

WEC CO-OP CURRENTS

Know Your Co-op

WEC's Engineering Department Has Designs Upon The System

Something you learn quickly as an employee of an electric utility is that people really love their property, and have a particular attachment to their trees. But they also love their electricity. A rural utility like Washington Electric Cooperative takes on a precarious responsibility as the steward of both trees and power lines in the company's right-of-way.

Trees and electricity don't have the best of relationships. As trees grow and become more beautiful and cherished by the homeowner, they present an increasing threat to power lines and a safety hazard if a broken branch or the entire tree should fall into the lines in windy weather. A downed power line is dangerous – deadly, in fact – and so is a tree leaning against a line; it conducts electricity to the ground and could electrocute anyone who touches it. Outages caused by a tree contacting a line can last anywhere from a few seconds to several hours, and potentially affect not only the homeowner but everyone connected to the electric lines past that fuse point.

Negotiating these varied and some-

times conflicting concerns is a daily challenge for the four "utility field technicians" who constitute Washington Electric's Engineering Department. While their responsibilities do not include right-of-way management (i.e., sending crews with chainsaws to maintain the power line corridors), it is the Engineering Department that makes the decisions about where the lines are built in the first place. Safety considerations, aesthetics, and government regulations pertaining to power line corridors and the combined placement of electric, phone and cable services, all come into play.

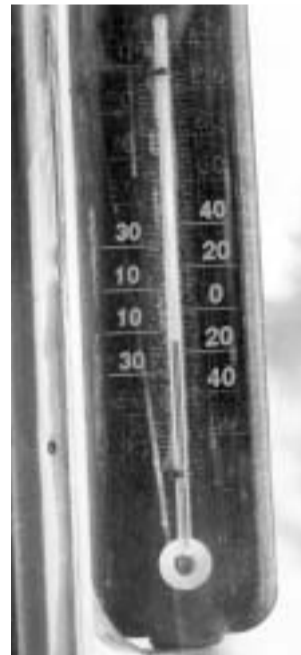
The Co-op attaches about 170 new homes or buildings annually to its system. Senior Field Technician Brent Lilley, head of the department, has a rule of thumb when considering the best way to design a new line: "I look at it as if it were my own property."

Yet practical (and regulatory) considerations must enter the equation, such as terrain, road or driveway configuration, acquiring right-of-way easements from neighboring property owners, and the

continued on page 4



Getting power to the people starts with the field technicians who staff the Co-op's Engineering Department.



January Cold Was No Fun

There are two rather daunting theories about Vermont's meteorological future. One is that New England and the rest of the world will be altered by global warming; the other is that we are between ice ages, the Fourth Ice Age – which covered Vermont under a glacial sheet that extended all the way to present-day New York – having dissipated only 10,000 years ago.

This January it was easy to believe that the Fifth Ice Age was here. But how cold was it really? And what effect did it have on your local electric cooperative?

Co-op member Roger Hill, the Worcester weatherman
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Inside

Know Your Co-op. This month *Co-op Currents* begins a series introducing the people and departments that make your Co-op work. The cover story on WEC's Engineering Department continues on page 4.

Looking for trends. Annual Outage report points to problems and successes on WEC's electric system. Page 5.

Spread the word: heating assistance is still available this winter through Co-op and federal programs. Page 8.

A reminder: time is now to consider running for WEC's Board of Directors. See page 3.



Meet David O'Brien, appointed by the Douglas Administration to head the DPS. Page 3.

Washington Electric Cooperative
East Montpelier, VT 05651

Members Write

Co-op Currents welcomes letters to the editor that address any aspect of the Co-op's policies and operations, or any matters related to electricity. Readers can write to Co-op Currents, P.O. Box 8, East Montpelier, VT 05651. Letters to the editor will not be published in the Annual Meeting (April) issue.

Economic Discrimination?

Editor, Co-op Currents:

In your December '02/January '03 issue, your article about providing long-distance calling services shows a 40-percent difference for the SAME service, depending on the method of payment: 4.9 cents per minute for interstate long-distance calls "for customers who pay with WEC's electronic billing option (E-bill)," but 6.9 cents per minute "for customers paying with the paper bill option."

Ironically, in the same issue, your Statement of Non-Discrimination says that "no person in the United States ... shall be excluded from participation in, admission or access to, denied the benefits of, or otherwise be subjected to discrimination ... [on the basis of race, color, national origin, age or handicap] ... under any of this organization's programs or activities."

Could you explain why it costs 40 percent more to pay by check than

electronically?

Some people choose not to conduct business electronically; others simply cannot afford it. Are you going to discriminate economically against them?

Linda Goldberg
Marshfield

General Manager responds....:

The long-distance program endorsed by the Co-op does offer a lower cost for "e-billing" than for traditional paper billing and payment by mail. The actual provider of the service, PowerNet Global, offers the lower rate for e-billing as an incentive for customers, because it costs considerably less to provide the service when they do not have to pay the cost of printing and mailing bills and return envelopes, as well as processing individual checks. Companies - including long-distance companies, electric utilities and other service providers - fold such costs into their bills, so the customer ends up covering them.

Long distance is a competitive service

and we are aware of a number of providers who offer separate rates for e-bill customers. Many other types of companies, including fuel dealers, also will charge differently depending on how a customer chooses to be billed and to pay. We do not believe it is discriminatory to charge different rates based on differences in cost of delivering service. In fact, WEC and all electric utilities have different rates for different customer classes for this reason.

We recognize that although the number of Co-op members with computers continues to grow, a great many members are not online, or prefer receiving bills and paying by mail. The long distance rates offered by PowerNet Global are competitive for most WEC members, whether they choose the e-bill or the paper bill option.

More information is available by calling the Co-op office, or on our website.

WEC Claims National Awards In Communications

Your Co-op is proud to announce that WEC recently won two awards in a national competition called "Spotlight on Excellence," in the field of communications. One award was for a photograph that appeared in the January 2001 issue of Co-op Currents, while the second award recognized the high quality of WEC's website, www.washington-electric.coop.

In the spring of 2002 the Co-op was invited by The Council of Rural Electric Communicators to participate in a juried competition, along with hundreds of other electric cooperatives. The Council sought entries in numerous categories, including (among others) Best News Story, Best Photo, Best Photo Essay, Best Newspaper/Magazine, Best Newsletter, Best Special Publication, and Best Web Site. The jury for the competition was drawn from the faculty of the University of Missouri in Columbia, and the judging occurred during the Council's Annual Meeting in July 2002 in St. Louis. Awards were announced toward the end of 2002. Thousands of entries were

received from co-ops, which were divided into six classes determined by the size of their memberships. WEC submitted entries in five categories, and won recognition in two.

The Co-op received an Award of Excellence for Best Photo, for a picture of Lineman Mark Maloney and Field Technician Kevin Stevens trying to solve a troublesome outage during a major snowstorm in January 2001. The photo, which illustrated the kinds of weather

challenges that face electric line workers in our part of the country, was taken by Co-op Currents Editor Will Lindner.

WEC also received an Award of Merit for its website. The website's design is by Old Barn Vermont, whose proprietor is Co-op member Andy Christiansen of East Montpelier. WEC director of products and services, Bill Powell, coordinated all the submissions and saw to it that WEC was well-represented in this prestigious competition.

Prize winners: photo of Mark Maloney (left) and Kevin Stevens; and WEC's website design by Andy Christiansen.



Co-op Currents

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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 Management and Programs Administrator Denise Jacques, 802-223-5245.

Opportunity And Infrastructure

The Vision Of New Commissioner

A month into his new job, David O'Brien has settled comfortably into his office, a spacious room with abundant natural light on the second floor of the Chittenden Bank building in Montpelier. On his desk, papers are weighted down with a hockey puck; on a cabinet behind him is a picture of his buddy, a beagle/basset mix, in a frame inlaid with the word "Dog."

O'Brien's location in a bank building is coincidental – that's where the state rents office space for the Department of Public Service (DPS) – but also appropriate, because Gov. James Douglas' appointee to the position of DPS commissioner has a banking background. O'Brien, 39, worked in commercial banking before moving to Vermont eight years ago to head the Rutland Economic Development Corp. Finance and development presumably were the experiences that led Douglas to put the personable Connecticut native at the head of the DPS, consistent with the new governor's emphasis on economic development and jobs as the goals of his administration. O'Brien adds that his Rutland job also gave him managerial experience, which will help him at the DPS.

As public service commissioner, O'Brien's statutory assignment is to serve as Vermonters' advocate before the Public Service Board in matters pertaining to regulated utilities, such electric, telephone, telecommunications and natural gas companies. Quick on his feet, he says the Department's relationship to the public is similar to WEC's relationship to its members.

"As a Co-op, the first duty is toward the membership," says O'Brien. "Broadly speaking, that's the same here (at the DPS), although there are lots of kinds of ratepayers and we have to be conscious of everyone's interests. It's our ultimate responsibility."

Ultimately, the Douglas Administration's expressed intention is to use state govern-

ment to develop jobs for Vermonters.

"My experience in economic development has bred in me a passion for people and the state of Vermont in creating opportunities for people," says O'Brien.

"How well people do in terms of employment is hugely important for their quality of life. A healthy, clean natural environment and healthy communities are strong factors as well."

O'Brien emphasizes the importance of a modern electricity infrastructure for Vermont, with sufficient capacity to reliably serve industry. He says it's time to start planning now for the scheduled termination, within the next decade or so, of Vermont's contract with Hydro Quebec and the operating license of the now privately owned Vermont Yankee nuclear plant. These

sources provide major portions of the state's electricity.

"Whether Vermont Yankee and Hydro Quebec are replaced or renewed, we're going to need enough power supply and transmission capacity to support the job development Vermont needs," he says.

O'Brien compares the state's power portfolio – the combination of its energy sources – to an individual's stock holdings or pension plan. Important to both, O'Brien says, is diversity. That's one reason he sees a place for alternative, or green, power. "These are in-state sources, they're environmentally friendly, and they're not subject to market volatility," he says.

Their development is also consistent with job creation. O'Brien has become acquainted with Renewable Energy Vermont, an advocacy and professional organization, and says Vermont's alternative-energy community has provided "some of the most innovative entrepreneurs in the state. They create value-added products, which are beneficial for export, and they employ Vermonters at good wages."

But his support "comes with a caveat."

"Wind and biomass are not going to get us home, alone. We need other in-state and out-of-state sources, including hydro

and natural gas. All the options need to be weighed in terms of costs and benefits to the ratepayers."

The Department is also required, by statute, to weigh environmental considerations. O'Brien says that this fits into what Douglas has called the "third way," in which jobs and environmental protections are not considered mutually exclusive.

The Douglas Administration is in line with the federal 1996 Telecommunications Act and with its predecessor, the Dean Administration, in advocating for the expansion of broadband and cable

capabilities. As a rural electric utility, WEC shoulders a significant part of that goal, altering and sometimes replacing its poles and wires to make room for these technologies' thrust into the countryside.

"Part of my, and the governor's, vision of the future," says O'Brien, "is a robust telecommunications infrastructure that supports jobs. Communications and the exchange of information are integral to that vision. We'll do anything we can to see that the benefits of technology are available to all of Vermont."



Department of Public Service
Commissioner David O'Brien

Your Chance To Serve

Candidates Face March Deadline For Petitions

Each spring at Washington Electric Cooperative's Annual Membership Meeting the terms of three members of the Board of Directors expire; meanwhile, the nine-member Board is replenished by the election of three candidates to fill those positions.

That means this is the time for Co-op members to consider running for the Board that presides over the operations of the consumer-owned utility and sets its policies. The Co-op serves more than 9,500 rural homes, farms, businesses, schools and offices in a 41-town service territory in central Vermont, and participates in various ways in community life. Membership on WEC's Board of Directors provides an opportunity to serve your community and help guide Vermont's future in important matters related to economics, the environment, energy and public service.

Directors serve three-year terms, and incumbents may run for re-election. At this time none of the Directors whose terms expire on May 20, 2003, have announced whether they will run again or retire from the Board.

Directors are expected to attend a monthly Board meeting, as well as committee meetings whose schedules are determined by the committee members. They are reimbursed modestly for travel and time. More information is available on the nature of Board service by contacting the Co-op or one of the current directors, whose phone numbers, email and postal addresses are found on page two.

One becomes a candidate for WEC's Board of Directors by submitting a petition signed by 25 members of the Co-op. The primary qualification is being a member in good standing of Washington Electric Cooperative. The deadline for petitions is Friday, March 21, 2003. Candidates can campaign as they wish, but are also introduced to the membership in some depth in the March and April issues of *Co-op Currents*. Anyone considering candidacy for the Board is urged to call WEC for further information on presenting successful petitions.

Co-ops are the only form of electric utility whose decision makers are directly elected by their fellow consumers. Like other forms of democracy, electric co-ops thrive when people take advantage of their opportunity to participate. Perhaps it's time to consider running for the Board.



Engineering Department

continued from page 1

location of the nearest existing pole for tapping into WEC's system. Choices have to be made. Those choices always involve the property owner.

"We look at every option," says Field Technician Mike Patterson. But Patterson says that complaints sometimes come from unexpected quarters – for example, when power line is strung where it hadn't been before, or where trees and other vegetation are altered. "We're dealing with people's relationships to the views they've gotten used to – even if they don't own the property."

'People skills'

This is particularly true for reconstruction projects, which may entail moving the entire right-of-way to provide power more efficiently and reliably.

"All of us have worked storms," says Lilley, "and we know that having lines close to the road so we can patrol and repair damages saves an unbelievable amount of time and shortens people's outages."

System reliability is perhaps the most important goal for the Co-op, and it's best achieved by building the line right in the first place.

The Rural Utilities Service (RUS), source of operations financing for America's electric co-ops, requires WEC to inspect at least 10 percent of its system every year, looking at the age and condition of the poles, wires and equipment, the condition of the right-of-way (landscape changes over time), and evaluating whether a new route would improve service. Plans are to examine 151 miles of line in 2003.

Inspection results figure into the four-year work plans, which require the approval of the RUS and the state Department of Public Service. And although Co-op members see the work being performed in warm weather by WEC's line crews (after contractors, supervised by ROW Coordinator Mike Myers, have cleared the right-of-way), the field technicians – Lilley, Patterson, Kevin Stevens and Steve Hart – have already been there, frequently in the dead of winter, making preparations.

You won't see these four on a Paris fashion runway, but they are designers – conceptualizing the route for the power lines, staking and charting the project to show the line crews where to set poles and anchors, whether crossarms will be needed, what kind of hardware to attach, and where to mount fuses, transformers and other equipment. It all must be done to RUS and National Electrical Safety Code specifications. System reliability is



Mike Patterson



Brent Lilley



Steve Hart

perhaps the most important goal for the Co-op, and it's best achieved by building the line right in the first place.

These designers must also have other talents, none more important than "people skills." They are the face of the Co-op when reconstruction projects involve securing town high-way permits and new easements from property owners. "We have to be able to communicate," explains Lilley, who adds, "That's one of the assets these guys have."

When a call comes in from someone planning new construction, the field tech who starts the project stays with it through to completion. That usually means meeting the prospective Co-op member at the site, getting a preliminary idea of what will be needed (such as temporary service for the building contractor) and when, and hearing what features are important to the property owner. Keeping the same technician on the job ensures that when the builder, electrician or owner calls WEC with questions, he or she will get consistent answers.

While some projects breeze through without a hitch, others become complex; perhaps an adjoining property owner refuses to grant an easement for the new neighbor, so an alternate route must be planned. About 50 times a year the prospective new member simply cancels the project, the work of the Engineering Department going for naught.

One thing new construction clients don't like hearing is that the costs of attaching to the Co-op's system are paid entirely by the person requesting service. "That's so the rest of the members don't

bear the cost of someone else's request," explains Kevin Stevens.

These days the Co-op is seeing more primary underground services (connections) requested. It costs more than overhead connections, but some people prefer the aesthetics. In such cases WEC's technicians mark out the route for the trench, which is then dug by a contractor. To avoid errors, the technicians purchase all necessary conduits and electrical equipment with money provided upfront by the property owner. The line crews complete the installation.

"Ten years ago we were doing one

or two underground primaries a year," says Steve Hart. "Now we're doing five or ten."

Rural development

Underground electric service is evidence that life is changing in rural Vermont. So is the expansion of upgraded telephone and cable services farther into the countryside – hitching a ride on WEC's utility poles as they go. Once again, the Engineering Department is called upon to perform "make ready" work, ensuring that the system can accommodate these additional uses, and redesigning it if it can't.

"Verizon, Adelphia Cable, Charter Communications, Topsham Telephone and Waitsfield Telecom are attaching to more and more of our poles," says Lilley. "There are required clearances between the cables for these different uses, which can mean we have to make alterations. If



(Top left) It's time to modernize some of WEC's earliest line, like this stretch in Williamstown where a 1940-vintage pole inclines to the right. (Above) Kevin Stevens takes measurements at a site destined for an upgrade this summer.



Kevin Stevens

With Room For Improvement:

Annual Outage Report Reveals 2002 An 'Average' Year

With so many variables built into the national electric distribution system – from centralized generation plants and long-distance transmission lines to utility substations and the local poles and wires, with their transformers, fuses, and other equipment, that carry power into WEC's remotest regions – it's impressive that the biggest cause of power failure, year after year, is trees.

There were no major storms (that is, "recordable" storms by the standards of state utility regulators) in 2002. And still the trend continued. WEC's recently compiled outage report for last year showed that fallen trees wreaked more havoc on the power lines, and interrupted electric service more often, than any other cause.

The report is an annual exercise for WEC and also meets state reporting requirements.

Graphs plotting a winter's outage record read almost like meteorological diaries; weather events are depicted in the slope of their lines. Observers can tell from the graph on this page that after a mild start to the winter of 2002 central Vermont was hit with repeated small-scale storms from March through June. The linemen remember that those were not devastating storms, but they never let up. The late winter and early spring of 2002 were a demanding period, as the crews recorded lots of overtime repairing damages and restoring people's power.

However, the graph also demonstrates

that the system suffered far more in 2001, when severe storms from January through March heaped snow onto trees and distribution lines, causing WEC's worst outage record in years: 230,544 "consumer-hours" (length of outage times number of members affected).

By comparison, WEC ended 2002 with 89,222 consumer-hours of outages.

Dan Weston, the Co-op's director of operations and engineering, said there are two basic ways that utilities and state regulators gauge a company's reliability: the frequency of outages experienced by the "average customer," and the average duration of those outages.

"One is a measure of how often there are power interruptions, and the other is a measure of how long the customers go without power when they happen," Weston explained.

"We did well in terms of the number of separate outages on our system in 2002; it was our second-best year in the last five years. But when you take into account the number of members affected the results aren't as good. That's because each outage affects a different number of members; you may have a few outages with a large number of people affected, which is the case with a substation outage."

That's what happened in 2002, when the second-leading contributor to down time (after fallen trees, which caused 236 separate incidents) was "power-supplier outages." That category refers mostly to

10 separate instances when transmission lines owned or controlled by other companies were shorted out by fallen trees or broken insulators. Those transmission lines supply power to WEC's substations. A transmission-line outage knocks out the substation and every WEC member that is served by it.

Most frustrating to the Co-op is that transmission-line corridors are built wider than distribution line rights-of-way, specifically to prevent such occurrences. WEC has been working with those other utilities to improve right-of-way maintenance and to install equipment that would confine the impact of transmission-line outages, perhaps sparing the Co-op's substations at least some of the time.

The third significant problem in 2002 was equipment failure, which caused 156 outage incidents. Though too frequent, those outages seldom affected a large number of members and usually didn't last too long. Almost all of them, Weston said, were caused by the faulty porcelain "cut-outs" (a fuse housing) previously reported in *Co-op Currents*. WEC's line crews are in the second year of a wholesale replacement effort to weed out the thousands of bad cut-outs installed during the early 1990s. Weston expects to have 600 new, improved cutouts on the lines by the end of 2003.

And finally, there are "planned outages," when the Co-op warns members ahead of time and then shuts down a section of line – or in some instances an entire substation – for maintenance or improvements. Some of WEC's planned outages are scheduled to allow cable TV and telephone systems to attach to WEC's poles. The federal 1996 Telecommunications Act requires utilities like Washington Electric Cooperative to make their rural infrastructures available to such companies to improve the national communications network.

Comme ci, comme sa

All in all, Weston considered 2002 a respectable year in terms of outage totals.

"We did significantly better than 1997, 1998 and 2001," he said, "and not quite as good as 1999 and 2000. You could 'if' this thing to death: 'if' the storms hadn't hit; 'if' cutouts weren't failing. Maybe some year it will be 'if' the red squirrels weren't shorting out the lines.

"The point is, there are going to be outages, for one reason or another. What you've got to do is look for causes and trends. That tells you what you can do to make the system better."

the poles don't provide adequate space we have to change to new, taller poles."

WEC recently replaced 12 poles in Middlesex and nine in Topsham. A Charter Communications project at Joe's Pond required five pole replacements. The attaching companies reimburse WEC for its costs.

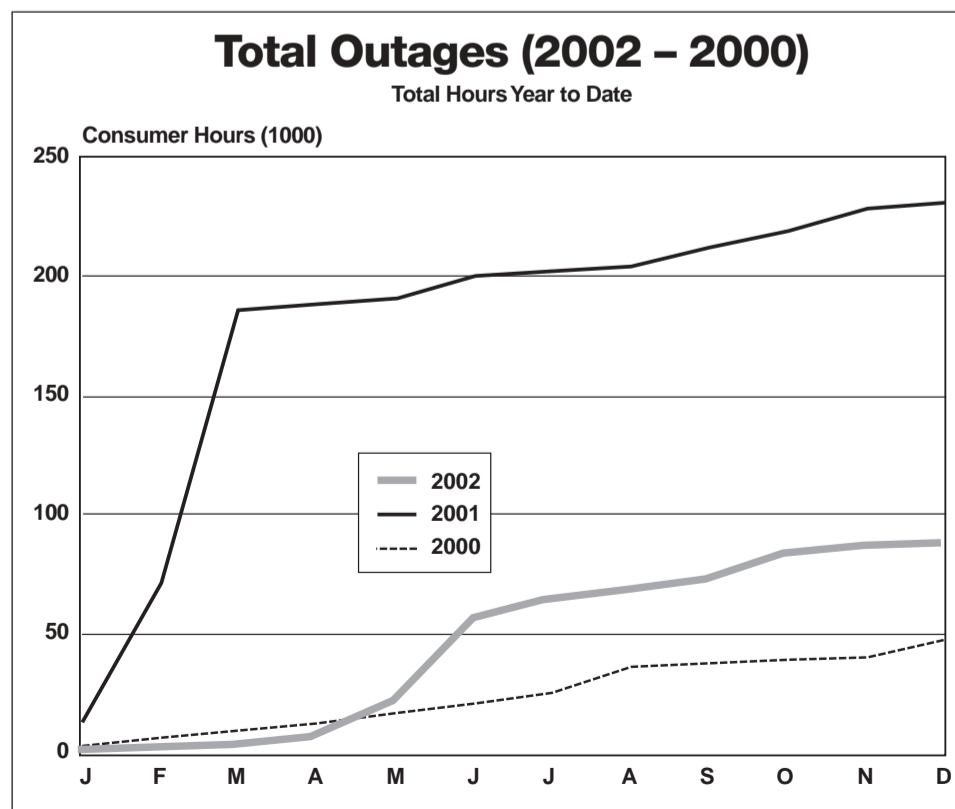
One vital duty of the Engineering Department – which is a departure from its basic role of designing changes and additions to the system – is inspecting each of Washington Electric's eight substations once a month.

"You've got to look at everything," Lilley insists, "because so many people are relying on every substation. If it goes down, hundreds or even thousands of people will lose their power."

So Brent, Mike, Kevin and Steve – who have all completed the three-year linemen's training course, and who periodically attend seminars to stay current with professional practices – read the pressure gauges, check the voltage leaving the substation en route to people's homes, examine the voltage regulators, and see how many times the automatic reclosers have functioned. (There's a counter on these devices; too many "trips" of the reclosers could indicate a system problem.)

Of the four members of WEC's Engineering Department, three are Co-op members themselves, with homes in Groton, Middlesex and Calais. (The exception is Brent Lilley, who now lives outside WEC's service territory in Waterbury but grew up in a WEC household). They are Co-op veterans, with an average of more than 12 years service among them.

They inherited this rural, 64-year-old utility from the engineers, line workers and decision-makers who came before. Their job is to redesign, modernize and expand that system to meet the expectations of today's electric consumers – and to make sure those Co-op members know that their wishes and priorities are crucial in the decision-making process.





Tracking The Development Of Fuel Cell Technology

By Bill Powell
Director of Products & Services

In the Bush Administration's proposed budget for FY 2004 there is not much good news for energy-efficiency and conservation programs. The budget proposes increases in federal spending for fuel cell research and low-income weatherization assistance, but these increases come in part from reductions that would cut almost \$36 million from efficiency and conservation (4 percent from FY2003 levels.)

The administration's support of increased research and development (R&D) for fuel cells primarily is directed toward hydrogen-powered vehicles. Recent news in fuel cell powered vehicles includes delivery of prototypes of such vehicles by Toyota and Honda to various California universities and utilities for study and evaluation. Auto manufacturers appear to be making significant

efforts toward fuel cell or hybrid-powered vehicles.

On the other hand, R&D in fuel cell development for stand-alone units capable of producing electricity for off-grid residential applications has burned through a lot of money, without yet achieving a market-ready product. A couple years ago Plug Power Company (Latham, NY), a leader in the field, experienced a significant loss of market capitalization when its stock tanked, due to overly optimistic sales expectations of its 5 kiloWatt (kW) residential co-generation unit.

Another aspect of fuel cell development has been mergers and acquisitions between various players. In particular, the Co-op has been following the activities of H Power, formerly of Montreal and New Jersey. Co-op members who attended Washington Electric's Annual Meeting in 2000 may recall the 35-watt electric generator demonstration fuel cell unit we displayed, which was a product of

H Power.

We have published several items concerning fuel cells in *Co-op Currents*, consistent with WEC's interest in providing members with information about this potential future form of electric service. Although a number of fuels can be used as stock from which hydrogen is extracted through various processes, the fuel of first choice for residential fuel cells in WEC's service territory would be liquid propane (LP), when/if such units are offered by WEC.

In addition, during the past two years WEC has been involved in working with H Power and an organization called Energy Co-Opportunity (ECO). ECO is a co-op whose purpose includes helping other co-ops diversify their businesses through distributed generation (DG) products and services. For more information on distributed generation, see <http://www.washingtonco-op.com/pages/distgen.htm>.

ECO had taken on an ownership position of H Power, and through this relationship had intended to act as a purveyor of residential fuel cell co-generators to the rural electric cooperative market nationwide. Plans for expansion were made, and licensing arrangements with local electric co-ops like WEC were begun. A couple dozen prototype 5-kW fuel cell units were installed in various rural electric co-ops across the country during 2001 and 2002. For a number of reasons, WEC neither committed to a license agreement nor sought a demonstration unit in its territory.

In October 2002 H Power was struggling financially, having insufficient funds to continue operating while also developing and testing residential fuel cells. The prospective date for commercial release of their product, originally scheduled in 2001, had slipped into 2002 and beyond. Without actual commercial sales, H Power was running out of money.

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Call the Co-op at 800-932-5245 or visit us on the web at www.washingtonelectric.coop/pages/prod.htm

Plug Power also was struggling in 2002 to get its residential fuel cell to market, and was burning through money at a rate that would cause the company to run out of cash before the launch of its residential co-generation unit. Plug Power and H Power's business models were similar in that both were built around the proton exchange membrane (PEM) form of fuel cell.

ECO liquidated its position in H Power, and Plug Power made a \$50 million acquisition proposal to H Power, which was recently approved by its shareholders and board. The result is one less manufacturer of fuel cells, as the market continues to consolidate worldwide. Coleman (the well-known maker of camping tents and other products) has been working with another major player, Ballard, and has recently rolled out a 1,000-watt (1 kW) portable fuel cell electric generator powered by compressed hydrogen.

WEC continues to believe that residential fuel cells will enter the mix of options for electric service. When that time comes, it's likely that there will be a

cost-effective residential fuel cell option. We believe the most likely site for installing this version of distributed generation would be at member locations that would otherwise require a significant distance of new power line extension to serve the member's electric load.

Technical talk:

(The following is excerpted from *Fuel Cell Advocate*, January 2003)

"Hydrogen is the most common element in the universe, but is also one of the most active chemically. It is almost never found as a free gas on this planet. Thus, since fuel cells run on hydrogen gas, hydrogen must be freed from a chemical compound with one or more other elements.

"The most common methods to produce free hydrogen gas are not 'free,' but are quite energy-intensive. One method is electrolysis of water (H₂O); another is the 'cracking,' or reforming, of a hydrocarbon, frequently natural gas (CH₄). The former involves applying a direct electric current to de-ionized water to separate hydrogen and oxygen.

"The problem with current electrolysis methods is that the process consumes more energy than is retained in the gases produced. Several approaches to this problem have been applied, including using off-peak electricity. The generating plants must run constantly . . . so off-peak power can be (had cheaply) and hydrogen gas can be stored and used to produce electricity by the fuel cell when needed. Other approaches involve using renewable electrical power generated by such sources as wind or solar, and storing or transporting the resulting hydrogen. . . .

"Cracking" or reforming hydrocarbon fuels into hydrogen, involves steam reforming of de-sulfured natural gas at above 900 degrees Centigrade in the presence of a catalyst. The resulting gas stream must then be purified of the carbon oxides (CO, CO₂), which usually involves at least one and most likely two additional reactions, including a water gas shift reaction or pressure swing adsorption."



Product and Services Manager Bill Powell displays a pee-wee fuel cell model at WEC's 2000 Annual Meeting.

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famous for his morning forecasts over the stations of Radio Vermont (and for his website: www.weatheringheights.com), did some calculations for *Co-op Currents* at the end of January. They revealed that the mean (middle) temperature for the month was 8.8 degrees Fahrenheit, which was 7.5 degrees colder than normal.

"That's pretty significant," said Hill. "It probably puts 2003 in the top five years (for cold weather in January) going back through the 52 years they've been collecting data at the (Knapp Airport).

"Maybe even more interesting," he continued, "is the number of consecutive days below freezing. This particular stretch of 29 days – every day in January except for the first and last days of the month – tied for seventh-longest. The longest period of consecutive days below freezing was 51 days, from December 22, 1976, until February 10, 1977."

It's the daily grind of it all that makes a cold-weather snap seem relentless. While this stretch of 29 days only registered as seventh-longest, central Vermonters haven't suffered a comparable streak for 18 years (since 1985).

Another reason January's weather seemed severe (other than the fact that it was severe) was that a year ago we were basking in uncommonly warm temperatures. The mean temperature for January 2002 was 9.7 degrees above normal – 17.2 degrees warmer than this year.

"There's your switch right there," said Hill.

Coincidentally, one particular date –

January 28 – summed up the difference in the two years. On January 28, 2002, a high-temperature record was set at 51 degrees. On January 28, 2003, a low-temperature record was set at 22 degrees below zero. The difference: 73 degrees! Furthermore, the average low daily temperature in January 2002 was 17.5 degrees, while the average high daily temperature this year was nearly the same, at 17.9 degrees.

But as for global warming, Vermont's frigid January meant nothing.

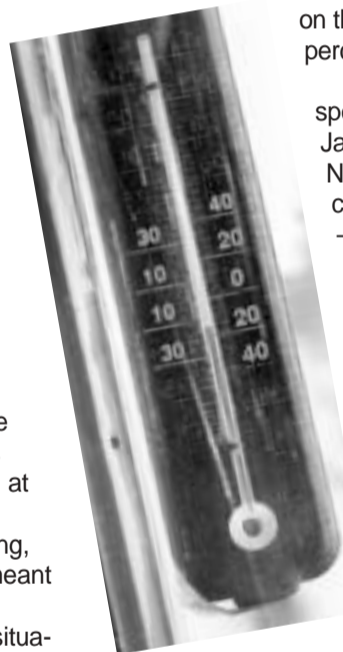
"This is a just regional situation," said Hill. "The regional situation in Alaska is that temperatures are well above normal – as much above normal as they are below normal here."

Higher costs all around

For WEC members, and for the Co-op itself, January's weather meant higher electric bills.

"The cold weather causes (electricity) consumption to go higher even though the overwhelming majority of our members don't use electric heat anymore, except perhaps for space heaters placed here and there," said General Manager Avram Patt. "But nearly everyone's system uses blowers or pumps, and in January they were running all the time."

If member power-consumption increases, WEC's must also. The Co-op had to boost its wholesale purchases on the "spot market" – instantly available energy that WEC buys to complement its longer-term contracted power purchases. WEC relies



on the spot market for some 15 percent of its power supply.

Not surprisingly, the cost of spot-market power increased in January, as demand soared in New England. But electricity costs also spiked for a second — though related — reason: higher costs for natural gas. Not only do many people in urban areas (including Burlington) heat with piped natural gas, but the fuel is also heavily used for electric generation in the Northeast. Electric power from natural gas was more expensive to produce, and consequently brought a higher price on the spot market.

Financially, Patt predicted that the winter might be a wash for the member-owned utility. Higher wholesale energy costs could be largely offset by increased revenues for retail power sales.

WEC members prove generous

And then there's the human toll of cold

weather – for members whose fuel and electricity consumption increases, and for WEC's outdoor employees.

Many Vermonters cannot easily absorb higher fuel and electric bills. Fortunately, said WEC Member Services Director Tammy Clark, Co-op members have pitched in with contributions to the WARMTH and Round-Up campaigns. WARMTH is a program through which voluntary donations from the customers of Washington Electric and several other utilities are channeled to local community action agencies to help people who are struggling to keep their heat and power on. Operation Round-Up is WEC's volunteer program in which people authorize the Co-op to round up their monthly bills to the next higher dollar, with the change going into the WARMTH fund. (These programs are separate from LIHEAP, the federal fuel assistance program; see story on page 8).

So far this winter, WEC has collected and forwarded \$11,644 for WARMTH. At the same time last winter the Co-op had received \$10,377.

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Mad River Glen Renews Discount Offer to WEC Members

Washington Electric Cooperative (WEC) is proud to offer a member discount at the nation's only cooperatively-owned ski area, Mad River Glen in Waitsfield, Vermont. This discount is valid for WEC members through the end of the 2002-03 ski season (or April 2003). This discount is valid only when the WEC member provides sufficient photo ID (driver's license, etc). Call the Co-op to get your coupon.

MAD RIVER GLEN'S
2002 – 2003 SPECIAL TICKET PRICING:
Weekday Co-op Member price . . . \$37



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The increase in member donations can't be credited directly to January's zero-degree temperatures, because sign-ups for WARMTH and Round-Up are ongoing. But the timing for these extra funds couldn't have been better.

"We push WARMTH and Round-Up every chance we get, because they help people right in our area," said Clark. "It seems like we get a little more response every year. One member sent a check for WARMTH for \$1,000. I was pretty impressed."

It's not too late to help your neighbors, even if you've done so already. Please contact the Co-op if you would like to contribute to WARMTH or enroll in Operation Round-Up.

Unwelcome holidays

Surprisingly, the major effect of sub-zero temperatures on WEC's linemen isn't that they freeze; it's that after a few days they go stir crazy.

Line crews are not required to work outdoors when it gets below zero. Zero is kind of an arbitrary number, said Foreman Bob Fair, but one agreed to by



the union and the Cooperative. Ironically, he said, it can be 10 degrees above with a stiff wind and be more miserable outside than 5-below and calm.

"Going out when it's that cold is extremely hard on equipment and on the human body," said Fair. "It can lead to breakage when you try to operate machines at those temperatures."

"But outages are another thing entirely," he added. "If anyone's out of power we go out regardless how cold it is."


That happened occasionally in

January, even though cold weather is rarely a cause of power failure. And once, when the Co-op had scheduled a power interruption for a system upgrade in Cabot, the crews opted against going out on the original planned day, when it was 15 degrees below zero, and took their chances on the scheduled back-up day two days later. It didn't make much of a difference because it was only about 8 above that day, with stiff 15-to-20-mile-an-hour winds.

One the whole, WEC's line workers

spent only six days inside during January, though it was one of the coldest Januaries Bob Fair can remember.

"Normally, for the first two days there are all kinds of things to do," said the foreman. "We tear apart and clean the chain saws, wash the trucks, clean and oil the come-alongs, chains and other equipment. Maintenance jobs in the building tend to get piled up, so we can work on those. But by the third or fourth day, the guys don't much care how cold it is. They want to get out and get to work."

Roger Hill predicts that February will be more conducive to outdoor work. It will be far from warm, but usually well above zero. It helps that these linemen are a hardy bunch, and Vermonters all! 

MARKETPLACE

FOR SALE: Old rustic pine cupboard. The top has shelves and two doors. The bottom has cutting board and eight bin drawers. Asking \$850. Call 244-1565.

FOR SALE: Four-piece Art Deco bedroom set; early 1900s. Asking \$1,500. More information available. Call any time. 802-533-2378.

LIHEAP Survives; Money Still Available

It has been difficult this winter to keep track of the status of LIHEAP, the federal program that assists some 18,000 Vermont families with wintertime fuel and energy costs. But if you've been confused about the reports coming from Washington – will LIHEAP be cut, level-funded, increased? – you're in good company; it includes Richard Moffi, outgoing chief of Vermont's Fuel Assistance Program, which is funded by LIHEAP (the Low-Income Home Energy Assistance Program).

However, at the end of January Moffi was able to report that a threatened 18-percent cut in the program by President George W. Bush did not materialize. To the contrary, Moffi was all but certain that Vermont would end up with a \$12-million allocation from LIHEAP, which is about \$2.1 million more than the state received last year. It is nearly \$4 million more than Moffi budgeted for when he designed this year's program in anticipation of the president's proposed rescission.

This is good news for Vermonters in need. But Moffi said it had been a difficult process for agency directors around the country, who had to structure their programs without knowing how much money they would have available. There are costs involved with reshaping and re-advertising the program midway. His strongest criticisms were for Congress, which adjourned at the end of 2002 without completing the federal budget. And it still hasn't – even with debate now beginning on the president's next proposed budget.

"The fiscal year is four months old and we still don't have a (FY 2003) budget," he said. "I would have lost my job if I'd done that."

Last year Vermont's Fuel Assistance Program, which is administered by Department of Prevention, Assistance, Transition and Health Access (PATH), received \$9.9 million in LIHEAP funds. Bush's proposed 18-percent cut would have pared Vermont's allocation this year to \$8.1 million. In October, the beginning of the federal fiscal year, Congress was unable to agree on a new budget, so it passed a continuing resolution that level-funded most government programs – "except," noted Moffi, "for a handful of social programs the president wanted to cut, which included LIHEAP."

So Moffi launched the current year's program anticipating the budget cut.

However, politics intervened. On January 3, 2003, Bush conceded to pressure and directed Health & Human Services Director Tommy Thompson to release the same funding for LIHEAP as last year. The House and Senate have agreed in principle, but Moffi doesn't count it as a bird in the hand because Congress still hasn't

passed an FY2003 budget.

A pleasant surprise, however, was Bush's announcement on January 24 that he would release LIHEAP contingency funds, which are solely in his control. Vermont has already received its portion, \$2.1 million.

"Some of the credit has to go to Governor (James) Douglas," said Moffi. "He spoke with the president on January 14 on a number of issues, and requested that the president consider our especially cold weather, the sluggish economy and the high cost of fuel. A couple of weeks later that request was acted on with the release of contingency funds across the nation."

LIHEAP has bipartisan support in cold-weather states. And this winter support spread to other states that are part of Bush's political base.

"There was snow in North Carolina and freezing temperatures in Florida," Moffi said. "That's a winning combination" for funding LIHEAP.

LIHEAP money is still available from the Vermont Fuel Assistance Program. People requesting assistance for the first time should call 1-800-479-6151. People already enrolled in the program will automatically receive additional assistance because of the increased funding.

Payments go directly to the client's heating supplier, which in most cases is not their electric utility. But fuel assistance can free up money that enables people to keep current with their electric bills, and in some circumstances the program will help qualified applicants pay their electric bills if their heating systems require electricity to operate.

"Eighteen thousand Vermont families receive fuel-assistance benefits," said Moffi (who will soon leave the program for another position in the agency), "but census data suggest there are 34,500 families in Vermont who are theoretically income-eligible. So there are families getting by without it. But when prices go up, extremely cold weather hits, and fuel deliveries come every three weeks instead of every five weeks, we believe that more folks need a hand. We hope they will come to us."

The average per-family benefit, to cover the entire winter, began at \$427. With the expected increase from restored full-funding, the average would increase to \$530. With restored funding plus the release of contingency funds, the average allocation could reach \$650. 