



WEC CO-OP CURRENTS

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July 2009

Bob Eastman: King of Honeybee Queens In West Fairlee

"If the bee disappears from the surface of the earth, man would have no more than four years to live."

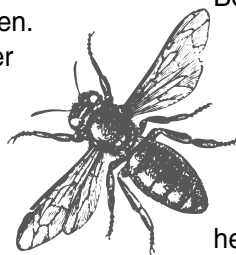
— Albert Einstein

Carefully, with no sudden or violent movements, Bob Eastman disassembles a hive body – a stack of wooden crates, each holding 10 frames that contain the waxy honeycomb – looking for a honeybee queen. Hundreds of bees crawl over one another on the frames, and dozens more fly around him, some landing on his shirt. He wears no gloves or netting, nothing more sophisticated than the "Husqvarna" work shirt from his establishment – Bob's Repair Shop on Route 113 in West Fairlee – about 50 yards away.

A telltale sign of the presence of a queen would be eggs in one of the frames. But queens themselves are surprisingly distinctive among their subjects, the "workers," "drones," and "attendants" that populate their buzzing realms; she is the largest of the bees and tends toward a lighter,

yellowish color.

This hive doesn't seem to have a queen, but as a final test Bob places a small wood and wire container about the size of a matchbox on one of the frames. In it is a queen (with four drones to wait upon her) that Bob has hatched separately. The container becomes the center of attention, as the honeybees gather upon it and bend their heads downward toward the queen.



"They're kissing her," says Bob, and he means it almost literally as their tongues are imparting a sweet substance to her. If there was a queen already in the hive, their rumps would be bent toward her instead, stinging her out of loyalty to the reigning monarch.

"They're glad to see her," says Bob. "They know they're doomed without her."

Bob Eastman has been keeping honeybees since 1963, when as a 21-year-old he continued a hobby he had learned from his father growing up in Strafford. His passion and dedication to beekeeping came to Mike Patterson's attention when Patterson, a Washington Electric Co-op field technician, was

continued on page 8



"While the sun shines!" There hasn't been a lot of that so far this summer, but this Vershire farmer took advantage of a rare sunny day in early July to cut his hay.

Air Conditioning Has Grown Hotter In Vermont Beware of 'Greenwashing'

If a few hundred years of recorded history is any indication, Vermont is going to have an actual summer in 2009, despite evidence to the contrary thus far in June and July. If that should happen, some Vermonters, including WEC members, may yet purchase and install air conditioning units or systems to get them through the season.

Washington Electric Co-op does not encourage its members to use air conditioning; it's a sizable additional

draw on the electricity resource.

However, it's an individual choice, and certainly the trend in our state has been in that direction. In recent years Vermont has joined most of the rest of the country by becoming a "summer-peaking" state. That means that the state's highest "peaks" of electricity consumption now occur

in the summer rather than the winter. In the aggregate, we are using more electricity to run air conditioners,

continued on page 6

Vermont has joined most of the rest of the country by becoming a "summer-peaking" state.

Washington Electric Cooperative

East Montpelier, VT 05651

Inside

We are not alone. There are nine other rural electric co-ops associated with WEC through the Northeastern Association of Electric Cooperatives. Like WEC, they're doing some interesting things. Meet Maine's three co-ops this month, on page 4.

Energy and IT. WEC is using the latter to improve its performance in the former, and to keep Co-op members informed. See Manager's Report, page 3.

To be or not to be – air conditioned? It's an individual choice, but if you're looking into AC or already have it, we've got some tips for you. Front page story and sidebar, continued on page 6.

Paying tribute to those who got us here. Our look back at 70 years of Co-op history continues in this month's 'Rear View Mirror' Page 2.

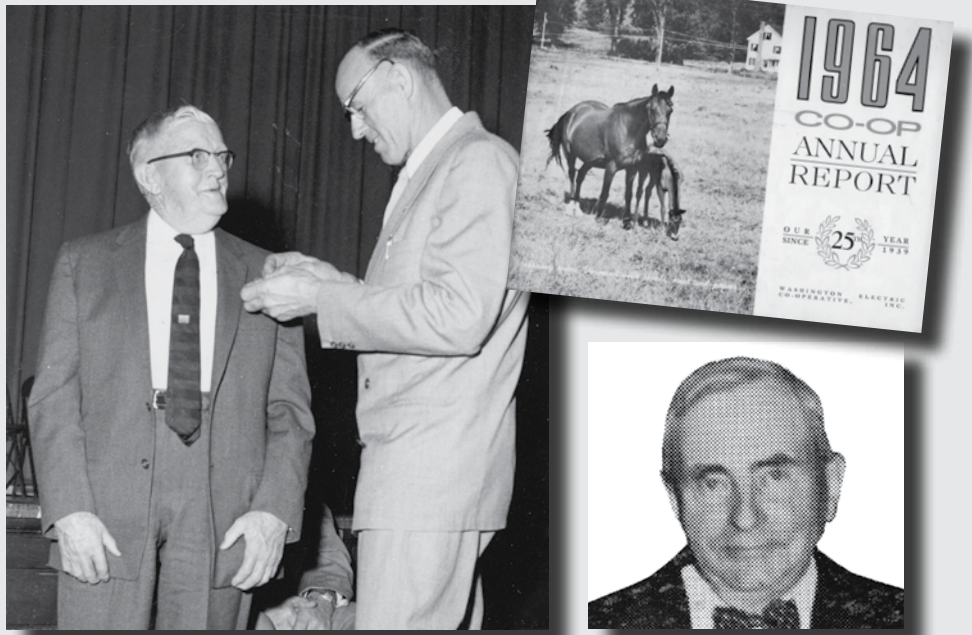


The Queen (circled) and her subjects. Our page 1 feature continues on page 8.

Rear View Mirror

Looking back at Washington Electric Co-op, on its 70th Anniversary

Scores of central Vermont men and women, members of Washington Electric Cooperative, have stepped up to help lead the Co-op during its first 70 years, devoting countless hours of their time voluntarily by serving on the Board of Trustees (renamed the Board of Directors in 2002). In the June issue of *Co-op Currents* we saluted the Trustees who served from 1939, the year the Co-op was founded, through the 1940s and 1950s. This month we are pleased to present the names of all the Trustees who served during the 1960s and 1970s.



Top left: Two Co-op stalwarts, founding member and longtime Washington Electric Cooperative Trustee Lyle Young (left), with John Larkin, Co-op president from 1954 to 1975. Middle right: 19-year board member G. Elam Bailey. Below, WEC's line crew, 1966. Back row, from left: Cy Lambertson, George Lane, Joe Copping, Hank Poirier, Bud Newton, Harvey George, and Myron Bowen. Kneeling: Bob Lovely, Phil Porter.



In 1972 a fire destroyed the co-op's garage and the vehicles parked in it. The garage -- located across Route 14 from Washington Electric's office -- was rebuilt, and in recent years part of the building has been leased to the East Montpelier Fire Department. Loss of the garage led eventually to WEC's constructing its present, more spacious garage and warehouse facility near the Huntington Homes factory off of Route 14.



- | | |
|-----------------------------------------|------------------------------------------|
| Lyle Young: 1939-1961 | Roland Foster: 1964-1975 |
| John Larkin: 1942-1974 | Frank Cate: 1970-1972 |
| Glen Button: 1944-1953; 1957; 1978-1981 | Eva Morse: 1973-1982 |
| George Ricker: 1946; 1954-1974 | Margaret Lucenti: 1975-1978 |
| Clyde Thompson: 1946-1961 | Robert Fisher: 1975-1978 |
| Wendell I. Goodrich: 1947-1970 | Robert O'Brien: 1975-1977 |
| J. Rollin Bruce: 1950-1975 | Donald B. Welch: 1976-1986 |
| G. Elam Bailey: 1952-1971 | Gene Parent: 1977-1980 |
| Charles Carpenter: 1954-1976 | Frank Sahlman, Sr.: 1977-1985 |
| Eugene Eastman: 1954-1976 | Gordon Booth: 1977-1992 |
| E. Clyde Fitch: 1955-1969 | Norman Bitterman: 1977-1980 |
| James Quimby, Jr.: 1961-1976 | Frederick Ladue: 1978-1990 |
| George Sibley: 1963-1974 | William Waite: 1978-1984; also 1986-1988 |

Co-op Currents

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WEC is part of the alliance working to advance and support the principles of cooperatives in Vermont.
www.vermontcooperatives.coop

Board of Directors

President	BARRY BERNSTEIN (May 2010)	1237 Bliss Road, Marshfield, Vt. 05658 Bbearvt@aol.com	456-8843
Vice President	ROGER FOX (May 2012)	2067 Bayley-Hazen Rd., East Hardwick, Vt. 05836-9873 rfox@pivot.net	563-2321
	ANDREA COLNES (May 2012)	918 Jacobs Road, East Montpelier, Vt. 05602 alc@sover.net	223-8474
Treasurer	DONALD DOUGLAS (May 2011)	21 Douglas Rd., East Orange, Vt. 05086 dondougl@gmail.com	439-5364
	KIMBERLY CHENEY (May 2010)	143 S. Bear Swamp Rd., Middlesex, Vt. 05602 kcheney@cbs-law.com	223-3181
	ROY FOLSOM (May 2010)	2603 US Rt. 2, Cabot, Vt. 05647 RoyGrnsy@aol.com	426-3579
	DAVID MAGIDA (May 2011)	632 Center Road, Middlesex 05602 vtmagida@aol.com	223-8672
Secretary	MARION MILNE (May 2011)	1705 E. Orange Rd., W. Topsham, Vt. 05086 milne@tops-tele.com	439-5404
	RICHARD RUBIN (May 2012)	3496 East Hill Rd., Plainfield, Vt. 05667 rrubin@sover.net	454-8542

AVRAM PATT General Manager avram.patt@washingtonelectric.coop	WILL LINDNER Editor Willind@aol.com	TIM NEWCOMB Layout
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Editorial Committee

Avram Patt Donald Douglas David Magida Will Lindner

The Board of Directors' regularly scheduled meetings are on the last Wednesday of each month, in the evening. Members are welcome to attend. Members who wish to discuss a matter with the Board should contact the president through WEC's office. Meeting dates and times are subject to change. For information about times and/or agenda, or to receive a copy of the minutes of past meetings, contact Administrative Assistant Deborah Brown, 802-223-5245.

Manager's Report

A Brave New Electronic World

IT, Twitter, Smart Metering, and WEC

By Avram Patt

Over the past several years Washington Electric Co-op has been steadily improving, upgrading, and modernizing how we communicate and manage information electronically. We also have plans or are considering further changes in the near or not-too-distant future



their bills electronically. We expect to offer this by the end of this year. Members are becoming increasingly comfortable with receiving and paying bills online, and this will further reduce our postage and paper costs.

Member Communications

- We encourage members to visit our website, where you can find all sorts of information such as billing and rates, information on efficiency, renewable energy and products and services we offer, bylaws, annual financial reports, WEC's history, our Coventry landfill-gas generating plant, and much more. We update our website from time to time and will be looking for further ways to make it more useful.

- *Co-op Currents*, our member newsletter, has been published since the Co-op's founding in 1939, when it was printed on a mimeograph machine. It is now written, reviewed by the Editorial Committee, laid out and sent to the printer via the wonders of computers and the internet. An archive of every *Co-op Currents* going back to October 2000 is on our website.

Although I think most readers still appreciate getting a printed newsletter in the mail, we will most likely offer members an option to have *Co-op Currents* sent to you electronically.

- The growth of interactive electronic networking media like Facebook and Twitter is causing us to look at new ways to provide information, answer questions and interact with members, and to provide a new means for WEC members to discuss questions of interest amongst themselves. I expect that we may stick our toe in the water and see if we can use some of the newer electronic communication methods to stay in touch with members and to involve more of our younger members, as well as making fuller use of the e-mail addresses we already have for many of our members.
- *Good old-fashioned e-mail*. It wasn't long ago that e-mail was the latest thing. We e-mail constantly at WEC in the course of doing business, and if you would like to contact me or

members of your board of directors, our e-mail addresses are listed on page 2. And yes, we still take phone calls and letters with postage stamps on them, and you can stop by the WEC office to talk as well.

The Smart Grid And Smart Meters

There is a lot of talk in the news about "the smart grid" these days, and about "smart meters," and I expect that we will have a lot more to say on these related subjects in future issues of *Co-op Currents*. I say "related subjects" because the terms actually mean somewhat different things and the distinction is important.

President Obama, Energy Secretary Chu, utility people, and many renewable energy advocates have been saying that we need a new and smarter transmission infrastructure in order to truly convert to cleaner and renewable sources of electricity generation. We

need to be able to transmit renewable energy over longer distances to take advantage of sources like large-scale wind or solar, and we need the transmission grid to be flexible enough to respond to changes in weather, time of day, and demand by energy consumers. This aspect of the smart grid is really a change at the utility and generation industry level, and it is needed not just as part of a conversion toward renewable energy

sources, but for basic reliability and energy security reasons as well.

There is also a lot of talk (and in my opinion maybe a touch of hype) about smart meters. Smart meters are a major technological step forward in providing two-way communication between the consumer and the utility, and in providing detailed hour-by-hour or minute-by-minute information to consumers about their usage. Instead of meters being read monthly, the data is available electronically on a constant or "real time" basis. With smart meters, both the consumer and the utility can be much more sensitive to the day or the time of day when electricity is being used. This technology can provide an opportunity to decide when to use electricity, as well as just how much you use overall. If electric vehicles and plug-in hybrids become readily available a few years from now, electric usage patterns may change noticeably, and smart meters could be important in assuring that such new uses improve the environmental and economic impacts of energy generation.

Another important advantage

offered by smart meters is that the utility can tell whether the power is on, and whether the voltage is at the right level, at each individual location on the system, which will further improve maintenance and outage restoration.

We have been looking at smart meters for a number of years, and actually tested a type of smart meter several years ago that was "not ready for prime time." Now Vermont's utilities and our state government are actively looking at smart metering implementation. Our sister co-op, Vermont Electric Cooperative, is in the process right now of changing all their old meters to the new smart meters, and is the first electric utility in the state to make this changeover.

I am a little skeptical that smart meters will have as much benefit as some people say they will in one particular area. For a utility in WEC's situation – overwhelmingly residential and with members on average using much less electricity than in other places – I don't think we will see as much benefit from getting people to shift their time of use of major electric load. There's not that much load to shift in most WEC members' homes to begin with. I do think smart meters will provide both you and Co-op staff with a great deal of useful information about how and when you use electricity, that will help further reduce your usage overall. And there are significant other benefits in terms of managing our distribution system and getting the power back on after a storm.

Converting to smart meters is a big and a very costly undertaking, and I expect that WEC will make the change a few years from now. Whether to change to smart metering and when to do it are decisions that your board of directors will be actively involved in, to make sure we are making the right choices, to make sure that there is a financial benefit, and to fit a project like this in along with other important priorities for the Co-op and our members.

Electronic communication between your meter, your appliances, your Co-op, and the rest of the hopefully smarter regional and national grid are coming. At Washington Electric Co-op, we have done well by being careful and prudent when making major long-term decisions, and we are applying that same care in analyzing and making decisions about smart metering.

I would appreciate hearing from members who have ideas about how Washington Electric Co-op can better use electronic communications to inform you and encourage dialogue. As always, feel free to contact me if you have questions or comments about these or any other matters.



THE NEAEC CO-OPS

In Maine, One (Co-op) By Land And Two By Sea

On a Saturday morning in spring, your intrepid *Co-op Currents* editor drove to a central Vermont lumberyard to buy some 2x12s to build raised beds for the vegetable garden. He selected half a dozen 16-footers milled from fir, and asked the lumberyard worker where they came from.

"Canada," said the man. "It's all coming from Canada these days."

When rural industries like logging suffer in the U.S., electric co-op members somewhere lose their jobs. The lumberyard worker's answer brought to mind Eastern Maine Electric Cooperative, which serves the town of Baileyville where the Domtar Corp. closed its pulp mill on May 5, putting 300 employees out of work. Like WEC, Eastern Maine Electric Cooperative (EMEC) is a member of the Northeast Association of Electric Cooperatives (NEAEC).

"They shut down the paper machine about two years ago," says EMEC Chief Executive Officer Scott Hallowell, "and in May it was the pulp mill. They had 70 megawatts of their own electric generation and were self-sufficient, so that didn't affect us when they went down. But 300 jobs lost – for us, that's a big deal. And then you have the ancillary jobs that can disappear. The way it affects the co-op is the potential for some people to leave the area, and for others for it to be harder to pay their electric bills."

The loss turned out to be temporary. Domtar announced in June that it would reopen the pulp mill (not the paper machine). But the event underscored the fragility of rural economies, and that means uncertainty for electric co-ops – because electric cooperatives brought power to rural America, and in most places they still provide it.

Maine's other two electric co-ops also have faced hardships. Tiny Swan's Island Electric Cooperative serves 297 year-round members and 233 seasonal members. Swan's Island is about three miles by ferry from Bass Harbor, just south of Acadia National Park; 50 of its members live on the island of Frenchboro, connected to their co-op by an underwater cable.

"Most of our members are lobster people," says General Manager Lorraine Stockbridge. "The fishing's been very slow. The price for lobsters is not good, and with all the other prices going up it hits the fishermen hard. They have to pay for their fuel, and at \$1,000 or so for two or three days of fishing it really hurts."

But despite the hardships, you don't hear a lot of complaining by the men and women in charge of these rural electric cooperatives. They're busy doing what co-ops do – serving their member/owners on a nonprofit, cooperative basis and coping with

the challenges of operating in diverse rural territories. And like WEC, several are finding innovative ways to secure affordable power from local, renewable resources, to combat rising energy prices and climate change.

The nine other NEAEC co-ops – three in Maine, one in New Hampshire, two in Vermont, and four in upstate New York – are interesting organizations, sisters, in a way, to Washington Electric. In June, *Co-op Currents* featured articles on the NEAEC. In this and following issues, we'll introduce these member co-ops, starting with Maine.

Fox Islands Electric Cooperative

Fox Islands EC is like Swan's Island EC, but larger. It serves residents, businesses, and visitors to two islands: Vinalhaven, an 11-mile, 45-minute ferry ride from the mainland harbor at Rockland; and smaller North Haven, separated from Vinalhaven by a thoroughfare of ocean. Fox Islands EC's general manager, Charles (Chip) Farrington, says, "There are probably about 1,200 people here year-round, and 600 more in the summer."

The company started out as a private utility, not an electric co-op, but it was tough providing power to an island.

"They had an oil-fired generator, and over the years the unit deteriorated and deteriorated until they'd have about an hour on, then an hour off," says Farrington. "The town fathers went to the REA (the U.S. Rural Electrification Administration, since renamed Rural Utilities Service) and got a loan for a submarine cable from Rockport."

That meant becoming a cooperative, turning "customers" to "members," and electing nine islanders to a new board of directors. That all happened in 1974. In the early 2000s Fox Islands received \$6.5 million in loans and grants from the RUS to put in a new and better cable.

"Between tidal changes and the fishing industry [the original cable] took quite a beating. We were constantly fixing it," says Farrington.

"Between tidal changes and the fishing industry the underwater cable took quite a beating. We were constantly fixing it."

— Chip Farrington
Fox Islands Electric Co-op

"The replacement uses more advanced technology and it's buried several inches into the ocean floor."

Submarine cables are a new kettle of fish for Farrington, who is a Vermonter, the former general

manager of Vermont Electric Co-op and for 10 years the chief financial officer for Vermont Gas Systems in Burlington. He and his wife, once the assistant town clerk in Stowe, still have a home in Hyde Park, Vermont.

The Vermont connection also surfaces in Fox Islands' power supply. The island co-op contracts with the Vermont Public Power Supply Authority in Waterbury Center to administer its power transactions. The purchased power is conducted through Central Maine Power Co.'s system to the Rockport substation, and thence underwater to North Haven and Vinalhaven.

The big problem for Fox Islands is cost. Imported power is expensive, and the co-op has a substantial investment in infrastructure shared among just 1,900 members. Farrington says the co-op's rates now average around

28 cents per kilowatt-hour (kWh), which is double the rate paid by most WEC members. And with the costs of natural gas and oil rising, those rates are sure to go up.

Fox Islands' solution? Wind power! Fox Islands Electric Cooperative is well along the path toward constructing four wind turbines on a 71-acre hillside on Vinalhaven.

"It's about a \$14-million project," says Farrington, "a pretty big project for a little co-op."

To swing the deal, the nonprofit co-op has fashioned a financial arrangement built around an equity-holding subsidiary

called Fox Islands Wind, with its own seven-member board of directors, along with a bridge loan from the Cooperative Finance Corp. and a potential loan from the RUS. A seasonal co-op member who is a business professor at Harvard University has lent his expertise to the project.

"We'll have a purchase-power agreement with Fox Islands Wind," Farrington explains, "with the co-op taking 100 percent of the power."

It could be not only a money-saving, but a money-making proposition.

Farrington says the wind turbines will generate around 11.5 million kWh a year, but the co-op will take less – around 10.5 million kWh. The undersea cable can transport electricity in both directions, so there should be a market for the surplus power on the mainland.

"We've had a lot of hoops to go through – a lot of Maine regulations, a bird study taking into account spring and fall migrations. But the end is in sight. The turbines will arrive sometime in August and the project is scheduled to go into commercial operation this fall."

Pretty soon the little two-island cooperative could be living off power generated from the hefty breezes of the Atlantic Ocean. Certainly there's nothing small about Fox Islands Electric Co-op's ambition.

Swan's Island Electric Cooperative

And you know what? Swan's Island EC might follow in its wake. SIEC is considering a two- or three-turbine wind project of its own.

"The rates to the outer islands are extremely high," General Manager Stockbridge explains. The co-op buys all of its power from Bangor Hydro Electric Company, "and we've been paying a 16-cent [per-kWh] delivery charge, so the cost comes to a good 28 cents for our ratepayers. We're trying to look at a cheaper way to produce power. We've got one of the best spots [for wind turbines], they say."

The coastal wind drops off somewhat in the summer, so SIEC would probably need to supplement its generation with power from the mainland. "The rest of the time we'd be producing more than enough," Stockbridge says. Consultants recently completed an 18-month study of the wind resources with strategically placed anemometers and wind-direction indicators.

SIEC has been consumer-owned since 1949. It generated its own power until the 1970s, when a cable was laid from the mainland. And although Swan's Island is, in Stockbridge's words, "a pretty good-sized island," the nine-member board of directors is three times larger than the current working staff.

"There's just me and the bookkeeper and a part-time lineman," she says.



Swan's Island Lighthouse

“We’re down to just me and the bookkeeper and a part-time lineman. We’ve been advertising for help, but it’s hard to get somebody to come live on an island.”

— Lorraine Stockbridge;
Swan’s Island Electric Co-op



Burdened by the cost of importing electricity from the mainland, Fox Islands Electric Cooperative is constructing a four-turbine, 11.5 million kWh wind project this summer. The community voted 382-5 in favor of the project, which will be the largest wind-electric facility on the East Coast. The simulation above shows what the project will look like from a cove off the island. At right, more than 120 islanders, officials, and project workers gathered on June 29 to celebrate the project’s official groundbreaking.



“We’ve always had a lineman and a ground man [an assistant, not trained to climb or do sophisticated electrical work], but we’re down to just a part-time lineman, a day or so a week and on standby for storms. We’ve been advertising, but it’s hard to get somebody to come live on an island.”

The ferry runs two or three times a day, and can carry up to 17 cars – not a bad commute, but not the greatest arrangement for providing service in the event of an outage. SIEC hopes to remedy the situation before long.

Eastern Maine Electric Cooperative

It would be hard to imagine a greater contrast to the small island co-ops than Maine’s third consumer-owned electric utility, the Eastern Maine Electric Cooperative. Not only is it on dry land, but it’s a sprawling, very rural co-op whose 3,000-square-mile service territory is about the size of Rhode Island and Delaware combined. EMEC maintains this territory and its 1,700 miles of power line with 13 linemen – the same number of linemen usually on Washington Electric’s staff.

“It’s a challenge,” admits CEO Hallowell, “but they’re good linemen. When you stack them up against the other utility employees around, I’d say overall ours exceed the others. They go the extra mile for the members.”

Geographically, the co-op is located in the part of Maine that juts eastward

toward New Brunswick. It serves members in 70 towns in Aroostook, Washington, and Penobscot counties. The territory is remote and beautiful in that austere Maine way, dotted with freshwater lakes. EMEC’s central office is in Calais, but it also has two satellite depots where linemen are stationed in order to reduce “windshield” time and facilitate outage response.

Here are some unusual things about Eastern Maine Electric Cooperative, from a Vermont perspective. It gets all of its power from Canada – which means that it is

basically not connected to the U.S. electric system. (In that way, EMEC is kind of an island co-op, too.)

“Our power comes in at Calais from New Brunswick,” Hallowell says, “and that serves 80-to-85-percent of our system. Up north we’re a transmission customer of Maine Public Service, but their power is Canadian as well.”

Eastern Maine Electric Cooperative’s 3,000-square-mile service territory is about the size of Rhode Island and Delaware combined, and it maintains its system with 13 linemen – the same number as Washington Electric.

Those two sections of the co-op’s system aren’t connected, which makes it harder for Eastern Maine to achieve the kind of “redundancies” WEC has been building into its system – that is, the ability to supply members from alternative substations in the event of an outage.


Something else that distinguishes EMEC from WEC is that Maine went to a deregulated, open-market system for its utilities in 2000. (Vermont was among the minority of states that

resisted the trend.)

“We’re a wires-only company now, not a power supplier,” Hallowell explains. “Our bill is broken into two sections: Delivery Service, for our distribution and transmission system; and “Electricity Supply”; this is for the electrons, the actual electricity. We bill for that but remit the money to the energy supplier, a company based in Wisconsin.”

That doesn’t diminish Eastern Maine’s determination to represent its members like any other electric co-op. EMEC recently opposed a complex proposal that would connect northern Maine to the stateside ISO (independent service operator) instead of Canada.

“Wind [power] would be a part of the picture,” says Hallowell, “and the construction of new transmission lines. But the rates to our members would have increased in the neighborhood of 1.5 cents per kWh. We’re not opposed to wind, nor to upgrades in transmission; the country needs that. We were opposed to the IOU (investor-owned utility) reaping all kinds of profits for shareholders, the wind developer making money in the marketplace, and for our members the only effect would be to increase the cost of power. We had to be adamant against that.”

The plan was rejected, but could reappear in a modified version. It’s a drama that reveals the complexity of electricity issues – and another example of how Eastern Maine Electric Cooperative, Fox Islands and Swan’s Island co-ops find their own ways to serve their rural members in a dramatically changing world. 



Right: Eastern Maine EC has an enormous territory to maintain, but managed to send four linemen (two at a time) to help New Hampshire Electric Cooperative restore power after the big ice storm last December (2008). The four, from left to right, were Bill Gillespie, Nate Maxwell, Mike Carrier, and Jason MacArthur. The picture was taken when Bill and Jason showed up to relieve Nate and Mike. Bottom: EMEC’s headquarters in Calais, Maine, where the co-op’s electricity comes in from New Brunswick, Canada.



Eastern Maine Electric Co-op’s CEO, Scott Hallowell.

Air Conditioning

continued from page 1

fans, refrigerated food-storage units in stores, pool filters, and summertime appliances than we use in the winter to power our heating units and light our homes in the dark afternoons and evenings.

Washington Electric remains an exception to the trend. WEC still experiences its highest peak demands in winter, even though summer usage has increased significantly. General Manager Avram Patt explains that demographics are the reason.

“In our territory, because we’re 97-percent residential, with predominantly single-family as opposed to multi-family housing, we haven’t followed the statewide trend,” says Patt. “Office buildings, and commercial spaces like malls with several thousand square feet of interior space, are virtually all air conditioned now, and we have almost none of those on our system. Go to Chittenden County and see the amount of commercial space, and you can see why the state’s peaking pattern has changed.”

It’s not just Chittenden County and other population centers, though. Resort areas – which used to be called “ski areas” in Vermont but which now

market themselves as four-season attractions – have developed hotels and condominiums for summer visitors, who must be kept cool and comfortable.

WEC’s rural territory happens not to include such resorts. So the Co-op remains a winter-peaking island in a summer-peaking sea.

But if you want to be cool...

That said, portable air-conditioning units are sticking out of the windows of more WEC homes every year, and some new homes are being built with central air conditioning. WEC’s summer peak has definitely gone up.

Co-op members are among the most efficient energy consumers in Vermont,

so it’s likely that those interested in adding air-conditioning to their homes will be looking for the ENERGY STAR® label and perhaps reading *Consumer Reports*.

Bill Powell, WEC’s director of products and services, encourages such research, but has some words of advice.

“There’s a lot of ‘greenwashing’ going on,” says Powell. “Just because manufacturers call their products green or environmentally friendly doesn’t mean they won’t increase your energy usage.”

“There’s a lot of ‘greenwashing’ going on out there,” says Powell. “Manufacturers are calling their products ‘green’ or environmentally friendly, and in some cases they’re getting smiled upon by ENERGY STAR® and *Consumer Reports*. That doesn’t mean they won’t affect your energy usage and increase your energy bill. So my first suggestion regarding

air conditioning is that people consider how much they would actually use it and whether the cost and the energy consumption are worth it.

“But if they are,” Powell continues, “my second suggestion is to look beyond the ‘green’ or ‘energy-efficient’ designation. Because those designations are relative.”

An example, says Powell, is the Dave Lennox Signature® Collection SunSource™ solar-assisted comfort system. (They really do call it a “comfort system.”)

Lennox is a familiar name in home appliances, and name recognition could

work in favor of this unit, which is an air-to-air heat pump (not a window air conditioner) that can both heat and cool your space. It comes attached to a 200-watt solar panel.

The company’s advertising boasts that the system is “ENERGY STAR® qualified.” And the fact that it comes with its own small solar panel is appealing to conservation-minded folks because it’s an opportunity to use solar energy without going to the expense of mounting photovoltaic (PV) panels on the roof or in the yard.

But Powell is not impressed.

“They have greenwashed what’s

Dos and Don’ts for Air Conditioning

First Step: Weatherize

Air conditioning is an extra energy load and cost, optional for most of us but certainly necessary for some. If you’re going to use it, General Manager Avram Patt reminds Washington Electric Co-op members that the same weatherization principles that apply to conserving heat in wintertime also apply to conserving cool air in the summer.

“When you’re air-conditioning a home you are still dealing with building-envelope issues,” says Patt. “A well-insulated and very well-sealed building is critical for conserving your air conditioning.”

The physics of air infiltration and air leakage are similar – though not precisely the same – when the warm air is outside and the cool air is inside, as when the reverse is true in winter.

The greater the difference between the inside temperature and the outside temperature, the more energy you must consume to bring the house into the comfort range (say, 65 degrees to 75 degrees) that most people prefer year-round. In summer, cool air will escape if your home isn’t insulated and sealed. Investing in air conditioning without investing in weatherization improvements would be a waste of both money and energy (a good opportunity to remind people that assistance is available via the temporary financial advantages contained in the federal stimulus bill – the American Recovery and Reinvestment Act).

Besides tightening up your house, here are some other things to be mindful of if you use air conditioning:

- **Don’t leave any doors open.** Sure, that’s pretty obvious, but it’s a habit for some people to enjoy their screen doors and let the peaceful sounds of summer come inside. Your costly cool air will disappear on you if you do. The same goes for your windows.
- **Turn your air conditioning off or down when you leave the house.** “Down” is up in the summer; you want to set it at a higher temperature level so your unit won’t run more than necessary. Do the same thing at night, although you’ll want to find a comfortable sleeping temperature. If you have a central air conditioning system, consider a programmable thermostat that will cool your house shortly before you arrive and save energy when the house is normally vacant.
- **Limit the direct sunlight that comes into your house.** Especially when the windows are down (as they should be), the glass will intensify the sun’s heat, making your air conditioning system work harder. So use your blinds or shades. The whole house doesn’t have to be dark – it would be a bummer to develop Seasonal Affective Disorder out of season – just the rooms where the sunlight pours in.

Another word of advice for Co-op members. If you use an air conditioner (especially one without the ENERGY STAR® label) and want to know how much electricity it’s drawing you can borrow a test meter from the Co-op and measure its usage. That could help you decide whether the unit is worth operating. Products & Services Director Bill Powell can provide informed assistance in making decisions whether to keep or replace an air conditioner or any other appliance.

With proper equipment and usage you can conserve your air conditioner, conserve your energy, and conserve your money.



A section of three-phase power line, recently reconstructed by WEC with spanking new poles and wires, comes marching over the hills in Chelsea.

basically a heat pump heating and air conditioner by adding 200 watts of PV. That 200 watts is just a fraction of the machine's rated load [the amount of energy it uses]."

Because the two are packaged together, a consumer might assume that the solar panel will operate the air conditioner. No way, says Powell, who calls the solar panel a "green fig leaf."

Something new under the sun

Something Powell finds more interesting is a new product called the "Coolerado." It uses less electric power than conventional air conditioners, and although it can be used with solar power it comes as a standalone unit.

(*Environmental Building News* points out an interesting virtue of linking air conditioning and solar power: people are more likely to use their air conditioning on sunny days, which is also when you can get the most production from a PV system. In a favorable review of the Coolerado, the magazine explains that "[o]ne of the holy grails of air conditioning is to get

the electricity consumption low enough that it's practical to use photovoltaic panels"; in other words, where solar panels aren't just fig leaves but can actually power the unit, or come close.)

Whether it's drawing solar or conventional power, Powell says the reason the Coolerado consumes less electricity is that it's a different kind of air-conditioning device.

"It has a variable speed drive – VSD – which seems to be unique for residential commercial air conditioners. Any electric motor will either run at one speed or at variable speeds, and today industrial designers are putting in VSDs more often where there used to be one-speed motors. The one-speed is usually oversized for what's needed, and equipment that operates under varying conditions but uses a one-speed motor will tend to consume a lot more power than units controlled by a variable speed drive."

Another difference is that the Lennox and many other air conditioners use conventional refrigerant (coolant) technology, while the Coolerado is an "evaporative cooler": it uses water to

achieve cooling by passing air over a cold, wet surface. Evaporative coolers are also called "swamp coolers." And although "swamp cooler" isn't meant to be a derisive term, Powell is quick to point out that swamp coolers can be duds.

"One of the evaporative coolers on the market is the Cool Surge, and *Consumer Reports* has panned it," says Powell.


The manufacturer claims the portable Cool Surge will rapidly cool an average-sized room up to 10 degrees using an amount of energy equivalent to a 60-watt bulb (less than 20 cents a day). *Consumer Reports* tested the Cool Surge and found that its energy usage was as low as advertised – but "during our four-hour test it failed to lower the average room temperature appreciably." Hardly a "surge" – and that failure earned it a Don't Buy rating.

"The lesson to draw is that it's 'buyer beware,'" Powell concludes. "On the one hand you have the Coolerado, which is getting excellent reports. On the other hand you have another of the evaporative coolers, and it gets a Don't

Buy rating. People need to do some research to make sure they're spending their money on a machine that's going to work for them. One way to do that kind of research is by calling the Co-op; we can work with them to help them make a wise decision and a wise investment."

The Coolerado is new, and Powell warns that it may not be as easily available in Vermont as traditional air conditioners.


There's also another factor: "The Coolerado isn't as electrically energy-intensive as a multi-ton rated air conditioner. If you live in Houston or Atlanta the Coolerado may not be as satisfactory. But if you live in Vermont and you have relatively short-term or low-level cooling needs, this technology seems to me to be more attractive, even if the Lennox does have the ENERGY STAR® rating.

"A term I would use is that the Coolerado is 'regionally appropriate.' For our environment you don't need to spend the kind of money the other unit costs." 

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Bob Eastman

continued from page 1

scouting West Fairlee on a right-of-way relocation project. The Co-op plans to move a section of power line that is presently almost inaccessible across a branch of the Ompompanoosuc River, building it closer to the road where it can be better maintained.

To make that happen, Patterson needs to seek WEC members' permission to stretch the right-of-way across a part of their land. (As it turns out, there are only three WEC meters in West Fairlee, and two of them belong to Bob Eastman – one at his house and one at his shop.) Patterson stopped in at Bob's Repair to ask about setting a few poles on Bob and May Eastman's property, but the discussion somehow turned to honeybees. Patterson, an outdoorsman himself, was fascinated.

"He's really into it, and has an association to help people learn about it and things we should be aware of," said Patterson. "It's one more pitch for the planet Earth, the way I look at it."

In fact, it could be a very important pitch. Albert Einstein is said to have linked the bee's survival to our own. The quote (on page 1) strikes some as mysterious, since Einstein wasn't an entomologist or a beekeeper; but whatever Einstein had in mind, it's worth speculating whether the sudden and mysterious disappearance of honeybees in the U.S., Europe, Brazil and other places is a wakeup call. Observers became alarmed in 2007, when not only wild honeybees (which are said to be virtually gone now), but the hives kept by commercial beekeepers who truck their apiaries all over the country to pollinate crops and

orchards were effected – not to mention backyard beekeepers like Bob Eastman who tend their hives for enjoyment and perhaps sell their surplus honey at the Tunbridge World's Fair.

The syndrome is called "colony collapse disorder." Swarms of bees become disoriented and abandon their hives for no apparent reason. Often those that are left are plagued with mites and pathogens.

"The stings are good for you. They help arthritis, MS (multiple sclerosis), and joint pains."

"It's one of the most alarming insect diseases ever to hit the U.S., and it has the potential to devastate the U.S. beekeeping industry," says Diana Cox-Foster, a Penn State entomologist and leading member of a scientific group convened to work with colony collapse disorder. "It may be to the insect world what hoof-and-mouth disease was to livestock in England."

The empire

You'd never know that by looking at Eastman's busy bee yard out behind the shop where he rehabilitates people's battered and decrepit chainsaws and weed whackers. In the bright sunshine in this remote and peaceful corner of Vermont, the biggest threat seems to be not from colony collapse disorder but from black bears. The hives are in a compound roughly 25 feet square, and protected by four strands of heavy-duty electric wire (Co-op electricity, by the way!) which Eastman treats with far more apprehension than he does his honeybees.

After all, he explains, a Vermont accent coating his words, "The stings are good for you. They help arthritis, MS (multiple sclerosis), and joint pains."

He'd like to see the state change its bear-hunting laws, going back to a rifle

period following deer season in late November when the pregnant sows are hibernating but the males are still active. Eastman claims that Vermont's bear population is increasing 12 percent annually. Some people worry about their backyards and porches; Eastman worries about his bees.

As he describes the bees' social order and mating habits, it begins to sound medieval, or like a chess game, with pawns, servants, and royalty.

"It takes 16 days to hatch a queen, 21 days to hatch a worker, and 24

days to hatch a drone. The worker goes out and brings in nectar to make the honey. The drone will bring in droplets of water, but his main purpose is to mate the queen. Then the drone drops dead."

Meanwhile, the queen keeps mating. She takes a few minutes to process the drone's sperm, storing the best of it in a special compartment and changing the texture of the rest and excreting it. Then she can mate again, repeating the process with up to 15 drones and possibly making a second mating flight to another group of drones. But then she's done – fertile for life (a period of three or four years) and capable of repopulating the colony.

New queens are hatched from eggs fertilized with "royal jelly." This substance is produced by a gland in the mouth of baby honeybees between five and 15 days old.

While all this is going on, the blue-collar worker bees are out visiting blossoms and gathering nectar during a season which, in Vermont, spans from May to September. If you step on a bee and get stung, it's a worker bee; drones don't have stingers, and queens are otherwise occupied.

The worker bees return to the hive and pass the nectar on to an attendant, who places it into a cell in the honeycomb. The process then is a little like making maple syrup: bees fan the nectar with their wings and eventually the water content evaporates and the liquid thickens to honey.

"I've read that each honeybee will produce less than a teaspoon of honey in its lifetime," says Eastman. And he points out that honeybees are the only insect that produces food used by human beings.

But they're not doing it for us. The honey is a nutrient that sustains the bees through the winter. What Bob Eastman takes to the Tunbridge Fair is surplus honey his colonies won't need. Especially popular at the fair, he says, is the light-gold honey from basswood blossoms, which will soon be coming into bloom.

The colony

The Upper Valley Bee Club is Eastman's way of sharing the



Bob Eastman with a frame of honeybees.

knowledge he has accumulated over 46 years of beekeeping and encouraging others to take up the hobby.

He's a good advertisement for the cause. "It's really fun," he says.

He estimates there are 40-some active members in the club, at various stages in their beekeeping,

and although he encourages all of them it's the younger members he most wants to inspire. He'd like to see the tradition continue.

"The youngest member of the club is 11 years old, a young lady," says Eastman. He recounts the story of a time when he had

purchased several swarms of bees and he needed to move them from their containers to the hives in his bee yard.

"I asked her if she'd like to put out a swarm of bees, and her eyes just lit up," he recalls. The girl's father, perhaps worried, said maybe he should do it. "But I said, 'Let her do it; it's something she'll remember the rest of her life.' She did it, and did an excellent job of it. She was very proud."

It's not too much of a stretch to say that the Upper Valley Bee Club is Bob Eastman's way of serving his own colony, the colony of people living in the rugged hills of Orange County. Beekeeping provides a unique insight into the natural world, and the connections that knit us together – the blossom, the bee, and the human being.

"Bees live for the colony, they don't live for themselves," Bob observes. "People could learn a lot from a honeybee."



Before disassembling this hive body at his bee yard in West Fairlee, Bob Eastman uses a smoker to calm the bees.