

Buttoning Up and Zoning Out Middlesex Family Taps Into WEC's Incentives

Callah Mandell Wood is three months old. Her big brother, Loren, is two. The house they live in, in Middlesex, is lots older – 184 years, in fact. It was built in 1833. Callah and Loren's mother, Bekah Mandell, grew up there, and when she and her brother were kids they didn't spend a lot of time in their rooms upstairs because for much of the year it was too cold up there.

Bekah remembers doing her homework at the wooden table in the large, open room on the first floor where the woodstove is. Her parents, Larry and Marcie Mandell, who bought the house in the 1970s, had created that space by knocking down the walls that, like a typical Vermont farmhouse, had originally divided it among several smaller rooms. Opening it up let the heat travel from the woodstove, and turned much of the first floor into a lovely, homey kitchen-living room-dining room, with natural light pouring in from the windows along the front and rear walls.

That was the kind of renovations people did in the 1970s, '80s, and '90s, to make the old farmhouses more comfortable. And it surely helped. But in the upstairs rooms, and even in the room off to the side of the living area – where, to this day

Bekah, who works from home, wears fingerless gloves at her keyboard in the wintertime – it's not exactly warm.

So Bekah and her husband, Patrick Wood, who purchased the house from the Mandells four days before Callah was born in April, are doing the kinds of renovations people can do today, which are several steps, technologically, beyond the improvements people her parents' age undertook when they were young.

Speaking of homework, Bekah and Patrick did theirs. They searched out and tapped into a nexus of local resources to make their project affordable. They secured a mortgage through VSECU's VGreen lending program that's specially designed to support home energy-improvement projects, and they applied for and received incentive packages from the Renewable Energy Resource Center (administered by the Department of Public Service's Clean Energy Development Fund) and Washington Electric Cooperative's Button-Up Program, which WEC runs jointly with Efficiency Vermont (EVT).

School is still a few years off for Callah and Loren, but Bekah takes comfort, she says, in knowing that "Our kids won't need to do

Bekah takes comfort in knowing that "Our kids won't need to do their homework down here, like I did!"

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Washington Electric Co-op members Patrick Wood and Bekah Mandell, above, with two-year-old Loren, left, and infant Callah, live in a house that has stood in Middlesex since 30 years before the Civil War. They're tapping into local resources to finance improvements that will make it more comfortable year-round. WEC's Button-Up Program helped them purchase a pellet boiler, plumbed to spread heat throughout the house.

PUC Workshop To Review Regulation, Rates, Energy Sector

Echoes of WEC's Rate Design Study

Just as Washington Electric Cooperative has recently begun to contemplate how the Co-op will meet the mandates and obligations imposed on the state's electric utilities by recent legislation, Vermont regulators, in an order published on June 26, have announced a workshop that will tackle some of the same questions for utilities statewide. According to the announcement, Vermont's newly renamed Public Utility Commission (PUC) – formerly the Vermont Public Service Board (PSB) – has scheduled the workshop to "broadly review emerging trends

in the utility sector and to evaluate existing forms of regulation in light of these trends."

The PUC is seeking input from utilities and other interested parties to consider the cumulative effects of regulations and technological advances on the utilities, including regulations related to rate-setting practices. Cost recovery and rate design – the very concerns of WEC's Board of Directors, as discussed in these pages last month ("WEC Eyes Changes To Its Rate Structure,"

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Washington Electric Cooperative
 East Montpelier, VT 05651


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Power planning #2. A deeper look at what the Co-op does every day, in an interconnected and interdependent region-wide grid. Page 4.

Are you kidding me? Half price for a new EV? Where? Here: page 5.

Air conditioning, too. Cold climate heat pumps have dual roles, but your house should meet energy code standards first. Page 5.



This wrecked power pole in Duxbury is just one of 20 that have been broken in an unusual series of brief but violent storms in central Vermont since May. Page 8.

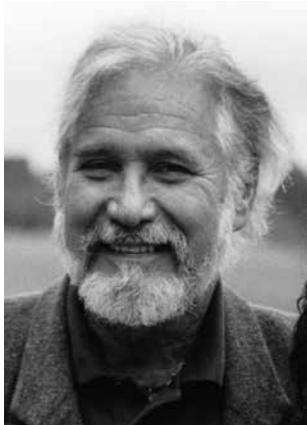
President's Message

Sweet Smells of Summer

Plus: Thoughts on Rate Design, and Co-op Departures

By Barry Bernstein

Summer is here in full force. I watch the fields around me get mowed, winnowed into rows, and then baled. What a sweet smell in the air when the farmers are doing their magical work, racing before the next storm rolls in, and how it lingers in the summer air when they're done.



As always, our line crew and other employees worked consistently and diligently to get our members' power back online. We appreciate our members' patience, as our line crews, assisted by other employees, restored power to, in one incident, more than 3,000 of our members.

New Rate Design Process

In the June issue of *Co-op Currents*, both in my President's Message and an article, we discussed the beginning of the process of a new rate design. We appreciate some of our members taking the time to either call and talk with the folks who serve on the Board of Directors or also writing to the Co-op

We welcome your continued input and thoughts on the rate design question, and look forward to a thoughtful discussion before we make any decisions affecting our membership.

to share their concerns and their thoughts on the issue.

As I mentioned last month, this is a slow and open process that we have begun. The Public Utility Commission (PUC), formally called the Public Service Board (PSB), has opened a workshop and information-gathering process involving all of the electric utilities (see our article on page one) to discuss their current rate designs, and how they plan to collect and allocate costs going forward. Obviously, as WEC begins to look at this issue the PUC workshop will have an impact on the course we choose. We intend to keep our members informed, welcome your continued input, and look forward to a thoughtful discussion before we make any decisions that affect our membership. It's important for all of us to realize that change, while difficult, must be taken thoughtfully.

Staff Changes

Cathie Vandenburg, our plant accountant for the past 24 years, left


WEC recently left to join her husband, Scott Martino, our former Safety & Environmental Compliance Specialist (26 years), in Georgia. We wish her good luck in her move.

Tribute

Will Lindner, our *Co-op Currents* editor for the past 22 years, is retiring from that position after this July issue, his last. We honored Will at our Annual Meeting in May but it's still important when a member of our Co-op family departs, who has given so much to WEC and our members, that we send him off with our heartfelt wishes for success in whatever he chooses to undertake next.

I cannot really express in words, on behalf of the WEC board and our staff, how much Will means to us all and how he has helped convey our WEC history in such a personal and meaningful way. His work sets a standard for us to use as a guidepost as we move forward. Thank you, Will, for bringing your special touch and caring to the *Co-op Currents* and to all who you came into contact with on WEC's behalf.

Finally, congrats to Director Annie Reed's mom, Jean, who just turned 97.

I hope all of you enjoy this beautiful summer and that the rains do not keep us inside too long and prevent a successful garden season and haying and growing season for our Co-op members and our Co-op farmers. 

Co-op Currents

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

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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 Dawn Johnson, at 224-2332.

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Middlesex Family Taps Into WEC's Incentives

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their homework down here." The renovations will create a number of individually controllable heating zones in the house. When the first stage is accomplished in coming months, the room the kids share will be part of a zone that will also heat Patrick and Bekah's bedroom just steps down the hall. When the kids are older they'll have separate rooms, so the plan is to add at least one more zone upstairs.

The first floor, too, will be divided into zones. The office, where Bekah provides communications services for the National Domestic Workers Alliance, will no longer have to rely on heat meandering in from the woodstove on the far side of the adjoining room, so she should be able to ditch the fingerless gloves.

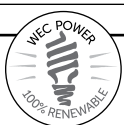
Made in Vermont

Just as important to Patrick and Bekah as the presence of actual heat throughout their home, is the source of that heat. They're getting off fossil fuels. For the woodstove in the large front room isn't the only heating source in the home; it complements a boiler that Bekah's parents purchased about 10 years ago, which sends warm air up from the basement through a venting system. It helps, but does not solve, the problem of disseminating the warmth.

The zones, however, will do that. And the source of the heat will be a pellet boiler, mechanically fed from a large bin beside it in the basement. The pellet boiler will heat water contained in two insulated tanks, and those tanks will circulate the water to wall-mounted units (basically, radiators) in the various zones. It will be not only a non-fossil fuel heating system, but an energy-efficient one, because it won't take a lot of energy to maintain the water temperature in a closed system.

Fossil fuels won't be a thing of the past for the Wood and Mandell family. Their cook stove and clothes dryer run on propane. So does their hot water heater, but not for long. Patrick doesn't believe it has a lot of life left in it, and when it gives up the ghost he plans to install a new one that will be connected to the pellet boiler.

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To call the Co-op, dial 223-5245 Mon - Thur 7:30 am - 5 pm and Fri 7:30 am - 4 pm.; toll-free for reporting outages & emergencies, 1-800-WEC-5245.

Manager's Report

After A Bustling Annual Meeting, WEC's Programs Are Full-Speed Ahead

By Patty Richards

As summer is in full swing, we hope you are staying dry and cool during this season of soggy and unpredictable weather. Along with summer usually comes an occasional thunderstorm, but this year we have had more than our share. Several severe, localized weather events resulting in power outages have been keeping our crews busy starting in May (see more on page 8). In Washington County, the areas of Fayston, Moretown, and Duxbury were hit hard with flooding in June and July, taking out roads and bringing down trees. These pop-up thunderstorms continue to plague our system, and they have been disruptive in many ways including causing power outages.

Annual Meeting Thank You

I want to thank all our members and staff who attended our 78th Annual Meeting this year. We had just under 250 in attendance and we were yet again at capacity for seating. We had a terrific evening and enjoyed the presentation of Sue Morse from Keeping Track, with breathtaking photos of wild animals in their natural settings. Once again we pushed to the



capacity of the venue's space as we tried out a new location at U-32 High School in Montpelier. For next year's meeting we will look for an even larger space in hopes of enticing a bigger turnout! To all who could make it, I want to personally thank you for coming and enjoying an evening talking about electricity-related issues

and simply catching up to say hello.

Integrated Resource Plan (IRP)

Every three years WEC must complete and file an Integrated Resource Plan with state regulators. This is a chance to document and make public where your power comes from – not only this year but for the next 20 years. We are proud of that, because we think our members will approve of these power sources, both for financial and environmental reasons. The IRP showcases our green and clean commitments for the next two decades, and members can rest assured we will have sufficient environmentally responsible power to meet those needs. The IRP is both a regulatory requirement and internal planning tool. In this important document we describe how we will meet the electric service needs of our members in a reliable,

secure, and sustainable manner, while assuring affordability and efficient use of energy.

There will also be a focus in the IRP on how we deliver power in the new era of small-scale “distributed” generation, like solar, with its impacts on our infrastructure (substations, wires, and poles). We will run engineering studies to examine those impacts, on a circuit-by-circuit basis, from the standpoint of how much solar energy our system can handle and at what locations more distributed generation can help. As the number of solar installations increases we must be mindful of the impacts on our equipment and grid delivery system.

We filed the IRP with the Public Utility Commission (PUC) in early July and look forward to working with our regulators to gain their support and approval. You can also find WEC's IRP on our website.

Button Up Your Home

WEC wants to give its members money to lower their carbon footprint. Yes, you heard that right! You have probably been reading about our Tier III programs – which we are now calling our Button-Up Program due to its emphasis on weatherization and energy efficiency — in *Co-op Currents*, including a feature article on page one of this July edition.

Following instructions from the state, we have set aside money to help our members reduce their dependence on fossil fuels. Our programs include financial incentives to weatherize homes, install solar hot water systems, install heat pump hot water systems, install wood-pellet boiler systems, and to add cold climate heat pumps in tight, well-weatherized homes.

WEC is committed to working with its members to achieve meaningful changes and we want to work with you to lower your carbon footprint and Vermont's greenhouse gas impacts. So if you are looking to weatherize your home and make some of the energy-saving changes noted above, this is a great time to do it because you can receive actual financial assistance! We encourage you to call Bill Powell here at Washington Electric to learn more.

Net Metering

The state's new (January 2017) net metering rules are well underway, and the pace of requests for installations from WEC members has been vigorous. The Public Service Board — now the PUC — issued new rules and orders for the statewide program in response to instructions from the Legislature in 2014 to alter regulations for non-utility-scale generation (less than 500 kW). Typically, net metering applications in WEC's service territory take the form

of solar panels installed by Co-op members at their homes.

To comply with the PUC's new approach to net metering, WEC filed a plan that went into effect, as required, at the beginning of the year, and we have begun to implement that plan and bill our net-metering members accordingly. We are glad to report that there is still robust interest in net metering and home generation among Co-op members. We have 72 new applications in hand already, totaling just under 500 kW of total installed generation. In fact, we expect this year's applications to exceed the total amount of solar systems installed in our service area over the past 15 years. I'll repeat: In just one year we will have more applications for solar systems than all prior years combined. While the pace and volume of interest has been a challenge for us to keep up with internally, we are working out the bugs of the new program and getting members installed and on line every month.

The Co-op Difference

Being part of a cooperative utility means you have a voice. You are not just a consumer, but rather you are a partial owner and a member. One of the many differences of being part of a co-op is not only the return of excess funds to you through what is known as capital credits (because co-ops, unlike investor-owned utilities, don't keep their “profits,” but rather share them among their member/owners), but you also can participate in the democratic control and decision making of your cooperative. There is no better example of local control than the cooperative model. At the annual meeting members elected three fellow members to serve on the nine-seat Board of Directors (two returning — Don Douglas and Mary Just Skinner — and one new director, Jean Hamilton).

Work is underway to calculate this year's return of capital credits to members. We will be ready to issue credits to members in November. (Inactive members receive a check.) The work is well underway now to prepare for this important endeavor, with WEC staff Dawn Johnson and Linda Nelson leading the way.

WEC also maintains a community- and civic-minded fund called the Community Fund, which is supported through member-donated capital credits. On page 6 we highlight activity and donations made in 2016. We would love to have more members participate. This is a way to make very small amounts add up and make a difference in the lives of those in the central Vermont region. Just another reason why being a part of a co-op is different!

Switching home heating, and eventually water heating, to the renewable resource of wood pellets will take a huge slice out of their fossil fuels consumption.

Bekah and Patrick have undertaken a lot of improvements in their 1833 farmhouse. But the main impact of WEC's Button-Up Program has been with the pellet boiler.

“It's a high-quality boiler that we're purchasing locally, from Pellergy, in Montpelier,” says Patrick.

Pellergy LLC's web site explains that the company secured the North American rights to a boiler designed in Finland. Most of the manufacturing is performed in Vermont.

“There was an alternative boiler we were considering that was cheaper,” Patrick says, “but we found out about the WEC incentives and that made it possible for us to get a better-quality boiler and do business with a local company, which was neat.”

Finances were tight because there are so many components to their overall plan: the energy-related mortgage, a home energy audit and weatherization, and an extensive plumbing project to create the heating zones linked to the tanks in the basement — all amounting to a borderline-approvable investment in a 183-year-old house. The incentives, however, need not be added to an institutional loan, so they were critical to the couple's calculations.



Ghost window! An important step for Bekah and Patrick was to have foam insulation sprayed in the basement of their old farmhouse. The frames of a now-covered cellar window can be seen above the shovel handle.

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When, Where, And How Much?

A Lot Rides on WEC's Role in Power Predictions

If you don't look deeply into the details, the work of an electric utility like Washington Electric Cooperative seems pretty straightforward. The Co-op's job is to provide power to its 10,800 members' homes, businesses, farms, offices, and schools. That means keeping the power lines up and in good working order, and the substations, too, to get the electricity from where it was generated to where it will be used. So the line crews go out each day for maintenance and repair projects, or to rebuild or relocate power line sections according to the carefully laid plans of WEC's engineers.

Just keeping the system running.

Meanwhile, at WEC's headquarters in East Montpelier, the member services and bookkeeping staff are responding to people's phone calls, preparing bills and tracking payments, and keeping the books.

Taking care of business.

Again, that's if you don't look very deeply.

But if you do look deeply, you discover that Washington Electric, and New England's other utilities, too, are engaged minute by minute, hour by hour, day by day, month-by-month, and of course long-term, in lining up the electricity you're going to need and predicting – not vaguely, but as precisely as possible (because there's money riding on it) – what WEC's power demands at any moment will be.

Numerous *Co-op Currents* articles, including "The REC Question" (June 2017), have described the regional power managers at ISO-New England ordering electric generating plants to ramp up production, or cut it back, or turn it off altogether,

because the electric grid is a balanced system. The industry hasn't arrived yet at a point where mass quantities of power can be cost-effectively stored for use later. Therefore, power production must match power demand at all times. If perfect balance is not maintained it leads to equipment failures and potentially major outages.

But how do the operators at ISO-NE (the Independent System Operator) stay ready to do that? How do they know how much power will be needed

in the Green Mountains of Vermont, the White Mountains of New Hampshire, on the seacoast of Maine, the cities and suburbs of Boston and the villages of the Berkshires, plus Connecticut and Rhode Island?

Washington Electric is engaged minute by minute in lining up the electricity you're going to need and predicting as precisely as possible (because there's money riding on it) what WEC's power demands are going to be.

It's because there's someone at each of the utilities, or someone working for a group of utilities, generating that information, reviewing and renewing forecasts, and communicating it to ISO-NE. Not after the fact, not (hopefully) during the fact. But before the fact. At WEC, that constant, vigilant duty is performed by

General Manager Patty Richards, who also taps into the expertise and resources of the Vermont Public Power Supply Authority (VPPSA) for short-term, day-to-day predictions.

Because there are costs associated with "truing up" any difference between what the Co-op projected it would need and what it actually used when the time came, the closer Richards and VPPSA are in their predictions the better it is, financially, for Washington Electric.

Coming close to the mark

Patty Richards came to the Co-op in June 2013, after working in the electric utility industry in Vermont for 24 years as a power planner. Richards is a self-described "power-supply wonk," and enjoys her immersion in the technical aspects of utility

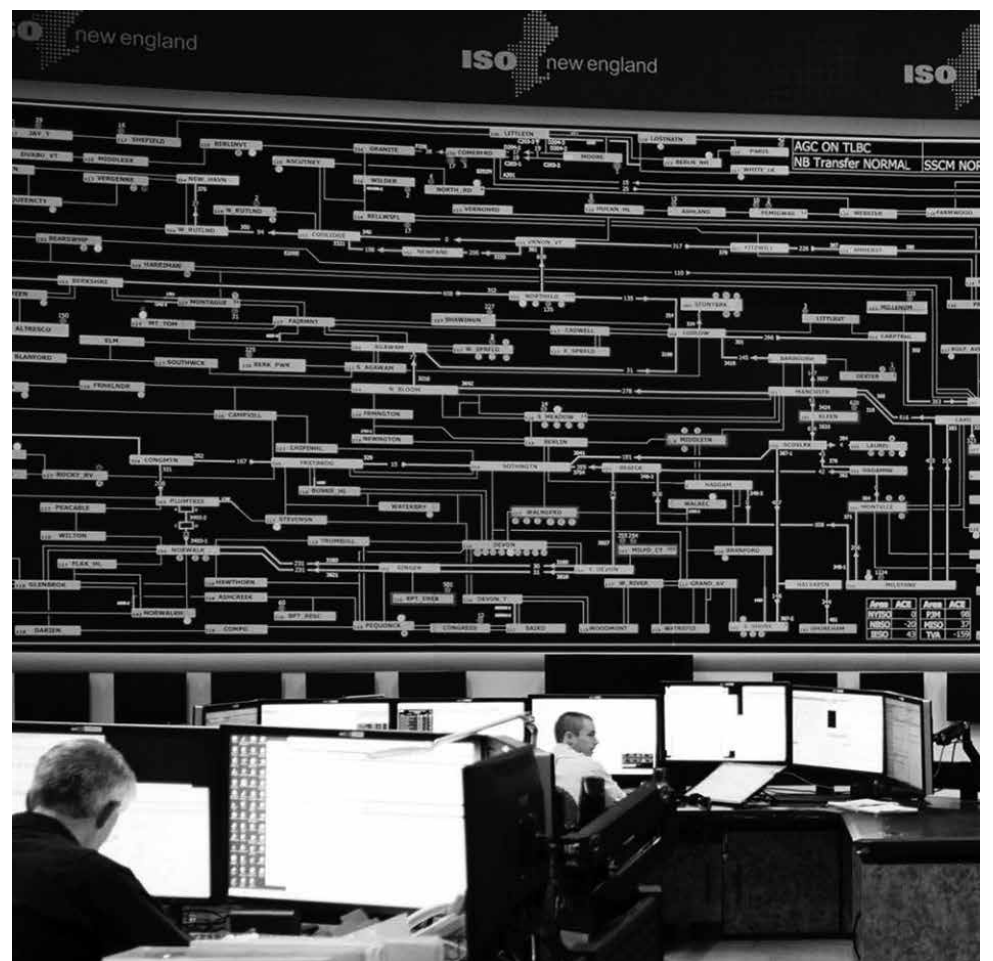
management. She's also the public face of Washington Electric Co-op, representing WEC in hearings and at public meetings, taking phone calls from members who want to take their questions or complaints – and sometimes their compliments – beyond the member services staff, and she's involved with policy formation

with the Board of Directors. That just scratches the surface of her duties.

This article focuses on her work in power planning.

"Every kWh [kilowatt-hour] we draw from the grid is charged to us by ISO-New England," says Richards. "There are other charges from them besides the energy we use, but energy is by far the largest component."

"We also get paid for generation, meaning the electricity we produce at our Coventry [landfill methane] and Wrightsville [hydro] plants and other



ISO-New England's operations center in Holyoke, Massachusetts. Here, at the "central brain" of the always-active New England power grid, technicians watch their screens and the big board in front of them to keep electric generation and usage in constant balance. They base their plans on projections from the region's utilities, and there's money riding for those utilities on getting it right.

power contracts that delivery power to the grid," she explains. "We net the dollars we pay and the dollars we get paid. To the extent that we can be really accurate with our load projections, we save on the payment side."

Richards describes ISO-NE, at its command post in Holyoke, Massachusetts, as the "central brain" of New England's almost living-and-breathing electric grid.

"They're in charge of giving the generating plants real-time operating instructions," she says. "They start with a plan for the next day: 'This will be the process tomorrow: this generator will come on at 2 a.m., this one at 10 a.m., this one turns off at 3 p.m.'"

"They do that based on the expectations – the load forecast – for the next day. And the way they get that is from us, at the utilities, saying, 'This is what we're going to need to serve our members' electricity needs on an hour-by-hour basis for tomorrow.'"

When the time comes, if Richards and her VPPSA team had predicted that WEC would draw 14 megawatts (MW) of power at noon but the Co-op used only 13 MW, WEC would nevertheless be charged for 14 MW.

"ISO would say, 'We used your forecast and had these power plants lined up and ready to serve your load, but it turned out we didn't need that extra megawatt.'"

"So we not only pay the per-megawatt charge for power we

didn't use, we could also have to pay a higher amount if our miscalculation had required the ISO to find sources of peak power [when demand is high], which is more expensive. Obviously, the closer we get to the actual number, the better off we are."

This is the scenario if WEC over-projects its power needs.

"If we under-project," Richards continues, "we have to buy more power than we had anticipated. The power forecasting we do, which is based on what we call the 'load shape,' is an effort to reduce and control our power costs, and also minimize the effects of the market's price volatility for us."

Fortunately, Richards says, her load forecasting is based on fairly predictable variables, and VPPSA gets the daily load shape right with less than 5-percent error.

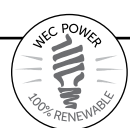
"The more we know about how the load shape responds to changes in weather, time of day, or day of week, the more accurate we are," she explains. "This is a great example of applying math skills to real-world problems."

How renewables benefit

The greatest challenge to getting load predictions right is weather. WEC retains relationships with multiple weather-forecasting services and checks their predictions frequently each day, even more so when storms are known to be approaching. These



The Vermont Public Power Supply Authority, in Waterbury Center, assists co-ops and municipal utilities with power-related services.



services, some of which are familiar names to central Vermont radio listeners and weather aficionados, are able to provide clients like Washington Electric Co-op more-precise details about storm strength, location, and duration than the general public usually receives.

The latest thing to come along is “Deep Thunder.” It’s a forecasting tool developed by the Vermont Electric Power Company (VELCO, which owns and operates the state’s high-voltage transmission system) in partnership with IBM. Deep Thunder is part of a concept the two entities are creating called the Vermont Weather Analytics Center. VWAC, as it is known, uses advanced tools that will enable it to provide what Kerrick Johnson, VELCO’s vice president for strategy and communications (Kerrick is also a Washington Electric Co-op member), describes as “hyper-local and hyper-accurate forecasts.”

The concept is exciting, and while it

hasn’t fully arrived yet, Deep Thunder has been active and available for nearly two years. WEC and VPPSA regularly tap into it to help predict peaks in energy needs and adjust the Co-op’s daily load forecasts. The model also includes sun and cloud data, factors that enable the Co-op to anticipate how productive members’ net metered solar systems will be, which in turn impacts WEC’s power needs.

“The model is taking weather for the state, and load patterns for the utilities, and saying, ‘Here is what we think the state’s load [energy demand] is going to be. This is big-picture, but it helps us do our forecasts, anticipating temperatures, wind, precipitation, sunshine... the factors that drive our load and potentially cause outages.’”

This information provides other

There’s someone at each of the utilities reviewing and renewing power forecasts and communicating it to ISO-NE. Not after the fact, not (hopefully) during the fact. But before the fact.


benefits, as well. When thunder storms or wind events are predicted WEC can target its outage-response even before the damage is done. Information from Deep Thunder sometimes helps WEC “shave” its peak, using tools at its disposal to maximize generation at the time of the highest demand on the system

– another way, since peak power is expensive on the retail electric market, to control costs.

Then there’s this. As weather-prediction technologies advance and become more finely tuned, the certainty they provide assists in taking full advantage of intermittent renewable generation sources. Whether it’s Patty Richards using Deep Thunder, and someday VWAC, to anticipate when, where, and how strongly the sun will

be shining for Co-op net metering solar systems, and building that information into her reports to ISO-NE; or whether it’s ISO-NE itself gleaning maximum benefit for the region by knowing when wind turbines on New England mountain tops or in the sea are likely to be most (or least) productive, advances in this technology can only help in our gradual transformation to a far greener grid.

Every day WEC employees show up and do the business of the Co-op. They keep the lines up and the power running, and see to the details of member services and management.

Meanwhile, behind the scenes, they are playing a crucial part in assembling a region-wide system of information that makes sure, almost no matter what the weather, that your lights will come on when you flip the switch. It’s incredibly intricate work, and it all starts with utilities like Washington Electric Cooperative. 

Believe It: A \$10,000 Discount For WEC Members And Employees From Freedom Nissan

If you’ve been thinking about changing your ride – making the switch from a gasoline- or diesel-fueled car or truck to an all-electric vehicle – Freedom Nissan in South Burlington has sweetened the pot. This summer, members of Washington Electric Cooperative are eligible to receive \$10,000 off the manufacturer’s suggested retail price (MSRP) on a new 2017 Nissan Leaf.

“If you’re thinking about purchasing an electric vehicle, this is a fantastic time to do it,” says Patty Richards, WEC’s General Manager.

The offer extends until September 30, 2017, if supplies last.

The 2017 Nissan Leaf has a range of up to 107 miles and an eight-year or 100,000-mile limited battery warranty. In addition to this offer for WEC members and employees, purchasers of electric vehicles potentially can receive up to \$7,500 in federal tax incentives. With the Nissan Leaf MSRP starting at \$30,680, this means that WEC members enjoying both the \$10,000 rebate and the federal incentives may be able to buy a new electric vehicle for half price.


To receive the rebate at Freedom Nissan, WEC members can simply show their WEC electric bill and supply Fleetall Certification Code B66647.

Richards points out that gasoline-fueled vehicles make

up 46 percent of Vermont’s greenhouse gas emissions. Because WEC serves a rural territory, its members generally rely on cars for transportation and contribute significantly to that unfortunate statistic. However, WEC is a green leader among electric utilities with a 100-percent renewable power supply. As a result, electric vehicles that plug in at WEC charging stations, or at members’ homes, not only produce zero emissions, but are powered by energy generated using zero fossil fuels.

“People can feel great about making this purchase and charging via WEC’s power supply,” says Richards. “You’re really making a dent in your carbon footprint using WEC’s electricity.”

WEC’s four EV charging stations are located at the Cabot Cooperative Creamery in Waitsfield, the VTrans commuter lot off I-89 exit 9 in Middlesex, the Rumney School in Middlesex, and Harwood Union High School in Duxbury. A fifth charging station is planned for a location near WEC offices in East Montpelier, and should be operational sometime this year.

WEC members interested in purchasing a Nissan Leaf at discount may contact Freedom Nissan at 802-864-7400 for complete details. 



ASK THE ENERGY COACH

Q: I’ve heard that heat pumps can provide cooling. What does WEC recommend?

WEC recommends that any building for which members want to replace existing fossil fuel heating equipment with a cold climate heat pump (CCHP) should meet certain thermal performance standards. This is to protect your investment, by making sure that the energy (electricity) your CCHP would consume for warmth or cooling would not be wasted through air leaks in or out.

Generally, the building should meet current Vermont Residential Energy Building Code standard or better. Members who want to determine what their current thermal performance is should contact WEC or Efficiency Vermont, to find a local “Home Performance with Energy Star” contractor. Especially for homes where the existing heating costs are high, before any equipment replacement is considered, the first order of business is an analysis of how much heating energy is being consumed, and the degree to which that can be corrected (and how much such corrections would cost).

For a building meeting today’s thermal performance standards, the CCHP does provide cooling capabilities. Depending on the house’s design and whether the CCHP is a single- or a multi-head unit, the cooling benefit can be throughout the whole building.

However, members not ready for a whole house CCHP installation have a range of wall-mounted or window air conditioners to consider. The important feature when shopping for window air conditioner (A/C) units is to look for the “Energy Star” certification. These are rated to use at least 10-percent less energy than non-Energy Star rated units. The CEER (see below) will vary with the BTU capacity, and should be > 10 generally.



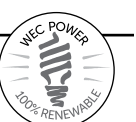
Room Air Conditioners Key Product Criteria

Criteria: At least 10% more energy efficient than the minimum federal government standards

Units without Reverse Cycle

Capacity (BTU/hour)	CEERBASE (units with louvered sides)	CEERBASE (units without louvered sides)
<6,000	12.1	11.0
6,000 to 7,999	12.0	10.6
8,000 to 10,999		
11,000 to 13,999		
14,000 to 19,999	11.8	10.2
20,000 to 27,999	10.3	10.3
=28,000	9.9	

Combined Energy Efficiency Ratio (CEER): The ratio of measured cooling output (in BTU per hour) to the sum of the measured average annual electrical energy input (in watts) and measured annual standby/off-mode power consumption (in watts). CEER is expressed in BTUs per watt-hour.



Washington Electric's 'Community Fund' Keeps Growing

2016 Report Shows Strong Performance for Local Causes

It is said that a society can be measured by how it treats its members who are most in need. The great number of charitable, service-oriented nonprofit organizations active in the central Vermont area, and the wide range of causes they address, reveal the towns and communities that make up this region to be compassionate, committed, and imaginative.

This provides fertile ground for Washington Electric Cooperative's Community Fund, which has donated modest but meaningful grants to organizations doing good – primarily in central Vermont, but for statewide causes when needed (such as the relief effort after Tropical Storm Irene) – since 2003. The Community Fund is managed in-house, by Co-op staff and members of WEC's Board of Directors, and because it has become well-known by the nonprofit community WEC does not need to advertise to attract grant applications. Consequently, there are no overhead costs associated with the Community Fund; every cent that people contribute to the fund reaches the organizations it is designed to help.

WEC General Manager Patty Richards prepares an annual report to the WEC Board summarizing the fund's activities in the previous calendar year. She filed her Community Fund Report for 2016 earlier this year, and it revealed that 2016 was one of the fund's most active and generous years yet.

"Our Community Fund contributed to 64 different organizations in 2016," said Richards, "and made donations totaling \$25,602, an amount we have exceeded just once in the fund's 13-year history. That's very exciting, and we hope to see our Community Fund program continue to grow."

Besides reaching more organizations – and thereby contributing to more, and more-varied, beneficial causes in our

region – another measure of the fund's vitality is the participation of an ever-increasing number of WEC members, the people who get their electricity from the Co-op.

When the Community Fund was conceived by Board members in 2003, it was in response to the "Concern for Community" tenet contained in the Seven Cooperative Principles, which calls on co-ops to "work for the sustainable development of their communities." But as a not-for-profit utility, state law as well as ethics prevented WEC from spending monies drawn from its operating budget. So the Board came up with an alternative: asking Co-op members to consider waiving their capital credits and provide them to the fund instead.

This system of voluntary contributions has worked wonderfully. Over the years, more and more Washington Electric member-owners have joined the list of folks contributing their capital credits to the Community Fund, rather than taking them as deductions on their November electric bills. (Former members of the Co-op, who are no longer purchasing electricity from WEC, receive any capital credits they're owed in the form of a check, for amounts of \$20 or greater.)

"In 2016 we had 1,312 members participating," said Richards in her report. "Now we're up to 1,336 members. More than 12 percent of our members have embraced the idea of contributing their capital credit distributions to their communities instead, and they find this a convenient way to do it."

For most residential members (residential members are by far the largest component of the Co-op's total

There are no overhead costs associated with the Community Fund; every cent that people contribute to the Fund reaches the organizations it is designed to help.

membership), these are fairly modest amounts, usually between \$10 and \$30. People can elect to contribute them to the Community Fund for a single year, or sign up to contribute them every year. Fully 10 percent of WEC's membership has chosen the latter option, so their capital credit

distributions are directed automatically to the Community Fund. That choice can be reversed anytime the member wishes, simply by contacting the Co-op.

WEC receives regular inquiries from organizations hoping to tap into the fund. Richards does the preliminary screening, then provides recommendations to the three Board members who serve on WEC's Community Fund Committee. Those directors are Richard Rubin, Mary Just Skinner, and WEC President Barry Bernstein.

Recipients include not only groups that assist the needy, but organizations that provide other social services, or promote literacy, the arts, education, environmental protection, and more. The 2016 list appears below.

Grants commonly range from a few hundred dollars to somewhat larger amounts (exceeding \$1,000 in very rare circumstances). WEC's Policy 6, which guides the fund's activities, prescribes that donations will be made to groups

the committee believes would have the support of most WEC members. Religious and political organizations are not eligible.

"We're always interested in hearing from more organizations needing funding for their good works in the area," said Richards. "All people have to do is call the Co-op at 802-223-5245, and we'll follow up with them."

Status report

The Community Fund began 2017 with roughly \$3,250 left over from 2016. Contributions from capital credit distributions in November 2016 reached \$39,712.

"That means we started this year, 2017, with a phenomenal \$42,962 in total," Richards pointed out. "That's \$14,424 more than the previous year."

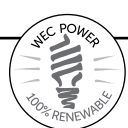
While thanks go to the 1,300-plus WEC members who contribute their capital credits rather than taking the November deduction on their electric bills, it's also important to recognize a major contribution from one of Washington Electric's REC (renewable energy credit) members. Direct Energy generously contributed its \$8,543 credit to the Community Fund, thus providing an additional benefit to central Vermont – supporting vital nonprofits – besides helping finance renewable energy development.

Washington Electric's employees
continued on page 7

2016 Community Fund Recipients

- | | |
|---|--|
| <p>AWARE
Barre Heritage Festival
Cabot Connects
Capstone Community Action
Central VT Adult Basic Education
Central VT Council on Aging
Central VT Home Health & Hospice
Champlain Valley Exposition-Vt
Agricultural Hall of Fame
Chelsea Public Library
Chelsea Public School
Corinth Historical Society
Dragonheart VT Boat Race
Dubtek Productions
Faith In Action Northern Communities -
Cabot Food Share
First Branch Ambulance
Fourth Grade Foresters
Friends of the Mad River
Friends of the Winooski
General Breed Fund
Good Beginnings
Good Samaritan Haven
Green Mountain Council
Green Mountain Film Festival
Green Mountain United Way
Green Up Vermont
Groton Community Club
Hardwick Area Food Pantry
HealthHub School Clinic
Home Share Now
Kellogg-Hubbard Library</p> | <p>Mad River Valley Rotary Club
Montpelier High School Project
Graduation
Montpelier Senior Activity Center
NFI Vermont
North Branch Nature Center
People's Health & Wellness
Plainfield Historical Society
Prevent Child Abuse
Studio Place Arts
Stuff-A-Truck
The Governor's Institute
The Topsham Historical Society
Tires for Troops
Toy Joy & Toy for Tots
Twin Valley Seniors
Twinfield Together Mentoring Program
Upper Valley Arts
VERSHARE
Veterans of Foreign Wars
VT Center for Independent Living
VT Child Care Industries
VT Community Garden
VT Community Loan Fund
VT Council on Rural Development
VT Energy Education Program
VT Foodbank
VT Historical Society
VT Horse-Assisted Therapy
VT Stem Fair
Woodbury Volunteer Fire Dept
Youth Service Bureau</p> |
|---|--|

Washington Electric Cooperative P.O. Box 8 East Montpelier, VT 05651	Thank you for your considerate donation to the WEC Community Fund!
<h3>Capital Credit Authorization to WEC Community Fund</h3>	
Capital Credit donations support worthwhile non-profit groups and projects in WEC's service territory and in the Central Vermont region.	
<input type="checkbox"/> I wish to donate this year's and all future years refunds	
<input type="checkbox"/> I wish to donate only this year's refund (Year _____)	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Name: _____ Date: _____ Address: _____ Capital Credit and/or Account #: _____ Telephone #: _____ </div> <div style="width: 45%; text-align: center;"> Washington Electric CO-OP </div> </div>	
Signature: _____ (Please return to WEC address above.)	



Community Fund

continued from page 6

have adopted a few causes of their own, such as the Adopt-a-Family program to assist military families, and

the annual Stuff-a-Truck food drive. The staff, plus several Co-op vendors, make their own contributions to these causes, adding some \$3,000 a year to the Community Fund for these specific purposes.

In all, since the Community Fund began operations in 2003, it has contributed more than a quarter-million dollars to worthy groups and good causes in central Vermont. If you're not already signed up to contribute to

the Community Fund, please consider whether you can afford to do so. You can use the sign-up form on page 6, or call the Co-op and get assistance over the phone. WEC would love to hear from you.

PUC Workshop

continued from page 1

Co-op Currents, June 2017) – will be a fundamental component of the workshop.

“We think this is a good idea and a good move on the part of the PUC and the Department of Public Service,” says Patty Richards, WEC’s general manager. “It’s about looking at an industry that has changed enormously in recent years, largely in response to Vermont lawmakers calling on electric utilities to take on great responsibility for converting all energy sectors – not just electricity, but transportation and heating energy as well – away from fossil fuels and toward renewable power. The DPS and PUC want to look at the best way to accomplish the environmental goals we all seek, while also keeping a viable, healthy utility industry in the state.

“We’ll be actively participating,” Richards promises. “We want to understand what regulators are thinking on rate design and future regulation. We want to understand their expectations of utilities as we move ahead with programs seeking to move members away from fossil fuel and toward electric energy. As a utility that’s already reached the goal of 100-percent renewable power, with most of our power coming from local, in-state sources, we’re in a unique position in this discussion. It means, for example, that members who switch from gas-powered to electric vehicles in WEC’s service territory are making a real dent in their carbon footprint.”

As discussed in the article in June, the WEC Board is reviewing and examining its rate design and the policies and practices by which the Co-op charges members for electricity and services. The Co-op must be prepared to meet present and future requirements placed upon the utilities by Vermont’s lawmakers. The WEC Board is also committed to efficiency, continuing its longstanding goal of helping members use their electricity efficiently and wisely. At the same time, moving away from fossil fuels such as oil and propane for home heating, and relying to a greater degree on systems that use WEC’s clean, green, and renewable sources of electricity, makes sense, too; the carbon reduction resulting from such changes fits squarely with the Board’s energy-related policies and goals.

But here’s where the rate examination comes in. WEC’s current rate structure was created with a strong focus on encouraging low energy (electricity) usage, partly by making high usage more expensive. Now, however, under Act 56, the state is requiring utilities to help members change from fossil fuel power to electricity for more of their energy needs – along with requiring utilities to

increase the proportion of their energy generated from renewable sources. (The latter provision WEC has already met, because its power portfolio is 100-percent renewable.) The purpose of the legislation is to move Vermont further along the path toward deriving 90 percent of all energy (transportation and heating included) from renewable sources by 2050.

WEC endorses these goals.

But there’s a problem: Encouraging members to change from fossil fuel to electricity for uses such as home heating (cold climate heat pumps) and transportation (electric vehicles) is a challenge with a rate structure that was designed to *discourage* high usage.

And there’s another problem. If the Co-op fails to meet its targets in this respect, the state, under Act 56, will impose fines, which will put pressure on WEC to increase rates.

Another rate design issue is that WEC’s current low member-service fee covers just a small portion of WEC’s fixed costs. Most of the burden to cover fixed costs resides on the variable part of the bill – i.e., the energy rate.

These issues are further compounded by the trend of flat and declining electricity sales. The prospect, for all these reasons, of annual rate increases in the immediate future to cover the cost of running your Co-op, has compelled the WEC Board to take a fresh look at how the Co-op charges for its services.

A shared agenda for WEC and the PUC

The Department of Public Service – the state’s consumer advocate, which asked for the workshop – apparently has come to similar conclusions.

Change has been the name of the game for Vermont’s regulated electric utilities. Propelled by progressive legislative responses to climate change and other environmental concerns, the PUC has been charged, with DPS input, with coming up with fair and effective ways for electric utilities to further the state’s energy goals.

“If Vermont is going to meet the 90-percent-renewable goal by 2050 we will have to make significant changes in many aspects of how we do business,” says Patty Richards. “In looking at how we charge for our services, we must ask ourselves if we are positioned to meet the state’s goals as well as the goals of our members. Encouraging Washington Electric members to think about changing to electric vehicles really forces us to look at our energy rates, because people would be substantially increasing the amount of electricity they used each month if they’re plugging in their cars at home.

“We’d love for our members to get off gasoline and power their cars with green electricity. That’s good for the environment, because transportation is the energy sector that consumes

far and away the most fossil fuels. And frankly it would help the Co-op, too, on the revenue side. But we have figure out how to make that goal fit our members’ wallets.”

Middlesex Family Taps Into WEC’s Incentives

continued from page 3

“Financially, this probably couldn’t have happened without the incentives,” says Patrick. “Particularly for getting the high-quality pellet boiler we really wanted, the WEC incentives clinched the deal.”

Found on Front Porch Forum

Button-Up is a program launched by the Co-op this year to respond to mandates created by Act 56, statewide legislation that calls for Vermont’s electric utilities to encourage and assist their customers (members, for the state’s two electric cooperatives) to reduce their consumption of fossil fuels. Switching people from fossil fuels like oil and propane to renewable sources is a cornerstone of the state law, linked to a requirement for the utilities to increase the portion of their electric power supply coming from renewable sources.

WEC’s power is already 100-percent renewable, so the Co-op automatically satisfies that criterion. To address fossil fuel reduction, Button-Up provides financial incentives, coupled with advice and guidance, for specific projects:

- Home energy audits and follow-up weatherization;
- Installing ENERGY STAR® heat pump water heaters;
- Creating solar hot water systems;
- Adding cold climate air source heat pumps (CCHP);
- And pellet boilers like the Woods and Mandells are buying.

There are targets in each category, which WEC and EVT are trying to reach. If WEC fails to meet the overall goal for 2017 in reducing fossil fuel consumption in its service territory, the state will charge a fine. (The same applies to all Vermont’s utilities.)

Button-Up places primary importance on energy audits and weatherization because energy improvements are always more effective in a tightly sealed, well-weatherized house. But Patrick and Bekah beat WEC to the punch on that score. Last winter, before they even owned the house, they contracted with Montpelier Construction to fully insulate their basement and attic and provide additional air sealing around windows and other areas where a blower-door

test indicated it was necessary. Then they took a break to wait for Callah to be born.

Patrick heard about WEC’s Button-Up opportunities on Front Porch Forum, where he saw a notice posted by Bill Powell, Washington Electric’s Director of Products & Services. (Bill is also known as the Co-op’s “Energy Coach.”) They also read up on the program in *Co-op Currents*.

They weighed their options. They had thought about installing solar panels and joining the Co-op’s net metering program (which is a separate program from Button-Up).

“But WEC is already renewable,” Bekah points out, referring to the Co-op’s 100-percent renewable energy status, “so that didn’t feel as important.”

They also considered cold climate heat pumps – which are part of the Button-Up offerings. But an analysis of their house revealed that CCHP would have been effective in heating around 40 percent of the long, rambling home, while the pellet boiler and additional heating zones would warm 80 percent of the building.

It was an easy choice, says Patrick, and was made easier by an efficient e-mail exchange with Bill Powell and a rapid, two-day approval of their application for Button-Up assistance. The grant even provided some help for the weatherization work that had been completed earlier.

“We got \$600 for weatherization and insulation, and \$1,000 for the pellet boiler,” says Patrick.

Their home energy improvements, and their participation in Button-Up, are consistent with their values. They are firm believers in cooperatives (when they lived in Burlington, Bekah started a worker-owned communications co-op there), and appreciate the fact that their electric utility is cooperatively owned by members such as themselves.

Energy efficiency and clean energy are also core tenets for them. Patrick is self-employed with a business he helped start, called Agriculture Methane Advisors. He helps farmers who use methane digesters sell their carbon offsets, a credit they receive for what’s known as “avoided methane.”

“We’re very concerned about climate change,” Patrick insists, while Bekah, nodding to the infant sleeping in her arms, adds, “Especially now, with these children.”



That’s one old house the Wood/Mandell family has!

A Vicious 'Holding Pattern'

WEC Walloped By Storms and Outages As Summer Gets Underway

At 3:00 on Saturday afternoon, July 8, almost on the dot, a bank of ominous storm clouds that had been looming in the northwest struck towns in Washington County with startling force, from Duxbury in the west to Barre in the southeast. A sunny and tranquil summer day was suddenly transformed by a dark turbulence, and for a while it didn't feel entirely safe to go outside.

For good reason. In South Burlington, where the storm had swept through before moving into central Vermont, several F-16 fighter jets were damaged when the winds collapsed the doors on a hangar at the Air National Guard facility. Weather.gov later reported that "severe thunderstorm winds were estimated between 60 and 80 mph across many locations. The primary severe weather threat observed was damaging winds, which resulted in over 30,000 people losing power across Vermont and numerous trees down across the North Country."

It was no different in central Vermont. The winds tore the roof off Project Independence in downtown Barre and toppled several trees in and around the city. Rain fell briskly, adding to concerns about flooding that had been nearly constant through the late spring and early summer.

In rural Washington County, where Washington Electric Cooperative's poles and wires try to withstand these forces despite their exposure to the elements on hillsides and amidst forested terrain, the damage was extensive. Eight hundred and ninety-six Co-op members lost their power in Middlesex, as did 725 members in Fayston, 421 in Duxbury, 288 in Marshfield, 163 in Calais, 162 in East Montpelier, and 126 in Plainfield. In all, the outages affected more than 2,700 homes, camps, and businesses.

Not only did those Co-op members have to spend time without power (restorations were quick in some places, more prolonged elsewhere), but it also marked the start of a long night for Washington Electric's line crews and assistants, the "birddogs" from other parts of the Operations team who help track outages. The damages were so extensive that WEC reached out to other local utilities and received invaluable help from the Stowe and Hardwick municipal electric departments.

"We had to bring in everybody we could get," Dan Weston, Washington Electric's Director of Engineering & Operations, said early the following week. "We typically send line workers home at night, but in this case we couldn't afford to. The storm had moved through – it's not like a sustaining, ongoing storm – and the damage was



The storm that descended upon central Vermont on Saturday, July 8, was scary to see as it approached (above, left). When it struck, it did a lot of damage in a short period of time. One victim was this utility pole on Route 2 in Duxbury. WEC crews were able to restore power by erecting a new pole that evening. WEC has lost 20 poles in the spring and summer storms this year.



done and now you've got to repair it. Our kudos go out to all the workers who helped and all the Co-op members who waited for their power to come back on. We had all but 500 of them back by 6 a.m. But these are grueling hours. We worked through the night again on Sunday and finished up Monday morning."

'I don't remember ever experiencing that'

As storms go, and the damage and outages they cause for the Co-op, the July 8 event, though serious, was not spectacular. What's truly unusual, according to Weston, is the frequency of storms much like it that have occurred in Washington Electric's service area since early spring.

The statistics support him. According to WEC's outage data, a storm on May 5 knocked out power for 1,644 members in the southern end of the Co-op's territory. Hardest hit were Orange (637), Tunbridge (404), Williamstown (262), Chelsea (218), and Washington (123).

Two weeks later another storm socked Washington County, causing hundreds of outages in Barre, Calais, Duxbury, East Montpelier, Marshfield, Plainfield, and especially Middlesex (1,374 members without power).

The May 5 storm was just one of two "significant weather events" that seriously damaged the Co-op's infrastructure. Together, they caused outages to well over 5,000 member homes – almost half the Co-op's membership – in 26 different towns.

"The primary cause of the damage, in each instance, was very large, reasonably healthy trees that were located well outside of the utility right-of-way corridor we maintain, being blown over onto the power lines," said

Weston. "Most were white pine, but we've also encountered 200-year-old maple trees, three feet thick at their base, being blown right over. The storms have tended to be very localized, and are short-lived thunder storms accompanied by strong winds that have a shearing effect as they roll over the Vermont landscape."

What's particularly unusual, as Weston sees it, is a reversal of the normal weather calendar. "We got May weather in April," he said. "Typically, in April, we get the seasonal transition of thunderstorms, wind, and that kind of stuff... wet, heavy snows a few times. This year that didn't happen; we got what we'd normally get in May – fairly uneventful, decent weather.

"Then along comes May, and we got April weather and it hasn't stopped. Since the beginning of May we've had a steady bout of pretty violent thunderstorms, microbursts, and wind events – things we might get occasionally in spring and early summer, but not with the repetition we're seeing.

"And it's continuing," he added. "Normally, July starts turning into a hot, dry time of year. But the forecast is for more storms."

The storms have taken their toll on WEC's equipment. By July 12, WEC had had to replace around 20 broken poles, and had repaired, restrung, or replaced more than 124 spans of wire that had been knocked to the ground. Crews had put in some 1,820 labor-hours fixing the damage, and nearly half the Co-op's entire membership had suffered outages at

least once. For some members, it was multiple times.

"It's been like one long outage-restoration project for us," said Weston.

The federal Rural Utilities Service (RUS), and WEC's Service Quality Reliability Performance, Monitoring & Reporting Plan, established with the Public Service Board in 2004, define a major storm event as "an interruption or group of interruptions caused by conditions that exceed the design and operational limits of [a utility's electrical] system."

The State of Vermont's definition is "a severe weather event that satisfies all three of the following criteria: extensive mechanical damage to the utility infrastructure; more than 10 percent of the customers in a service territory out of service due to the storm's effects, and at least 1 percent of the customers out of service for at least 24 hours."

Amazingly, Washington Electric Co-op got through 2016 without a single "major storm event" by these definitions. No such luck in 2017.

"We're halfway through the year and have had three major events that have done significant damage to our infrastructure," Weston said as his crews were out tidying up after the July 8 thunder-and-windstorm. "The weather appears stuck in a holding pattern where we are continually getting storm after storm accompanied by shearing winds and torrential rain. I don't remember in the 21 years I've been at the Co-op ever experiencing that.

"But we're not alone," he pointed out. "Our farmers are struggling to get a three-day stretch without rain in the forecast!"

"We had all but 500 of them back by 6 a.m. But these are grueling hours."

— WEC Engineering & Operations Director
Dan Weston

