on standard meters kicks in after the first 450 kWh/month. This high cost summer power is often the basis for justifying rate increases.

If more power was used "off peak," there would be less need for additional generation, and the grid would not be as stressed during peak times. This shifting of

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PNM and Misleadership

By Gary Vaughn, NMSEA President

On Dec 11, 2014, the PNM public relations (PR) machine sent out a 3 page "PNM Price Increase Fact Sheet" stating that PNM was requesting a 12% increase in electric prices, but that "the bottom line increase to PNM customer bills will be about 7.7%." Elsewhere in that same document PNM states that "What this means for the average residential (*customer*) using 600 kWh per month is an increase of $9.75 per month on their bill, from $70.26 to $80.01." If you bother to do the math, that works out to a whopping 13.9% increase. On page 29 of VP Ortiz's formal PRC 2014 Rate Case testimony, he states "the residential class will see a full 17% increase in basic rates." Turns out that PNM's small business companies will also see a 17% rate increase, as will PNM's irrigation-class customers. So, who are you supposed to believe? PNM 12% or PNM 7.7% or PNM 13.9% or PNM 17%? Seems like some of those PNM numbers are intended to mislead you.

The PNM Price Increase Fact Sheet states that "The bill increase includes an increase in the fixed customer charge, which also helps to reduce the energy usage portion of the bill. For residential customers the fixed charge will change from $5.00 to $12.80 per month."

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New Mexico Solar Energy Association

NMSEA Office Staff: Volunteers

Website: www.nmsolar.org

NMSEA Office: 1009 Bradbury Dr. SE #35
Albuquerque, NM 87106
(505) 246-0400, (888) 886-6765
info@nmsea.org

The SunPaper

Editor: Ron Herman, rhermansolar@aol.com
Send all letters, comments, and articles to the Editor, or to the NMSEA office, by the ad due date given below. 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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Advertising copy may be in black and white or in color. 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 to the Editor by April 18 for the May/June issue. Note that the SunPaper is no longer available in printed form, but only at our website and by e-mail to members, which is currently about 200. Size requirements and prices for individual ads are as follows:

		May/June
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The views expressed in the SunPaper are not to be considered an endorsement by the staff or Board of Directors. We strive for an open platform.

NMSEA Chapter Leaders and Contact Information

Alamogordo Chapter
Official Name: Alamogordo-NMSEA
Chapter President:
Ron Offley, (575) 682-6027,
ronoffley@gmail.com
Chapter Program Director:
Jay Harrell, (575) 430-0876,
harrellalm@aol.com

Albuquerque Chapter
Coordinator:
Jim DesJardins, (505) 917-5074
jim.desjardins@affordable-solar.com

Las Vegas (New Mexico) Chapter
Official Name: Sustainable Las Vegas
President:
Lloyd Goding, (505) 454-9122,
lgoding@hughes.net
Communications Contact:
Emelie Olson, (505)-454-3920,
eolson@desertgate.com

Los Alamos Chapter
Official Name:
Los Alamos Sustainable Energy Network (LASE Network)
Website:
www.lasenergy.net
Chapter President:
Karen Paramanandam, (505) 216-4250
ekarenp@gmail.com, or
karen@positiveenergysolar.com
Chapter Box:
P.O. Box 221, Los Alamos, NM 87544

Santa Fe NMSEA
Chapter President:
Claudia Pavel President, (505) 795-4332
claudia@solarlogicllc.com

Silver City Chapter
Co-Presidents:
Lynda Aiman-Smith,
laimansmith@gmail.com
Mike Sauber (575) 654-3906d, 538-2710
mikesauber@gmail.com
Chapter Box:
P.O. Box 5129, Silver City, NM 88062

Taos Chapter
Official Name: NM Solar - Taos Chapter
Chapter President:
Scott Evans (505) 758-5338,
scott@greenbuilderstaos.com
Chapter Vice-president:
Larry Mapes

Hey, All.

The new NMSEA website now has a page dedicated to the San Juan Generating Station Settlement, a page dedicated to the 2014 PNM Rate Case, and one dedicated to the general topic of electric utility decoupling. Check out these new NMSEA website pages by going to http://www.nmsolar.org/ and then selecting the Advocacy tab at the top banner. Follow the page links under each topic heading.

These new pages include info summaries, links to official documents, links to other sources of info, and downloadable copies of related reports and articles. In addition, the rate case and decoupling pages include impressive embedded PowerPoint presentations created by folks you may know. You can run thru those PowerPoint presentations right on the page without having a PowerPoint app on your computer. Pretty cool.

But that's not all. Some of you have been following Board email threads about these three topics. We now have another option for continuing and expanding those email thread conversations – online Discussion Forums. Our NMSEA "Aficionado" membership site now hosts a dedicated Discussion Forum for the San Juan GS case, for the 2014 PNM Rate Case, and for the general topic of utility decoupling. Check out these new Discussion Forums by going to https://nmsea.wildapricot.org/ and then selecting the "MEMBERS" tab. A drop-down menu of Forums will appear.

These three discussion forums are open to NMSEA members and non-members alike. Note that in each Discussion Forum the Board email thread content as of Feb 9, 2015, has been copied over to a corresponding Forum summary sub-topic. You can review the earlier email discussion content by selecting that summary sub-topic and then scrolling thru the associated summary file.

The new NMSEA website pages provide in-depth info about each of these advocacy "hot topics." We'll try to keep those pages up-to-date. The new online Discussion Forums provide a convenient way for everyone to share their opinions, insights and suggestions. Please post your new comments on each Forum's "active discussion" sub-topic, which is listed at the top of the Forum topics window.

Please "spread the word" about these new NMSEA online "resources" among your own interested contacts. That's one way we can help get more folks "engaged."

REgards,
Gary Vaughn, NMSEA President

At right is Matuke Fomukong, a freshman at Rio Rancho High School, displaying her project at the Rio Rancho Public School Science Expo on January 15. Her project was a low cost solar energy system for distilling water. NMSEA board members Athena Christodoulou, Elena Kayak, and Gary Vaughn participated in judging the science fair at Rio Rancho High School.

Energy/Utility Investments

Closing share prices compared to the DOW index:

2/27/15	12/19/14	2/21/14
First Solar (FSLR):		
$59.75	$45.03	$55.93
Market Vectors, Solar Energy ETF (KWT):		
$75.41	$65.98	$85.71
PNM Resources (PNM):		
$28.55	$29.20	$26.15
Dow Jones Industrial Average ($INDU):		
18,133	17,805	16,103
Crude Oil//barrel (NYMEX futures)		
$49.76	$56.52	$102.20
Natural Gas/mmBtu		
$2.73	$3.46	$6.14
Gasoline/gal		
$1.77	$1.56	$2.83

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.

(PNM and Misleadership, Continued from page 1)

Apparently that means that PNM would have increased residential rates even more without this fixed surcharge. Using PNM's average residential bill of $70.26, the added $7.80 per month fixed surcharge amounts to an 11% increase on top of the 17% usage rate increase. This just points to the fact that all of the PNM increases quoted in the first section above are (intentionally) misleading.

The PNM Price Increase Fact Sheet states that "The balance of our [*Rate Case*] request is related to declining energy sales driven by the New Mexico economy, improved appliance efficiency, and PNM's own Energy Efficiency programs." When the economy turns down, everyone suffers. Modern appliances can do more work with less electricity. PNM knows years ahead what the impact on energy usage will be when it meets NM's energy efficiency targets. So, why should PNM be immune to economic and efficiency "trends" that are obvious to everyone else? Why is PNM immune to the law of supply and demand, which rules every other business in New Mexico? PNM is forced to charge more because the NM economy is depressed? What kind of misleading argument is that?

The PNM Price Increase Fact Sheet states that rooftop solar customers will see the following:

1) "the DG Interconnection Fee of $6.00/kW of installed capacity."

2) "Changes in the banking option."

3) "All other program elements provided to rooftop solar customer will continue."

But what about the changes in the amount that PNM will pay net-metered customers?

And what about the changes to the REC payment program, and PNM's plan to take customers' "excess" REC credits for free?

Statement #2 above is clearly leaves out important information.

Statement #3 above isn't just misleading, it's wrong.

In a 12/12/14 Albuquerque Journal article, PNM VP Ortiz is quoted as stating that "even with the new interconnection charge, [*PV customer savings*] would only be shaved by about 3 cents per kilowatt hour." But the actual calculated cost to a typical PV customer of the $6.00 per every 1000W of PV interconnection charge turns out to be a **minimum** of 4 cents per kilowatt hour. Where did that big difference come from? Should you believe PNM's number or the actual calculation? Seems like PNM's 3 cents per kilowatt hour number is misleading.

In a January 20, 2015 letter, PNM "assured" its residential PV customers that they would not be affected by the 2014 Rate Case proposal. Of course that's not really true.

1) A PV customer's contract doesn't deal with electricity rates, or rate riders, or increases in fixed fees. Existing PV customers will see all of those PNM bill increases, and several of those increases will mean that their bill will go up even if they don't change how many kWhs they use or generate. That means that a PV customer who is financially "net-zero" now won't be financially net-zero after the new rules take effect. Everyone will pay PNM more.

2) When existing 8 year PNM PV contracts expire, PNM will impose the new rules, so it won't be long before ALL PV system owners will be forced to pay PNM thru the nose.

3) When an existing PNM residential PV customer with a pre-2010 REC contract sells their home, the contract doesn't transfer. That means that the new owner will immediately face all the proposed extra fees and changes to net metering and REC rules. Later contracts do transfer, but the 8 year clock continues to count down. That means that an existing customer's PV system will be worth much less than it was worth under the old contract. That means that this PNM plan will actually reduce the market value of the home. Pretty neat trick, que no?

PNM executives strongly oppose "subsidies" for PNM's residential, small business, and solar PV customers, but strongly support "incentives" for PNM and PNM's large business and corporate customers. "Such incentives are critical to attract more business to New Mexico, said PNM spokeswoman Susan Sponar" in an Albuquerque Journal article on 12/21/14. Yet in his formal PRC rate case testimony, PNM VP Ortiz responds to a question from the PRC this way: "Do you believe that PNM's rates are an impediment to economic development in New Mexico?" "NO, I DO NOT." So should you believe PNM or PNM? One of those statements seems to be misleading.

As predicted, PNM allies in the NM State Legislature are proposing to eliminate the NM Renewable Portfolio Standard (RPS) requirement for 20% renewable energy (RE) by 2020, and they also want to reduce the "cost cap," which limits how much utilities can spend to meet RPS requirements. That would mean there'll be far less RE in NM's future.

The PNM PR machine is constantly claiming that PNM is "investing" in renewable energy. The fact is that PNM has never acquired any significant amount of RE unless it was forced to do so by a NM State mandate. And PNM has always added the minimum amount of renewable energy required.

PNM is "entitled" to recover all of its costs, plus a cool 10% profit, for every penny it spends on implementing NM's renewable energy mandates. By any standard business definition of "investing," PNM has never actually invested in renewable energy. Those PNM PR campaigns are mostly misleading.

The PNM PR machine is constantly claiming that PNM is "investing" in protecting the environment, cutting pollution and reducing greenhouse gas emissions. The fact is that PNM has never added any significant environmental protections or pollution controls unless it was forced to do so by a Federal or NM State law or statute. PNM has fought most of those pollution control laws and statutes in court. When it is finally forced to install

pollution control equipment or adopt measures to protect the environment, PNM always attempts to install the minimum amount and lowest quality of air, water, and solid waste pollution controls possible.

Again, PNM is "entitled" to recover all of its costs, plus a cool 10% profit, for every penny it spends on cleaning up its act. By any standard business definition of "investing," PNM has never actually invested in protecting the environment. Again, those PNM PR campaigns are mostly misleading.

The PNM PR machine is constantly claiming that PNM is "investing" in promoting energy efficiency. The fact is that PNM has never implemented any significant energy efficiency programs unless it was forced to do so by a NM State statute. Energy efficiency initiatives that have been in use by other utilities and electrical co-ops are still "out of bounds" for PNM. Smart meters for residential and small business customers? Time-of-use rates? Electric vehicle charging "deals." No way! And PNM continues to use and invest its customers' money in ancient generating plants with horrible efficiency ratings.

PNM recovers all its costs, plus a cool 10% profit for every penny it spends on implementing NM's energy efficiency mandates. There's a separate fixed charge on your PNM bill called an energy efficiency rate rider, which is dedicated to paying for PNM's energy efficiency programs. That charge will be going up, too. Did PNM mention that? And now PNM wants to increase electricity rates to inoculate itself against growing energy efficiency trends and (OMG!) LED light bulbs. By any standard business definition of "investing" PNM has never actually invested in energy efficiency. Those PNM PR campaigns are mostly misleading.

In the recent PRC San Juan Generating Station Settlement case hearings, it was revealed that PNM had understated the future cost for its favored proposal by $367 million due to a PNM "bookkeeping error." Looks like PNM's SJGS plan will end up costing PNM ratepayers $1 billion more than expected. Yes, folks, that's a "B."

Who can take PNM executives and "spokespersons" seriously after serial misleadership like this?

Gary Vaughn is an electrical engineer and has served on the NMSEA Board of Directors for 10 years, currently as President.

Solar and the Yo-Yo Fossil Fuel Economy

By Ron Herman, Editor

Over the past couple of years there has been a dramatic increase in the installation of solar electric (photovoltaic, or PV) systems across New Mexico. This has been due to the increase in fossil fuel prices and the decrease in PV systems costs as the result of greater production volumes and the excellent response of professional installers. General expectations for a continued rise in fossil fuel prices have failed to materialize, as the United States now produces more of its own demand (mostly due to fracking), making us less susceptible to crises in the Middle East. Now fossil fuel prices have dropped again, and our largest local utility, PNM, has reduced their benefits for solar and are threatening to add a penalty fee and other disincentives.

Given the historic volatility of fossil fuel prices, home and business owners, solar company owners, and even utility companies, cannot plan ahead with confidence. Coal and natural gas prices, the main drivers for the cost of electricity, have varied significantly over 50 years. In 2007 they rose over seasonal lows, then dropped again, only to shoot up (along with oil and gasoline prices) over the summer of 2008. Now they are back down to record lows. Investments in renewable energy systems or companies is risky business, as long as fossil fuel prices vary over such extremes, while fossil fuel industries continue to receive enormous subsidies without paying environmental impact (external) costs,.

Observing the energy economy over the past 40 years, those of us who are engineers are reminded of an unstable structural system that oscillates more and more wildly until it breaks – like a steal beam cantilever that is stressed repeatedly until fatigue causes greater and greater strain and displacements, and failure occurs. Whatever precious load is supported out on the end of the beam goes up and down like a yo-yo and then comes crashing down. Does this look like our economy? What is needed are forces to counteract the stresses and return the system to stability, so that the oscillations dampen out. We must encourage our politicians and state agencies like the PRC to act with stabilizing forces. We must actively monitor government actions and insist that measures are taken to provide stability and environmental protections – not just to maintain fossil fuel revenues.

I and others have suggested that a variable tax on fossil fuels – a carbon tax - is needed to raise and stabilize prices within a reasonable range and fund renewable energy subsidies. An article in Solar Today, the publication of the American Solar Energy Society, by John Schaefer supports this type of approach. ("Market-Based Policy Offers Better Economy, more Employment," Jan/Feb 2015, p. 8.) I suggest that the tax should be applied directly to consumer prices and vary depending on the market price of fossil fuels, so that prices to utilities and consumers can be maintained within a range of +/-10% of the historical average of prices for the specific fuel. When the market price exceeds that range, the tax is reduced; when the price drops below the lower level, the tax is increased.

Furthermore, subsidies for fossil fuel production must be adjusted for parity with renewable energy or eliminated altogether.

Ron Herman, the SunPaper editor, is a mechanical engineer with an MS and MBA from UNM.

(Time-of-use Meter: Continued from page 1)

loads would be encouraged if folks got a lower price for electricity at night. A standard meter does not charge a lower rate during off peak, so currently there is no direct cost benefit to charge an electric vehicle at night.

The PNM time-of-use meter requirements are a little confusing. First of all, a TOU meter is more complicated and therefore more expensive. Additionally, in order to get a time-of-use meter, more than 50% of the power must be used at night. Night time usage is considered 8pm to 8am Monday through Friday, and this is very achievable for a home with a net-metered solar electric power system and an electric car. The solar system provides the majority of power during the day, which covers the daily loads, and extra power goes to the grid. This spins the electric meter backwards during the day; and at night, when the electric car is charging, the meter spins the other way. This takes back the credit earned during the day and allows the purchase of low cost night time base load power.

The time-of-use pricing varies depending the time of year (summer is the highest) and time of day. To keep the math manageable let's assume it is approximately $0.18/kilowatt hour (kWh) during the day and $0.0663/kWh hour during the evening. The evening rate makes for very cheap power for electric cars and a very low cost per mile for an electric car, especially when one considers an electric car is 300% to 400% more efficient than a diesel or gas powered car, respectively. Low cost electricity would make the electric car even more cost effective.

The only catch is the TOU meter costs an extra $21.10/month, and you must have the meter for at least 12 months. This amounts to $253.20/yr just for the meter. A regular meter has an average residential electric rate of about $.126/kWh, including the Customer Charge, the Fuel Cost Adjustment, etc. The annual cost of the TOU meter is roughly equal to 3,820 kWh of power that could have been purchased with a regular meter before being able to take advantage of the $0.0663/kWh rate.

If one assumes the car's battery pack is 50% depleted/day (12 kWh = 36 miles), and the car is used 5 times/week, which equals 20 time per month, then (12 X 20 = 240 kWh) 240 kWh/month is used to charge the electric car. This would be equal to about 720 miles/month or 8,600 miles/yr. This mean the TOU meter would take 3820/240 = 15.9 months each year just to pay for the cost of the meter. It doesn't pay back at all, because it costs more for the TOU meter than it does to charge the car.

This doesn't include the actual cost of power. The power would cost $0.0663 X 8600/3 = $190. At the standard retail power rate of $0.126/kWh this would be equal to $190/.126 = 1,508 kWh. This value divided by the monthly usage 1508/240 = 6.3 months.

- Annual time-of-use meter ($253.20) payback 15.9 months.
- Annual Cost of power ($190) payback 6.3 months.
- Total 15.9+6.3 = 22.2 months. (Needs to be less than 12 months.)

In this example, the cost is significantly higher for a time-of-use meter compared to a standard meter. As they say "your mileage may vary," so if you drive more than 8,600 miles/yr the pay back will improve. The breakeven calculation is just under 13,000 miles per year. In the analysis above, one would have to drive about 53 miles/day to break even. Otherwise, none of the plug-in hybrids currently on the market could benefit from a TOU meter. However, the owner of an all-electric Tesla may be able to benefit from a TOU meter, assuming they drive it more than 15,000 miles per year.

A substantial drop or elimination of the TOU meter monthly cost would be a win for the electric car owner and for PNM. A lower TOU meter price may encourage folks to buy more electric cars and use more electricity. More electricity usage would improve PNM's bottom line, and the power usage would be shifted to evenings when the power is cheaper, cleaner, the grid is less stressed, and the transmission lines are more efficient. This approach could allow PNM to deliver more power without the need for more generation facilities and transmission lines and their associated rate increases.

This could be an opportunity for the automakers to use their corporate clout to drive down the electric meter costs for all of us, or at the very least to create a special time-of-use meter price for folks who purchase an electric vehicle or plug-in hybrid. This creative solution could be a win/win for everyone. It could be a good discussion to have with your Public Regulations Commissioner during the next electric rate case.

Wayne Evelo, Jr. is a lifetime member, has been active with NMSEA since 1999 and has served as Vice President. He has worked as an engineer with the US Department of Energy for over 20 years as an expert in green building, sustainability, and project management.

ABQ Chapter Meetings

You are invited to join us on the 4th Tuesday of odd-numbered months starting on March 24 for a couple of hours of "energy" and education. NMSEA monthly Chapter Meetings in Albuquerque are FREE and open to the public. The topic for the March meeting will be "Utility Company Decoupling" with Jason Marks, former PRC member. Learn how this important concept can help utility companies make real progress toward energy efficiency. We meet at 6:00 PM at the REI store, 1550 Mercantile Ave NE, 87107. We have a variety of speakers and expert-led discussions at each meeting. Come hang out with other concerned citizens to learn how you can do your part, as we all transition toward a more sustainable lifestyle. Share your project successes with us! Experts and novices are all encouraged to attend. We hope that you will join us!

Join the New Mexico Solar Energy Association!

Be a part of a creative, innovative organization dedicated to bringing renewable energy and sustainable building to New Mexico!

Keep informed of what's happening through our electronically 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.

Name: _____

Company or Affiliation: _____

Address: _____

City, State, ZIP Code: _____

Phone: (H)_____ (W)_____

Email: _____

Any special Solar interests? _____

_____

☐ Yes, I would like to volunteer on occasion!

How did you hear about us? _____

NMSEA Chapters

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: NMSEA 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 (by default) to the main office general fund:

Affiliation	Donation
☐ Alamogordo Chapter	$_____
☐ Albuquerque Chapter	$_____
☐ Las Vegas Chapter	$_____
☐ Los Alamos Chapter (LASE)	$_____
☐ Santa Fe Chapter	$_____
☐ Taos Chapter	$_____
☐ Silver City Chapter	$_____

Dr. Wm A Gross RE Education Fund $_____

NMSEA Membership Dues

☐ Individual / Family, 1 year	$40
☐ Business, 1 year	$100
☐ Individual Lifetime	$325
☐ Senior (65 & up) /Discounted, 1 year	$20
☐ Teacher / Student (with certification), 1year	free

AMERICAN SOLAR ENERGY SOCIETY CHAPTER

Combined NMSEA & 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, discounts on ASES Conferences, publications, and more! For more info about ASES and ASES membership benefits, please visit **www.ases.org**

ASES is offering a discount on ASES Membership & Combined ASES & NMSEA Membership if:
you JOIN on-line using the ASES website at www.ases.org/join
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For more information, please call **505-246-0400** or visit **www.nmsea.org**.

The SunPaper
New Mexico Solar Energy Association
1009 Bradbury Dr. SE
Albuquerque, NM, 87106
www.nmsolar.org

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

March 3 **Board of Directors Meeting**, Tuesday, NMSEA office, 1009 Bradbury Dr. SE, Albuquerque, 87106. Meeting at 6:00 PM, starting with potluck dinner at 5:30. Members welcome.

March 24 **Albuquerque Chapter Meetings,** Fourth Tuesdays at REI, 1550 Mercantile NE, 6:00 to 8:00 PM, odd numbered months, only. Topic: electric utility company decoupling with Jason Marks.

Check our online event calendar at http://www.nmsolar.org/Pages/Events.aspx for the latest event listing.