Winter 2010 -2011

THE MAINE SUN

NEWSLETTER of the Maine Solar Energy Association

A Difficult Start in Niger

By Richard Komp

When we arrived in Niger I assumed that the planned cottage solar module workshop course would be the same as I have been doing in nearby Mali, Rwanda and many other places around the world. We had the work all planned and expected to drive off to a remote oasis in the Sahara Desert in a few days to meet up with the Tuareg and Wodaabe nomad tribes to begin the assembly of photovoltaic (PV) modules and the instructions on how to install them and use them. We spent the first day after I arrived in Niamey shopping for the glass, aluminum frames and the other locally available materials to build the PV modules.

However, when we went to a dinner out in the edge of town, given by nomad leaders who spend time in Niamey, we were told about the plans of a group of nomad bandits to kidnap 1st World people. These bandits (who call themselves Al Qaida but are not actually affiliated with the regular al Qaida groups) were supposedly doing this because the idiot in Florida was going to burn Qurans; but the Tuareg nomads told us they were doing it mostly for the ransom money. (*Continued on Page 3).*

Nomad group learning how to solder PV cells to make a module for a water pump

Output Power of Maine's Wind Generators

By Richard Komp

A number of people are concerned with the actual usefulness of wind generators here in Maine. There are several "red herrings" going around about how wind is not really a "green" source of energy in Maine. One of these is the concern that since the wind varies in both direction and strength, it is necessary to have coal powered power plants "standing by" to take up the utility load when the wind fluctuates. This problem turns out to be much smaller than usually presented and the solution involves the smart grid and energy storage. I will go into that subject in detail in a future Maine Sun. The second problem has to do with the fact that the wind farms in Maine don't produce anything like their rated power output. This is to be expected and is designed into the plans if the engineers are competent.

The rated output of wind generators is at the maximum wind speed they can handle before they start to feather to keep from being overpowered. That happens rarely if the correct wind turbines are picked for a particular location. You can derive from pure theory (I did so many years ago) that the power available in the wind goes up as the cube of the wind speed. This means that if you have a wind of 1/2 of the maximum, you will have a power output of 1/2x1/2x1/2 or 1/8 of the rated output (assuming that the efficiency of the machine stays the same for the different wind speeds. With a range of ever varying wind speeds, you have to use calculus and integrate over the wind regime.

Most wind farms produce between 20 and 30% of the nameplate ratings over time, which means that the Stetson wind farm at 14.5% is a bit below average, while the Mars Hill at around 28% is slightly above average. People who are going to build these wind farms put up wind measurement towers and collect at least a year's worth of data before they can get a permit, so they should have done the calculations on what to expect so they can make money.

By the way, photovoltaic (PV) systems aren't really any better. In Maine a typical PV array will produce about 1/5th (20%) of its nameplate rating in the summer but only about 15% in the rated power in the cloudy Maine winters. Good engineers also know all this and design for the actual expected conditions. I have software I wrote that can be used to do these design calculations for Maine locations and will happily send you copies.

The Maine Sun

Newsletter of the Maine Solar Energy Association

The Maine Sun is published four times a year by the Maine Solar Energy Association (MeSEA), a non-profit organization (sister chapter to the North East Sustainable Energy Association).

Our Mission:
We are dedicated to promoting the public awareness and use of:

- solar energy
- energy conservation
- other renewable non-polluting energy sources
- environmental and health awareness building practices throughout the state of Maine

Opinions expressed by authors or editors do not necessarily reflect the views of MeSEA. The publisher reserves the right to refuse advertising which is not consistent with the goals of this organization. Acceptance of advertising does not constitute endorsement of the advertiser, its products or services.

The Maine Sun welcomes articles, submissions, photographs, and letters. Please send editorial materials to the following address: **MeSEA P.O. Box 100 Lubec, ME 04652**
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Calendar of Events

MeSEA Website WWW.mainesolar.org

WORKSHOPS

Jonesport, Maine - Do Yourself Solar! Spring, 2011

Enjoy the SPRING! And the Solar Home of Dr Komp, in Jonesport!

April 8 & 9, April 15 & 16, 2011

Two weekends – (Fri. eve. lecture, 7 pm; Sat. workshop 9:30 – 4:30
Five-day PV module assembly Series. April 10 - 14 (9am – 5pm)
(With MeSEA Certificate for PV assembly workshop completion)

Site -17 Rockwell Rd, SE, Jonesport, ME 04649 ph.**(207) 497-2204**
Program presented by experienced MeSEA trainers.
To only attend one weekend, (one evening + one day) session - $125.
(Attend both weekend sessions for only - $225.) (partial scholarships available)

Five-day Intensive – PV program - $275. For MeSEA PV certification
(All noon meals included with each full workshop day).
Limited space is available for overnight stay, or longer, (add. fee).
Local motel info available.
We will try to keep maximum # of participants to 10 per day.
Call to reserve space – 207-546-1639, 516-669-2442, 207-497-2204
Reservation and $50. Dep. required / full payment due upon arrival,

Solar PV assembly - training for trainers and PV certificate with MeSEA.
PV assembly intensive for general public, five-day program.
(Apr. 10 – 14., - 9am–5pm, Sun.–Thurs.) $275
Five day intensive participants are invited to attend each weekend program for additional $80 **(**see description below).

Weekend Program:– Apr. 8 – 9 & Apr. 15 - 16), Power point / lecture and hands-on workshop, will allow all participants to fully experience the complete PV assembly and encapsulation process, developed in Nicaragua by Dr. Komp and Marco Antonio of Grupo Fenix, for third world "PV Cottage Industry". Saturday program will focus on the PV assembly and encapsulation. 60W PV modules will be available for sale to participants, to raise funds for third-world work!

How to… start a PV "Cottage Industry", Fri. 7:00pm lecture
How to… assemble 60W PV modules in the jungle!
With John Burke and other MeSEA facilitators- Including: a full, one-day PV assembly workshop, utilizing the third-world "cottage industry" encapsulation method. ***Continued on page 6***

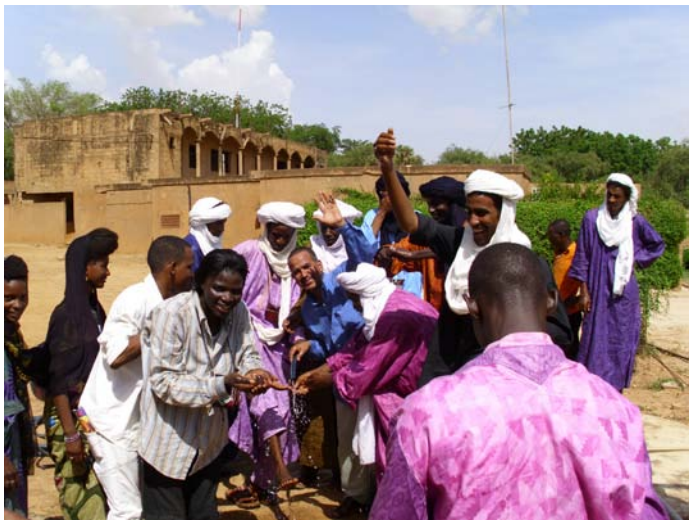
We changed our plans and arranged for the nomads to come down to an "undisclosed location" near Niamey. Three days after we got the warning, the bandits did kidnap 7 French workers from one of the uranium mines in the desert area where we were to be working (There is a lot of Nigerian politics involved in this event).

Because all this arrangement and traveling took so much time, we had only seven days for the actual workshop. I started the workshop by having everybody build small solar battery chargers and learn how to sort and cut the PV cells. We next built solar cell phone chargers and the special 52 watt PV modules designed to solar power the pump we were supposed to put in the well at the oasis.

The nomad group showing all the PV modules we made in 6 days of the workshop.

Before the week was over, we had also made 32 and 65 watt modules and took the pump and two modules to a well near Niamey to show how to install the pump. Everybody was thrilled to see the water gushing out of the delivery pipe and they mad sort of a ceremony of the production of the solar pumped water. I actually lived directly with the nomads for more than a week and got to know them quite well. Some of them are very excited about creating a worker owned company to manufacture the PV equipment and promise to make sure I am protected.

We finished the workshop with a ceremony where everybody signed the first PV module made in Niger. While some signed in French, most of the participants signed their name in the extremely ancient alphabet that has been used in the Sahara Desert for 10,000 years (they claimed). We had made four of the little solar battery chargers and four cell phone chargers; and since there were eight different nomad groups at the workshop, they drew numbers to see who got each charger to bring back to the desert with them.



Tasting the water being pumped by the just completed PV water pump system.

The workshop ended earlier than I would have wished because everybody was anxious to get back to their homeland to take part in the big celebrations and meetings of tribes that take place every year at the end of September.

I will be going back to Niger in January and will have to go up to the desert to continue this work, but we have received assurances sure that everybody understands that I am not to be kidnapped. Since the bandits belong to the Tuareg tribe, the leaders say they have enough control and there is enough interest on everybody's part to invite me back to safely work with the groups. I suggested that some of the bandits might wish to attend the solar workshops and learn a different profession. I'll keep you informed about the progress of this work.

Boeing Now Holds Record for Most Efficient Terrestrial Solar Cell

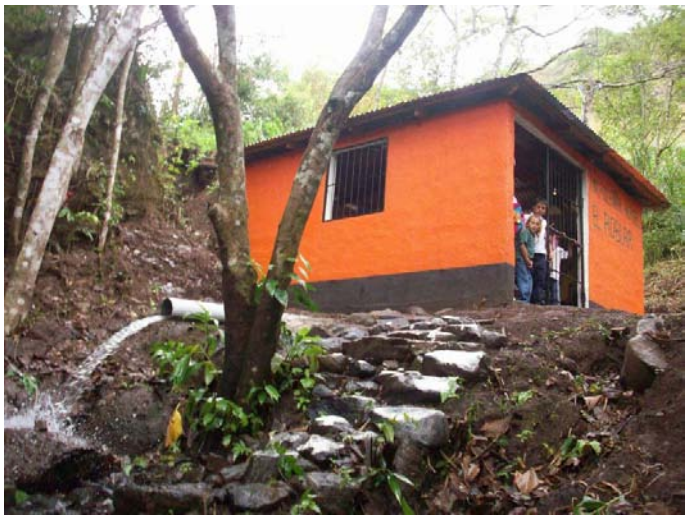
Last week, the Boeing Company announced that Spectrolab, a wholly owned subsidiary, has started mass production of its newest terrestrial solar cell, the C3MJ+. With an average conversion efficiency of 39.2 percent, Boing said that the C3MJ+ will be the industry's highest-efficiency cell. The concentrator photovoltaic (CPV) cells are an improvement on the C3MJ cells currently in production, which convert 38.5 percent of the sun's rays into energy. (*This multijunction PV cell was developed byChristine Myers [maiden name], one of our graduate students when I was at Wayne State University – RK)*

Spectrolab is a supplier of multi-junction photovoltaic solar cells, solar panels, searchlights and solar simulators. Spectrolab products have powered satellites since 1958 and have contributed to the on-orbit success of many commercial and NASA space missions, including the two rovers now working on Mars.

Inauguration of a Microhydroelectric Installation in El Roblar, Nicaragua

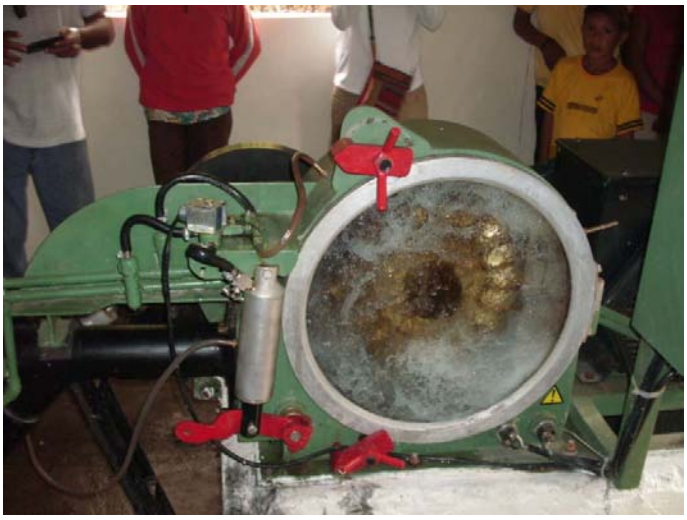
The Microhydroelectric System

On Saturday the 30th of January 2010, we traveled to El Roblar, a very remote community in the eastern part of Nicaragua, to take part in the inauguration of a brand new microhydroelectric installation there. Asociacion Fenix, a part of the Grupo Fenix since 1999 had organized the event to celebrate the biggest project they had ever accomplished. Jaime Muñoz, the director of AsoFenix, as the group is normally called, has been working with HIVOS, a Dutch NGO who paid the entire $40,000 cost of the 17 KW hydro installation. This sum included not only the hydroelectric Pelton wheel generator installation but all the costs of running the electric lines to three different locations and wiring up 100 homes plus community buildings for electricity, including furnishing all the 11 and 5 watt compact fluorescent lamps in the homes. The homeowners each pay a flat $3 per month for the service, since there are no electric meters. The actual Pelton generator cost $15,000.



The new microhydroelectric building being inspected by the local children

All the materials for the installation, including the rather heavy Pelton wheel generator, bags of cement powder, heavy plastic pipe and miles of electric wire had to be carried about 4 miles by hand by a group of 30 volunteers. These workers included local people as well as about a dozen student volunteers from all over the world. At any particular time, the Grupo Fenix, including AsoFenix as well as the other branches, such as the Solar Women of Totogalpa and Suni Solar have groups of volunteers who work with us on our various renewable energy projects. For more information on the Grupo Fenix or their volunteer program, go to the www.grupofenix.org website.



Examining the Pelton wheel generator

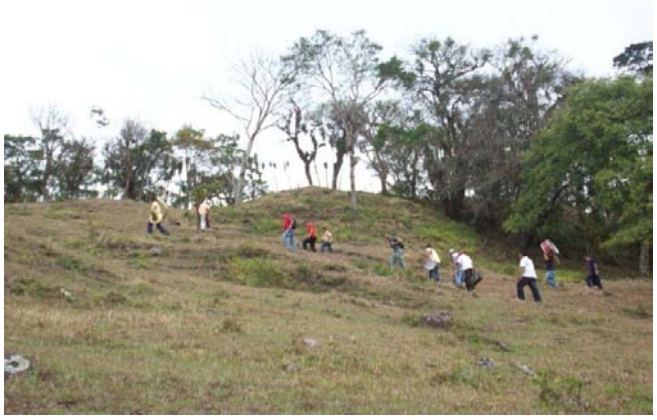
With a head of 120 meters (almost 400 feet) the generator produces 17 KW at maximum output, but an automatic throttling control adjusts the water flow to keep the generator spinning at 1800 rpm to produce 60 Hz three phase electricity at 480 volts, independent of the load. Transformers at the end of the three transmission lines drop this to the usual 120 volt AC used in Nicaragua (the same as we use in the US).

The system operates without a true dam; a small diverting weir collects the necessary water from the upper part of a mountain stream and runs it through a 4" diameter pipe to the generator building. This is normally less than half the stream's flow but can be a larger percentage in the dry season if the generator is operating at near full output. One of the Grupo Fenix rules for microhydro installations is: *Never build a dam or take all the water*. AsoFenix has a contract to install another similar microhydroelectric system this month, and possibly more in the future.

The Inauguration Fiesta

The Inauguration ceremony was a big local event. Not only members from all the different parts of the Grupo Fenix came, but volunteers from the Green Empowerment and Blue Energy NGOs were invited, and Martha Sarria, the mayor and other dignitaries of the nearby town of San Jose de los Remates also took part. Since El Roblar is in a very remote valley, we drove as far as we could in

"real SUVs": manual transmission, diesel engine, four-wheel-drive pickups with the backs filled with people (ours included a brass band in the back). Then we all got out and walked up one side of a mountain and down the other to the steep valley, about 4 miles. Some people rode horses, taking a slightly different, longer path with fewer stairs.



Climbing the mountain with the brass band

When we got to El Roblar, we were welcomed by the committee who are in charge of the microhydro installation and walked around the tiny village until the band was tuned up and the dignitaries arrived. It was a festive event with lots of live music and dancing, as well as the usual speeches and shaking of hands.

The mayor and Jaime Muñoz cutting the ribbon on the electric sewing machine, part of the ceremony inaugurating the start of the flow of electricity

Susan Kinne, the organizer of the Grupo Fenix and I were asked to start thing off by dancing with the people in charge. (What good is a renewable energy revolution without dancing?) I danced with the mayor of San Jose de los Remates, a very dynamic woman who played a part in getting the system installed. The brass band had a nice loud sound and could play salsa music as well as the traditional Nicaraguan music. After the ceremony and the lunch served to all of us, we had a tour of the microhydro installation.

Offshore Wind Moves to Full Speed Ahead

With the 'Smart from the Start' initiative, offshore wind is 'open for business' and ready to harvest 1,000 gigawatts. One presidential administration late, U.S. offshore wind got its go-ahead when Secretary Salazar officially launched the federal Smart from the Start initiative, which is designed to streamline approvals and move U.S. offshore projects into construction and production by 2015-2016.

The Energy Policy Act of 2005 established federal jurisdiction over offshore energy on the outer continental shelf (OCS) and called for rules and regulations to be established within 270 days of President George W. Bush signing the measure. More than four years later, President Obama -- on Earth Day 2009 -- ordered that regulations be issued. A week later, they were adopted.

Based on its streamlining of the federal lands approval process for solar power plant development in the Southwest, the Department of the Interior (DOI) Smart from the Start initiative for offshore wind streamlines the regulatory process for OCS leases off the Atlantic Coast.

"It was a long time coming," said Jim Lanard, President of the Offshore Wind Development Coalition. In predesignating Wind Energy Areas (WEAs), Interior's Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) could "save developers in the permitting process up to two years," Lanard said. The WEAs are intended to eliminate conflicts with uses such as shipping channels, Department of Defense protected areas, Federal Aviation Administered radar zones, commercial fishing waters and recreational waterfronts, Lanard explained.

See the next page for information on new sustainable living internships next summer in Downeast Maine. WWW.mainesolar.org

(Calendar of events continued from page 2.)

Climate Change and Global Warming Symposium
April 21, Machias Maine.

This free all day symposium sponsored by Clean Earth Farms and MeSEA will be held at the University of Maine in Machias. The morning session will concentrate on the science of climate change and the global methods of mitigating its effects. The afternoon session will be focusing on local efforts here in Maine to cope with the change in the climate that is already underway. Climate change is very real, caused by us and will have a profound effect on the people of Maine, especially in coastal communities and this will be an opportunity to educate yourself on this important problem and on local solutions.

Experts in energy and climate change from Brandeis University and MIT will be presenters as well as local experts like Richard Komp and Nancy Oden. The sessions are free and will be informal to give as many people an opportunity to participate in this important Earth Week event.

For more information and to register contact: Nancy Oden 207-497-5727 or MeSEA at 207-497-2204. cleanearth@myfairpoint.net

Falls Brook Centre Solar PV Workshop Series June 4-5 Knowlesville, New Brunswick Canada

This workshop will be focused on the construction of a 60 Watt Solar PV panel, as well as a solar thermal project. Dr. Richard Komp will lead the workshop, providing insight on the sources and uses of solar energy. Falls Brook Centre will be hosting the workshop at their off-grid conference centre, set on a beautiful organic farm and forested acreage. Individuals from the region are invited to participate. If you have a personal project in mind, be sure to bring your questions, too.

A home cooked organic lunch will be provided as part of the workshop, and accommodations and extra meals are available upon request at an addition fee. Cost for the weekend workshop will be $120. *For more information and to register*, please contact Greg LeBlanc – greg@fallsbrookcentre.ca or 1-506-375-4310

Grupo Fenix Solar Culture Course
July 5 - 16: Solar Culture in Nicaragua

Come to Nicaragua and engage your head, heart, and hands in the real work of developing countries. The Grupo Fenix's hands-on courses allow you to be immersed in the daily life of rural Nicaraguans by living with host families and working alongside local community members to create their vision of a model community through renewable energy and sustainable practices.

Discuss the theory behind solar energy and the challenges of development with your instructors and other course participants. Spend your days learning how to construct solar cookers, photovoltaic panels, and installing photovoltaic systems. Laugh along with your host family as you try to recall your high school Spanish, balance water on your head or make tortillas. Most activities and classes are held in the new adobe Solar Center. Housing will be simple, like that of a typical rural Nicaraguan family.

Summer Internships in Sustainable Living in Downeast Maine

MESEA, together with SEADS of Truth will be offering summer internships at three different nearby locations in Columbia and Jonesport, Maine. The interns will live and work on solar thermal and photovoltaic (PV) projects, and organic gardening at one or more of these locations which include Richard Komp's beautiful home on the coast of Maine, a long established SEADS workshop center on 40+ rural acres and a small organic farm. All three locations are off-the-grid with many solar and renewable energy features and all three need repair and upgrading work to make them more useful as alternative learning centers.

The internships arrangements will include free lodging. The only cost will be payments for food.

For more information and to register contact:
SEADS-Charles Ewing seads@maineline.net
MESEA-John Burke 516-674-9090
dadsolar@yahoo.com
Joan McMurray 207-483-4690

MESEA and Concerns of Spreading Do-It-Yourself-Solar Information

By John Burke

After hearing concerns from those involved with MESEA, and talking to others, we have tried to give a short explanation of why MESEA is not concerned with the do-yourself-solar PV assembly workshop information being used for profit by those who have experienced it.

The reason we give the workshops, is to further our efforts, by spreading the low-tech, do-yourself methods and help those with low skill levels, create a self-reliant lifestyle for themselves and their families. This work, around the world, has helped those with less education and opportunities, establish PV "cottage industries" that will benefit their communities and neighbors

We function as a not-for-profit corporation. Again, our desire is to spread the technology, to help create the beneficial effects between communities, local and world-wide, of self-reliance and sharing. Those who would "profit" by using these simple, low-tech methods are invited to do so, as long as the credit is given to those who have developed the methods used.

The same philosophy is attached to other do-it-yourself-solar projects included in the Maine Solar Primer and on more and more web-sites. Please feel free to help us spread this technology, so those less fortunate may feel the benefits and excitement of creating something that can give them a step towards self-reliant lifestyle and world peace. A world that is not profiting on the exploitation of each other, for non-renewable resources, will be that much closer to reaching true peace.

Recent MeSEA Workshops and Events

MeSEA has held PV workshops in New York City with The Young Women's Leadership School, in Manhattan; the School of Cooperative Technical Education, in Manhattan; and in conjunction with the New York Solar Energy Society www.nyses.org in the Bronx, NY. We are planning another MeSEA / NYSES PV workshop this month, August, in the Bronx. A PV workshop weekend planned in Minnesota, in conjunction with the Minnesota Renewable Energy Societ www.mnrenewables.org in October, as participants in the '10-'10-'10 nationwide programs with www.350.org; but had to be cancelled after John Burke had a stroke. However John is now recovering well and is active.

MeSEA Membership Form

Annual membership includes: a subscription to the quarterly MeSEA publication - *The Maine Sun,* 10% discount on workshop fees and MeSEA-sponsored events, networking with other like-minded people in Maine, contribution to the sustainability of our program, and the right to declare your donation to a 501(c)3 on your taxes.

Name(s): _____

_____

Address: _____

_____

Phone: _____

E-mail: _____

Individual MeSEA membership - $20. □

Ind. MeSEA/NESEA* member. - $55. □

□ new □ renewal □ upgrading

Family MeSEA membership - $35. □

Lifetime MeSEA membership - $1000. □

Corporate MeSEA membership - $150.□ **

Would you prefer to receive your Maine Sun by e-mail? □ yes □ no

* Save $5 with a MeSEA/NESEA membership which includes reduced rates at conferences plus a subscription to the *Northeast Sun*.

**This includes a business card – sized ad in each *Maine Sun*, and promo on our website, as well.

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