

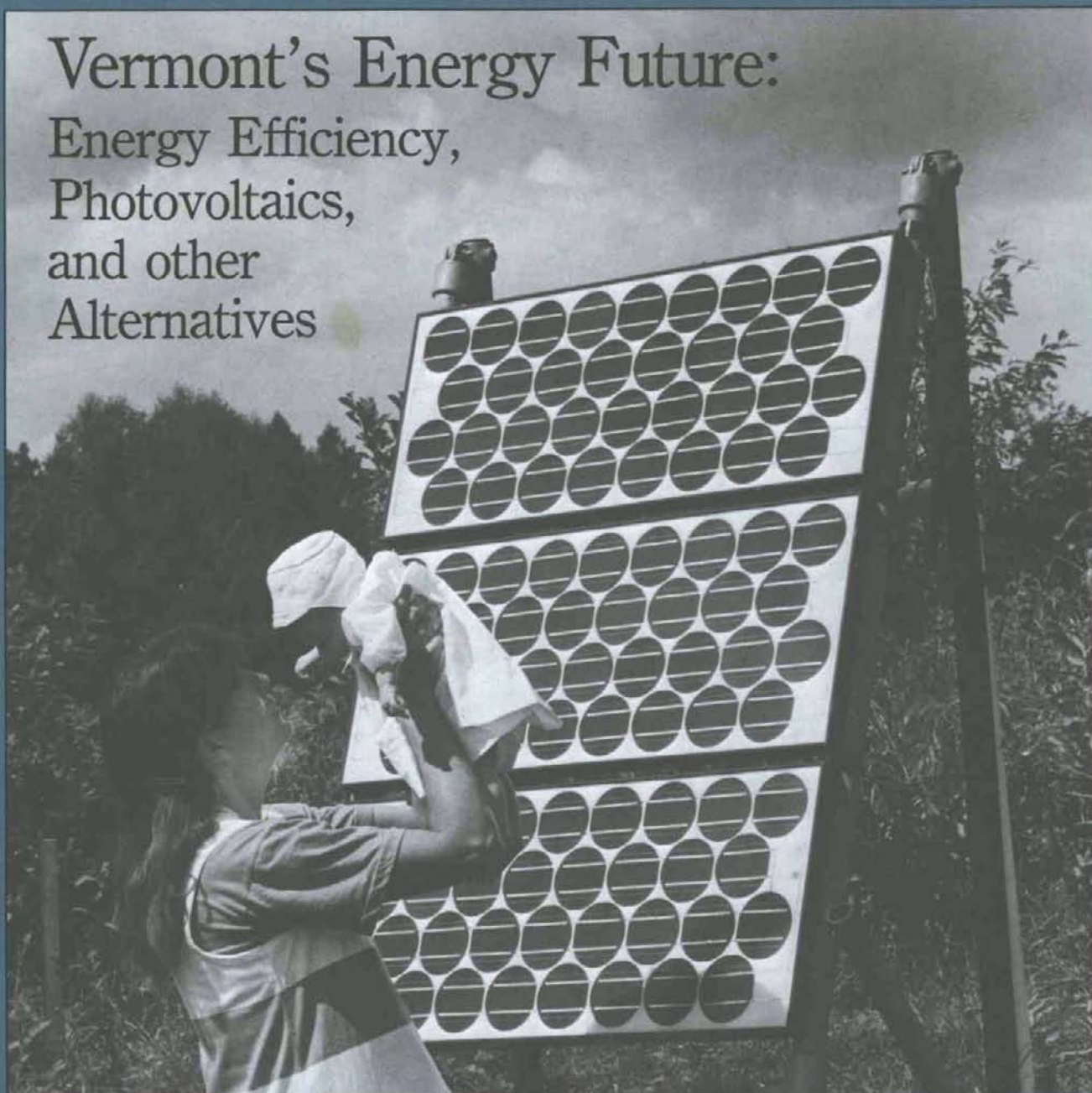
Vermont Environmental REPORT

Vermont Natural Resources Council

Volume 18, Number 3

Summer, 1988

Vermont's Energy Future:
Energy Efficiency,
Photovoltaics,
and other
Alternatives





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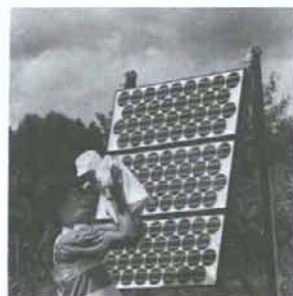
The Vermont Natural Resources Council is a non-profit environmental organization working to promote the wise use of Vermont's natural resources. The Council does legislative lobbying, research, and educational work on a variety of issues including forestry, agriculture, water, energy, hazardous wastes, and growth management.

VNRC is the Vermont affiliate of the National Wildlife Federation.

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The opinions expressed by VER contributors are not necessarily those of the Council. VNRC reserves the right to refuse advertising that is not in keeping with the objectives of the organization.

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Credits:

Cover photo by Craig Line. Photovoltaic cells are likely to play a role in Vermont's energy future. These solar panels provide electricity for the home of Vicky Palmer, Jon Vara and newborn Rosalind Palmer Vara of Cabot.

Masthead design by Laughing Bear Associates.



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FROM THE FRONT OFFICE

Just as the Vermont seasons turn quarterly, VNRC editor Susan Clark appears at my office door and gently reminds me that it is time to write this column. I ask her to summarize for me the range of articles in the upcoming *V.E.R.*, and the overall theme. She then leaves, and I turn and reach for my yellow pad (or available scrap paper, or soon to be installed MacIntosh computer!) and begin to compose. But this quarter it is truly a difficult task to land on just a single topic.



Should I write about what I think is pure unadulterated greed, overwhelming us in Vermont and acting as the driving force behind many development projects currently being proposed in different parts of the state?

Should I write about the dismal record of implementing a number of key pieces of environmental legislation passed since 1985—pieces which have yet to go through the complete rule-making process, and thus still lack the force of law?

Should I write about Act 200, the new growth legislation, and describe generally how it is being received and what strategies are being developed for its implementation?

Should I write about my growing anger about what is happening to our Vermont—that many parts of our mountains and valleys are no longer special places, but rather becoming like anywhere else in southern New England?

Should I write about a strong VNRC, one which will not stand by passively as the Vermont we care about is developed out of its traditional and diverse heritage?

Should I write about staff changes at VNRC, where Associate Director Eric Palola—a one-person whirlwind of activity, energy, and competence—is going off to graduate school, and will be greatly missed?

Should I write about our new Associate Director Ned Farquhar, who is already taking the advocacy reins for the Council?

Should I write about Seth Bongartz and Marcy Mahr, now staffing VNRC's Manchester office, both ready to meet the challenge of natural resource protection needs in southern Vermont?

Should I write about...Oh, no! Susan just came back into my office and said she needs my column right away. I guess I will just start again when the leaves turn.

Monty Fischer

R. Montgomery Fischer
VNRC Executive Director

VNRC Dives Into Salmon Hole Resort Proposal

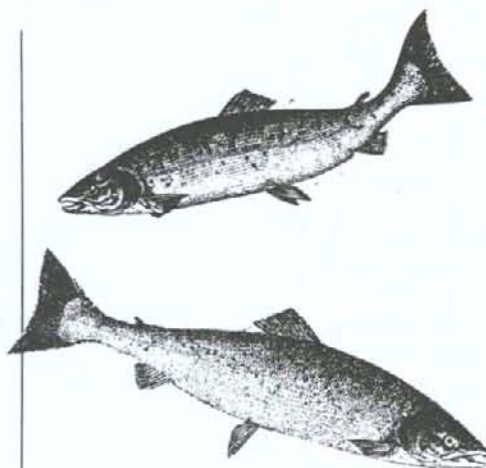
"Country Homes for Rich and Famous Proposed for Jamaica-Stratton Area" is the way the *Rutland Herald* headlined the news, and the figures confirm the headline.

Covering 1,480 acres and scheduled to be built over ten years, the mammoth \$100 million "Salmon Hole" project proposed in southern Vermont would offer luxury residences replete with a tennis center, X-C ski trails, an "Arnold Palmer" golf course and clubhouse, and a fenced security system that opens for residents only. With 235 single family lots and 200 multi-family condominiums planned, developers have estimated that a single-family home might have a \$1 million price tag. The project is proposed by the Richard Roberts Group, a Connecticut-based national investment firm, and planned by the Cavendish Partnership of Ludlow.

"The Salmon Hole project turns its back on the community-based goals of the recently passed growth bill," says Southern Vermont Associate Director Seth Bongartz. "If it is built, the project will create entirely new energy, waste disposal, and water supply demands far removed from existing community centers. And there is no question that it will put even more Vermont land and homes out of affordable reach for the average Vermonter."

In late June, VNRC requested party status before the District 2 Environmental Commission to participate in the case under Act 250, Vermont's land use management law. "Party status" gives a person or organization the legal right to participate in the Act 250 process—to offer evidence and cross-examine witnesses at hearings, and to appeal a decision if necessary.

In its party status request,



VNRC registered concerns over traffic impacts, threats to an important bear migration corridor, and pollution of the nearby pristine headwaters of Ball Mountain Brook and Forrester Pond from sewage disposal and golf course fertilizers.

Salmon Hole backers appealed the granting of party status to VNRC and to the Stratton Area Citizen's Committee, a group which focuses on water quality concerns in the upper West River watershed. The appeal stalled proceedings temporarily, but later this summer the Vermont Environmental Board ruled that the developers' appeal was irrelevant, and both conservation groups' party status was upheld.

Salmon Hole developers and VNRC have since agreed to meet, exchange information and attempt to address environmental concerns before Act 250 hearings resume.

"VNRC is glad to discuss our concerns about the project with the developers," notes VNRC's Eric Palola, "but there are many unanswered questions. Salmon Hole backers have yet to show that they can even satisfy the criteria to receive permits addressing such basic issues as sewage discharge, air quality, drinking water, or stormwater and pesticide run-off."

If developers receive these permits, hearings will resume in the

fall. VNRC will offer testimony on the direct environmental impacts of the project, as well as an assessment of long-term impacts to neighboring communities from this type of development. EP/SC

The Bottle Bill—Beyond Soda and Beer

Let's hear it for the bottle bill! Vermont's highly successful beverage container deposit law will now cover wine coolers and liquor bottles. In addition, provisions have been made to study the expansion of recycling in Vermont.

The bill was one of VNRC's top priorities, and the Council provided testimony and support throughout its five-month passage through the General Assembly. Under the new law, wine coolers will carry a five cent deposit as of July, 1989, and liquor bottles over fifty milliliters will have a deposit of fifteen cents as of January, 1990.

Under a unique last-minute agreement between the House and Senate, the Liquor Control Board is instructed to report to the legislature in 1992 on the percentage of liquor bottles redeemed in Vermont stores. If the return rate is under 60%, the liquor bottle deposit will automatically increase to twenty-five cents.

The bill also requires the Agency of Natural Resources to prepare a report by this January on a variety of recycling issues including the incorporation of wine bottles in the deposit system, the recycling of wine, liquor and non-beverage containers, and personnel and facility needs.

Vermont's fifteen-year old bottle bill has proven to be an excellent tool in reducing highway litter, vastly expanding the percentage

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of containers recycled, and reducing strain on our landfills. Experts emphasized during the course of the hearings, however, that recycling markets must be established.

"In the near term, I see no problem with expanding the deposit law to include a larger number of beverage containers," testified John Cassella, owner of a large independent trash-hauling



"This travelling stuff is for the birds. Do you know of any nice, quiet nature centers in the area?"

This bird needs a copy of the **Vermont Environmental Directory**. Over 100 pages of addresses, phone numbers and descriptions of Vermont's private environmental organizations—nature and environmental education centers, land trusts, advocacy groups, and many other organizations. And the **Directory** also includes complete state government contacts for environmental concerns, college environmental programs, national contacts, and much more.

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and recycling operation. "However, in the long term when different types of recycling hit New England," noted Cossello, "we'll need to have new markets already created to absorb future effects of increased recycling." MM/SC

Wildlife Check-Off Complete

The Vermont legislature placed the finishing touches on the non-game check-off program this year, ensuring that all taxpayers will have the opportunity to contribute to wildlife enhancement programs for non-hunted species.

Under the check-off program created in 1987, a line is provided on Vermont income tax forms for taxpayers to voluntarily contribute toward the non-game wildlife fund. This year's law clarifies that *all* taxpayers may contribute—whether their contribution comes out of a refund, or whether they make an additional contribution along with their tax payment. Fund monies go toward a variety of programs including inventories of and habitat protection for rare and endangered species.

In addition to the non-game revisions, VNRC supported several other wildlife bills this year. Under Act 216, anyone who

knowingly injures an endangered or threatened species may be ordered by the court to make restitution for veterinary and related expenses. And Act 178 prohibits municipalities from regulating hunting, fishing or trapping. VNRC argued that wildlife populations can not be managed on a piecemeal basis, but must be managed as a state resource. SC/MM

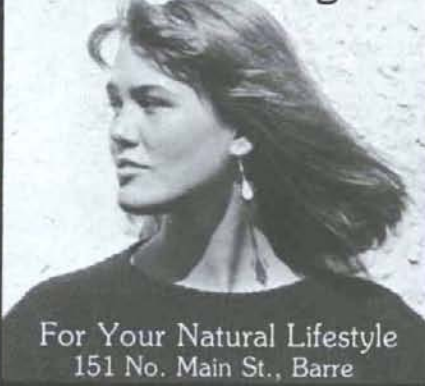
A Bad Plan for Garbage

Vermont's comprehensive solid waste management law, passed in 1987, gives top priority to waste reduction, re-use and recycling as methods to deal with our state's growing garbage crisis. The law is only as strong as the plan that implements it, however, and VNRC and the Conservation Law Foundation of New England (CLF) argue that the Agency of Natural Resources' new solid waste management plan does not make the grade.

In comments to the Department, VNRC and CLF state, "The plan simply does not implement Act 78's strong priorities encouraging waste reduction and assuring recycling in the state of Vermont. Rather, the plan will discourage these practices in favor of landfilling and incineration." VNRC and CLF go on to comment, "In many respects, the plan reads like a brief in opposition to the policy choices the Vermont legislature made last year when it enacted Act 78."

Among the major concerns of VNRC and CLF is that the plan does not ensure that municipal solid waste programs comply with Act 78's priorities; nor does it include siting criteria for solid waste management facilities, as required by the law. Further, the plan, by not including the full range of "life cycle costs" of solid

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waste management technologies, underestimates the cost of land-filling and incineration and overestimates the cost of recycling. VNRC and CLF also argue that the plan encourages the cheapest, but not necessarily the most environmentally sound, waste disposal methods.

In addition to the general solid waste management plan, the Agency proposed rules for waste management as well; the rules are intended to deal with the specifics of the siting and design of solid waste facilities such as landfills and incinerators. CLF has expressed concern that the rules are so vague that regions and municipalities will have little guidance in how to locate and build these facilities.

The Agency may propose final siting and design rules in early September; it intends to revise the plan and publish a final plan in October. VNRC and CLF will continue to monitor the process and press for changes in the rules and the plan. *Diane de Conick*

Diane deConick is an intern with VNRC focusing on solid waste issues.

Taking A Stand On Timber

Harvesting timber from Vermont's forests—what's the best way to do it? The fastest or cheapest methods are often not the most environmentally sound, and the Vermont Department of Forests, Parks and Recreation will soon be conducting a study of harvesting practices.

Mandated by the legislature this year, the Department's report will assess the effectiveness of existing timber harvesting laws and regulations, and recommend the most appropriate meas-

ures for mitigating timber harvesting impacts in such areas as aesthetics, wildlife habitat, water quality, and timber quality and productivity.

Many foresters have predicted that the demand for Vermont's spruce and fir from the woodchip and paper industry will increase; if the demand materializes, stronger regulations may be necessary to protect Vermont's forests. Although VNRC advocated standardizing woodchip-harvesting practices using standards now used by the Burlington Electric Department's woodchip suppliers, this proposal was defeated. Interim recommendations are due at the end of this year, with the full report due in December, 1989. SC/MM

The Growth Bill: What's In It for Me?

A new publication from VNRC due out this fall will take a look at Vermont's new growth bill, and how Vermonters can get involved in our newly-strengthened plan-

ning process.

Growth and planning legislation was VNRC's top legislative priority this session. The final result—Act 200—includes important strengthening provisions in Vermont's planning process, both local and regional, as well as financial allocations to the Housing and Conservation Trust Fund and agricultural support efforts.

"Act 200 will only be as successful as we make it," notes VNRC Executive Director R. Montgomery Fischer. "Every Vermonter has a role in planning our towns' and regions' futures—and Act 200 gives each of us an even stronger voice in the process. We will be working to make sure Vermonters take advantage of these opportunities."

The new publication will also pinpoint areas not addressed by the legislation—most notably, the Act's failure to address Vermont's need for property tax reform—and why these changes are critical to effective land use planning.

VNRC members will receive the publication in the mail; copies will also be distributed throughout Vermont, and will be available from VNRC. SC



Cartoon by Tim Newcomb, reprinted from the Barre-Montpelier Times Argus.

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Pyramid Mall: Part II, Act I

Get ready for another show; the Pyramid/Maple Tree Place debate has moved into the Act 250 ring.

Maple Tree Place Associates, a partnership comprised of Pyramid Cos. of Syracuse, N.Y. and developer Ben Frank, applied this July for review of their proposed Maple Tree Place mall under Act 250, Vermont's land use and development law. Pyramid proposed a similar one on the same Williston site in 1977; after a prolonged Act 250 and court battle, the proposal was defeated (see "Pyramid Mall/Maple Tree Place," *V.E.R.* Spring 1988).

With 75-80 stores and restaurants, the massive regional mall complex would occupy a 72-acre site, and would include a 2,100-space parking lot and roads

covering over 23 acres.

At procedural hearings in August before the District 4 Environmental Commission, VNRC applied for party status under the air pollution and growth impacts criteria of Act 250. Citizens for Responsible Growth (CRG), a Williston citizens' group organized against the mall, applied for party status with concerns about water and air pollution, traffic, demand on municipal services, growth impacts, and the mall's conformance with the regional plan. Among others applying for party status were several nearby towns concerned about the regional impacts of the mall.

At the August hearing Chittenden County Regional Planning Commission (CCRPC) representatives said that the mall would clearly have regional impacts on traffic, road design, services, as well as solid waste disposal.

"This mall would have the single most dramatic impact on the entire middle portion of Vermont

of any development to date," says VNRC/CRG attorney Harvey Carter. "A mall of this proportion would radically alter the planning dynamics of this area of the state; it will pull development out of the urban areas and into the countryside."

Although Pyramid developers claim that the mall would curb suburban sprawl, opponents are skeptical; not included in the mall permit application is the fact that a front company of Pyramid partners holds an option on 160 acres within a quarter-mile of the mall site.

Three studies commissioned by the CCRPC are due out soon, which will address the mall's potential impacts on traffic, economy and municipal services. At the August hearing, the CCRPC called Pyramid's application "incomplete"; if the District Environmental Commission agrees that more information is needed, hear-

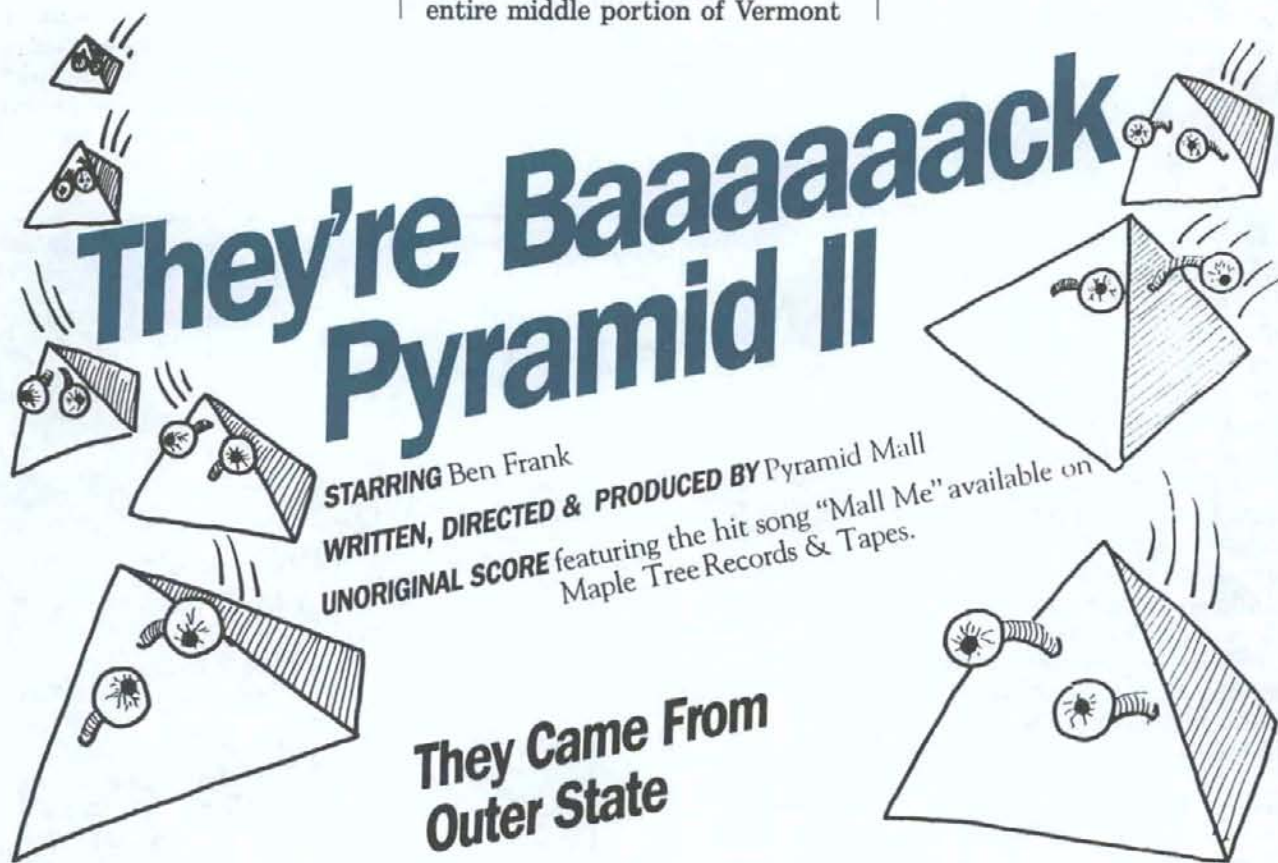


Illustration courtesy of Citizens for Responsible Growth.

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ings may be delayed.

In addition to meeting Act 250 criteria, mall developers must gain the approval of Williston's municipal officials. The proposal has already passed the first phase of a three-part town planning commission process; the more detailed second phase is expected to take two to six months. Williston selectmen have already approved the mall's sewer allocation—committing a hefty 70% of the sewage capacity that was intended to last that part of town until the year 2003. However, CRG is appealing that allocation on the grounds that the town's planning goals were not adequately considered.

Meanwhile, questions about the mall proposal have been coming in from all sides—and sometimes from unexpected places. In a strongly worded editorial this spring, *Vermont Business* magazine stated, "The mall will siphon off Vermont dollars out of state, bring national stores in to compete with Vermont-owned stores, hurt downtown shopping districts throughout northwestern Vermont, and preclude more productive use of Williston's land and its sewage capacity. In short, Pyramid would be bad for business."

The editorial concludes, "In the final analysis, the only real beneficiary of the Pyramid Mall will be Pyramid itself. There is little reason the Vermont economy should subsidize the profits of a company that has proven itself an unfriendly neighbor at best, and at worst an unethical manipulator."

The theme of Pyramid Cos. as "unethical manipulator" has been echoing throughout the northeast, as Pyramid has struggled with local and state governments over the siting and construction of several other malls. A May *New England Monthly* magazine article gives a tongue-in-cheek account of Pyramid's "civic-mindedness" in a number of mall cases;

the article highlights the Lanesboro, Mass. case where "as early as 1986, [Pyramid] was caught illegally bulldozing dirt into a protected wetland and simply paid a \$90,000 fine—not exactly a killing sum in a project budgeted at \$57 million." The article notes that "the developer has been having its way with Lanesboro town officials, who are giddily eager to have the mall open, but has been butting up against less tractable state regulators who have actually read the laws that require them to protect wetlands."

Also in the public eye this year has been testimony before the New York State Commission on Governmental Integrity on Pyramid's tactics in getting its Poughkeepsie mall approved. Pyramid spend over three quarters of a million dollars in a town of 30,000 on an election that would create a pro-mall Town Board; one of Pyramid's campaign consultants of Campaign Strategies of New York testified, "What these people were seeking to do was influence an election for their own personal pecuniary gain, for no other purpose whatsoever in my opinion."

"There's no question that squaring off with Pyramid, we're up against a tough bunch," says VNRC Executive Director R. Montgomery Fischer. "But it's equally clear that the mall would have severe negative impacts on

the area." Adds Fischer, "When Vermonters testified at growth hearings last year, they made one point very clear: keep our community centers strong. When we passed Act 200, Vermont made a commitment to regional planning. This mall proposal is a slap in the face to those commitments." SC

Housecleaning on Solid Waste

When the new solid waste management law was passed last year, some Vermonters felt a backlash: in some areas, the cost of disposing of garbage rose dramatically. But questions were raised about how much of the

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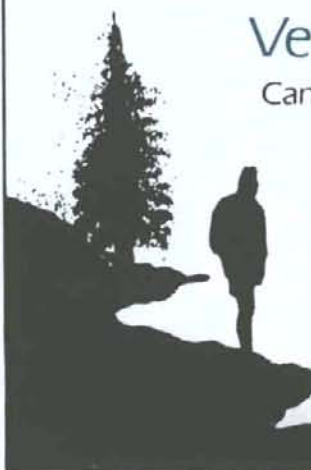
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price difference at landfills could be directly attributed to the new law.

In response to these questions, the legislature made a number of amendments to Vermont's solid waste laws. Effective this summer, the Secretary of the Agency of Natural Resources may demand from an owner or operator of a solid waste facility information on the facility's expenses and revenues. (The information can not be disclosed to competitors.)

The new law also enables a solid waste management district to require, by contract, that a facility owner or operator establish an escrow account to provide for

the timely compliance with solid waste management laws. Also, as of July 1991, municipalities' option for computing a per capita tax on people served by the solid waste facility will be eliminated in favor of the user fee or "tipping fee" system; this system makes individuals more directly accountable for the trash they produce, since they are charged by the weight or volume of their refuse.

Another piece of legislation effective this summer allows municipalities and solid waste districts to obtain interim grants and loans prior to the completion of their regional solid waste plan.

The new law states that the projects funded must be consistent with the planning underway, and that they may not rule out alternative options for solid waste management. MM/SC

An Omnibus Energy Bill

What began as an effort to bring waste-to-energy facilities under the scrutiny of Act 250's environmental criteria unfolded this year into an omnibus energy bill. This legislative package was expanded in response to federal applications to build a large natural gas pipeline across Vermont, and major new power contracts pending with Canada.

In the past, energy projects have been exempted from the Act 250 process, and the Section 248 process that they have been subjected to has provided only minimal environmental review. VNRC argued that energy projects deserve thorough environmental scrutiny that is consistent with Act 250's environmental criteria.

The new law includes strong energy conservation language concerning all Public Service Board (PSB) rate hearings, as well as direction on the PSB's role in the siting of new natural gas facilities before the Federal Energy Regulatory Commission (FERC) and state agencies. The law also requires conformance with a duly adopted regional plan, and prohibits gas connections that do not conform with adopted municipal plans.

In keeping with the bill's original purpose, the PSB must examine all new incinerator proposals for their compatibility with state solid waste planning efforts. The PSB must also give consideration to Act 250 environmental criteria for all facilities seeking a "certificate of public good" under the Section 248 hearing process.

I remember

I remember an evening in summer
when I was fourteen or so, or maybe twelve

mother in the house doing the dishes perhaps
because I wasn't and should have

brother out in the barn milking the cows

and in between feeding calves
and doing the milkpails
I wandered out by the front of the house
and sat on the knee of the old maple tree

and I watched the light after the sun had set
it filled the air with rose and filled me
with such longing

I wanted to write what I saw
but found 'beautiful' and 'magical' too plain
found no words to tell about air full of rose
after the sun went down

Even now many years later,
remembering brings back tears,
the pain of the beauty comes back
mixes with the pain of my growing up years
and I watch skies and sunsets and wait
for the air filled with rose.

Cherie Staples Langer

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"Adding specificity to the statute focuses attention on the environmental criteria to be examined," noted PSB Chair Richard Cowart at a House committee meeting. Both Cowart and Leonard Wilson, Environmental Board Chair, agreed that the PSB should be mandated to consider fully the value of water resources, endangered species, natural areas and archeological, historic and research sites in its review of energy projects, including wood- and trash-burning facilities.

The new law also requires the PSB to assess future trends in the natural gas industry in Vermont, with a preliminary report is due to the legislature by January, 1989 and a final report due by the end of the year. The law specifically calls for the report to review the "potential secondary environmental and development effects" of proposed pipelines and "mechanisms for enhancing conservation, load management, and end-use efficiency in the use of natural gas in Vermont." EP/MM

Happier Waterways for Vermont

The clean-up of Vermont's waterways got a boost from the legislature this year, as lawmakers allocated funds to help municipalities abate pollution.

Partially in response to the federal government's planned phase-out of construction programs for municipal sewage treatment projects, lawmakers created a \$12 million revolving loan program with budget surplus monies. Under the new formula, a town making a financial commitment of 25% of a project's cost is eligible to receive 50% of the cost through a twenty-year revolving loan; the final 25% may be funded through a state grant.

The new law was referred to by some as the "Lake Champlain clean-up bill," since it gives priority to projects that would remedy pollution discharges into or near lakes. Particularly targeted are "combined sewage overflow" problems such as Burling-

ton's. The Queen City's antiquated sewage system is tied in with its stormwater run-off system. This means that when the system is overloaded—as it is after a heavy rain—stormwater and sewage are dumped untreated into Lake Champlain. Thanks to

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the new funds, construction began this summer to separate the city's system.

The waterway that borders the other side of Vermont was also given attention by the legislature this year, with the creation of the Connecticut River Watershed Advisory Commission. Act 208



"Curiouser and curiouser"

—Lewis Carroll

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created the nine-member commission, made up of watershed residents and state and regional environmental and planning officials. The commission will work with New Hampshire to ensure that development within the watershed protects the regions' outstanding ecological, agricultural, recreation, and cultural values. MM/SC

How—And Whether—To Reclassify A River

Should a section of the Ottauquechee River in Sherburne be down-graded? The Town of Sherburne, home of Killington ski area and other resort developments, has applied for a reclassification of a river section from Class B to Class C (the lowest water classification). But VNRC and six other conservation and local government groups continue to fight the proposed change (see V.E.R. Spring, 1988 "Vermont Perspectives").

Traditionally, "C" classification has been used to recognize and allow for the abatement of existing pollution problems. The past two decades have seen an extensive effort in Vermont to restore water quality; VNRC argues that the Ottauquechee case could be

precedent-setting, since it is the first time a Class C zone has been proposed to accommodate sewage from new, yet-to-be-built development.

The Ottauquechee reclassification question has a complex history. Last January, after a controversial two-step review process, the Vermont Water Resources Board adopted a rule that would reclassify the river segment. The Legislative Rules Committee, however, formally objected to the Board's reclassification decision, for water quality and public use reasons.

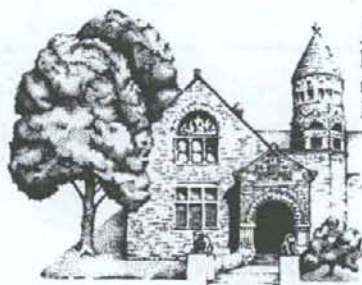
This spring, with the momentum gained from the Rules Committee's decision, VNRC and six other groups filed a second appeal contesting the Board's review process and decision. The appeal alleges that the Board: failed to consider federal Clean Water Act requirements protecting existing uses of waters; inappropriately re-interpreted water laws to exclude fishing and other water-contact recreation as Class B uses; and failed to observe the statutory definition of the "public interest."

The reclassification battle made its mark in the legislature this year, as the procedural dispute prompted a legislative inquiry. Act 154 was among the few environmental bills to survive the session with little controversy; everyone agreed that the convoluted two-step procedure used in rivers reclassification was not adequate to sort out the public's interest in river use.

Under the new law, the Water Resources Board will take evidence from the broadest possible cross-section of the public in determining whether a river segment should be reclassified. The Board is also required to explain the basis of its decision under each of ten existing criteria, and it must consider the availability of alternative waste disposal methods in lieu of reclassification. EP/SC

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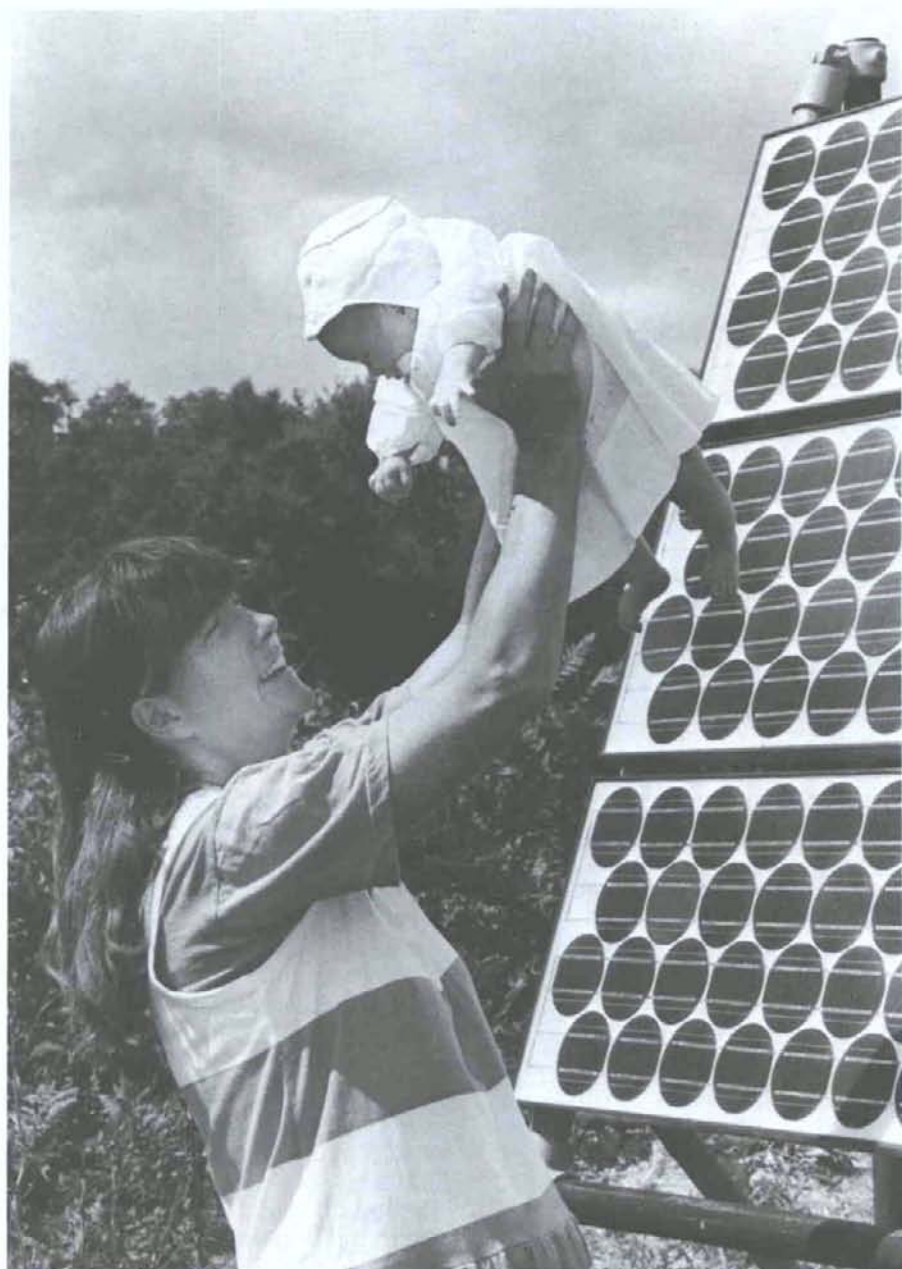
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IN VERMONT'S BEAUTIFUL NORTHEAST KINGDOM

Vermont's Energy Future



ENERGY EFFICIENCY: Vermont's Most Promising Power Source

Paul Markowitz

A hot shower, a cold beer, a bright light to pierce the darkness—the conveniences of modern living. All conveniences made possible, in part, by electricity, that amazing, versatile form of energy that has in many respects transformed our society.

But how many of us actually stop to think about where that electricity comes from, and how future utility investments will impact upon consumers and the environment? This summer, the Vermont Public Service Board (PSB), the quasi-judicial state agency that regulates utilities, began an investigation into Vermont's long-term energy future. And three environmental and consumer groups—VNRC, the Vermont Public Interest Research Group (VPIRG), and the Conservation Law Foundation of New England (CLF)—are working with the Board to ask some tough questions.

"This is the most important investigation the Public Service Board has ever undertaken," says Leigh Seddon, VNRC Energy Task Force Chair. "Its findings could change forever the way Vermont utilities do business. And with work, it could result in more economical, reliable and environmentally-safe energy for Vermonters."

Where Should We Get Our Energy?

The discussion about Vermont's energy future has been prompted in part by decisions being made about where we get our power now.

Last winter, Vermont utilities announced the signing of a \$5.5 billion twenty-year contract with Hydro-Quebec for 500 megawatts of electric power. Hydro-Quebec has constructed eight huge dams, as part of Phase I of the James Bay Project.

The project has flooded 4,600 square miles of pristine wilderness in northern Quebec—an area equal to the size of Connecticut. Of equal severity, thousands of native Inuit and Cree Indians have been displaced from their

lands. Now, Hydro-Quebec is planning to dam an additional seven rivers in Phase II of the Project—to create power which will be sold to Vermont under the recently signed contract.

Under Phase I, the backed-up water from the dams has released mercury from the soil, which in turn has appeared in toxic levels in the fish that are a mainstay of the local diet. Wildlife species—many of which are also key to the subsistence of native peoples—have suffered habitat disturbance or destruction. Summer nesting grounds of loons, American Black ducks and Canadian geese have been eliminated. Village water supplies have been contaminated.

"Our decision to purchase Hydro-Quebec power has a direct, adverse effect on the native cultures and on the last remaining wilderness area in eastern North American," says Jim Higgins, a Vermont social worker who has travelled to the region and visited with the native people. "Under Phase II, more villages and natural lands will be flooded and more natives will be displaced from their homelands."

Lewis Milford, CLF's Vermont attorney, agrees. "Hydro-Quebec has had serious environmental repercussions, and Vermonters should realize that by buying that power, we're part of the problem. That's one reason we're working for the energy efficiency alternative."

Promoting energy efficiency in Vermont has been the focus of VNRC, VPIRG and CLF in the Board's investigations. The organizations have completed research and gathered expert testimony from around the country, in an effort to convince the Public Service Board that energy efficiency is the cheapest, most environmentally-sound energy source available.

Energy Efficiency: The Least-Cost Investment

"When we think of energy conservation, many of us think of the Arab oil embargo of the 1970's," says CLF Executive

Director Douglas Foy. "But we were using a very low-tech approach then—we put on our sweaters, drove at 55 mph, and sat in gas lines a lot." Adds Foy,



"even in the five or ten years that followed, we were fairly low-tech; those of us who were concerned with the problem wrapped our water pipes, insulated our hot water heaters, and had to take the attitude of 'It's a hassle, but it's good for us.'"

Foy notes, however, that recent years have seen a revolution in the development of energy-efficient technologies. "There has been an incredible crescendo of new energy efficient products," says Foy, "and the good news is, technology is eliminating the 'deprivation' of energy efficiency."

By being energy efficient, say efficiency advocates, we can enjoy the same amount of electrical services—such as heat, light, and power—by more efficiently using the electricity we already generate. And the savings from new technologies which have entered into the marketplace over the last several years are impressive.

A recently-developed screw-in fluorescent light bulb uses only 18 watts of electricity, yet produces the same amount of light as a 75-watt incandescent bulb. The new bulb lasts ten times longer than its incandescent counterpart; the "flicker"

that many associate with fluorescent bulbs has been eliminated; and although more expensive to purchase initially, the bulb pays for itself two to three times over

in its lifetime.

Motors constitute the single largest user of industrial electricity consumption. Adjustable speed drive, an electronic device which increases or decreases motor speed to meet changing process requirements, can save 20-30% of electricity use in a wide range of applications.

Institutions, businesses and homeowners are installing these technologies and reaping enormous savings. The University of Rhode Island, for example, recently reduced electricity use for lighting by 78% at its Kingston campus by adding high-efficiency light bulbs and reducing unnecessarily high lighting levels. As a result, the campus saved \$200,000 per year on its electricity bill—substantially more than the cost of obtaining the reductions.

The Massachusetts State

Above: The environmental effects were as massive as the dam at Le Grande II, part of Hydro-Quebec's immense hydropower complex. Should Vermont be hooked in?

At right: Transmission lines from LG II, Hydro-Quebec's huge hydropower system. Photos by M. Ishkanian, Natural Resources Council of Maine.

Transportation Building consumes 40% less electricity than other comparably-sized office buildings, thanks to better insulation and high-efficiency cooling and heating equipment. Annual electricity savings exceed \$1 million. Thousands of similar examples of comparable savings exist throughout the country.

According to the 1987 *Power to Spare* report by the New England Energy Policy Council (a consortium of the region's leading environmental and consumer groups including VNRC, VPIRG and CLF), energy efficiency investments could reduce the region's projected electrical demand by 35% to 57% by the year 2005. Put another way, using energy efficiency measures, New England

intensive power plant construction," reports *Power to Spare*.

National studies, even those by utility-related organizations, bolster these findings. A 1986 study by the Electric Power Research Institute, the research arm of the electric utility industry, found that energy efficiency improvements could reduce projected peak demand in the year 2000 by 25% using technologies that are commercially available in the marketplace today. A 1986 study sponsored by the U.S. Department of Energy found that new technologies such as high efficiency appliances, lighting, window technologies, and adjustable speed motors could reduce projected demand levels another ten to fifteen percent.



could be using less electricity twenty years from now than it uses today, even with the level and pace of economic growth predicted by the region's utilities.

According to the report, these savings could be achieved simply by replacing the inefficient existing stock of appliances, lights, and motors with state-of-the-art efficient technologies. Furthermore, the bulk of these electricity savings could be achieved at a cost under 1½ cents per kilowatt-hour.

"Dollar for dollar, investments in electrical efficiency equipment are less risky, cause fewer environmental problems, and create far more jobs than capital-

Vermont Lags Behind

Energy efficiency improvements reduce the need for new generating capacity. To re-state an old adage, a kilowatt hour saved is equal to a kilowatt hour generated—only better, since saving energy means lessening the environmental impacts of energy generation. Utility programs nationwide are evidence to this fact. For example, the Pacific Gas and Electric Company, the nation's largest investor-owned electric utility, has eliminated the need to invest in six large power plants over the next twenty years as a result of energy efficiency and load management programs.

However, *Power to Spare* authors warn that three serious obstacles stand in the way of fully implementing efficiency improvements. According to the report:

- "Many of these technologies are relatively new and...information about them has not been widely disseminated to consumers and utilities.

- "Many electric users, especially small businesses and homeowners, do not have the capital or incentives to purchase new equipment because they often do not receive all of the economic benefits of the resulting electrical savings.

- "Even the region's most active utilities are still spending on end-use efficiency only a small fraction of the amount they are spending on building power plants and transmission lines."

New England utilities and regulators must play an active role, notes *Power to Spare*, in order to overcome all three obstacles. Unfortunately, Vermont's utilities are among those that are lagging behind the nation in energy efficiency.

"Vermont's utilities have been exemplary in some ways—for example, developing new rate designs and electric load shifting programs," says Leigh Seddon. "But they are among the least progressive in New England in energy efficiency."

Meanwhile, utilities nationwide are offering a wide range of financial incentives to their customers, such as cash rebates and direct grants for low-income customers, to invest in energy efficiency measures. (See sidebar by Lewis Milford, this issue.)

"A lot of people ask, 'Why should utilities encourage conservation when it means they sell less electricity—and so, make less money?'" notes Seddon. "But VNRC, VPIRG and CLF agree with the utilities on at least two related points: First, utility investors should not be penalized for investing in efficiency, such as lost sales from efficiency investments; and second, utilities should be able to earn a profit on

(Continued p. 15.)

New energy-saving innovations may change the face of energy use in New England in the coming years. But as important, another new factor has now come on the scene: new alternatives in who will pay for these energy-efficiency programs.

In the past, the owners of buildings or machines may not have paid for energy-saving measures for a number of reasons: they lacked the information about what was available; they saw no way to obtain an economic return on the purchase; or in many cases, utilities simply did not aggressively advocate energy-saving alternatives.

Thus, with the beneficiaries of energy efficiency unable or unwilling to purchase these improvements, environmentalists have begun to look to one player in the energy picture with the financial resources to purchase the improvements: the utilities themselves.

Under a series of agreements between environmental groups and utilities, several utilities around the country have agreed to design, purchase and install these measures in homes, businesses and factories, at the utilities' expense, instead of waiting for customers to pay for them. New direct investment approaches in states such as Maine, Massachusetts, Wisconsin and Oregon recognize that rebate, audit and information programs that depend on consumers to make these improvements simply have not worked in the past.

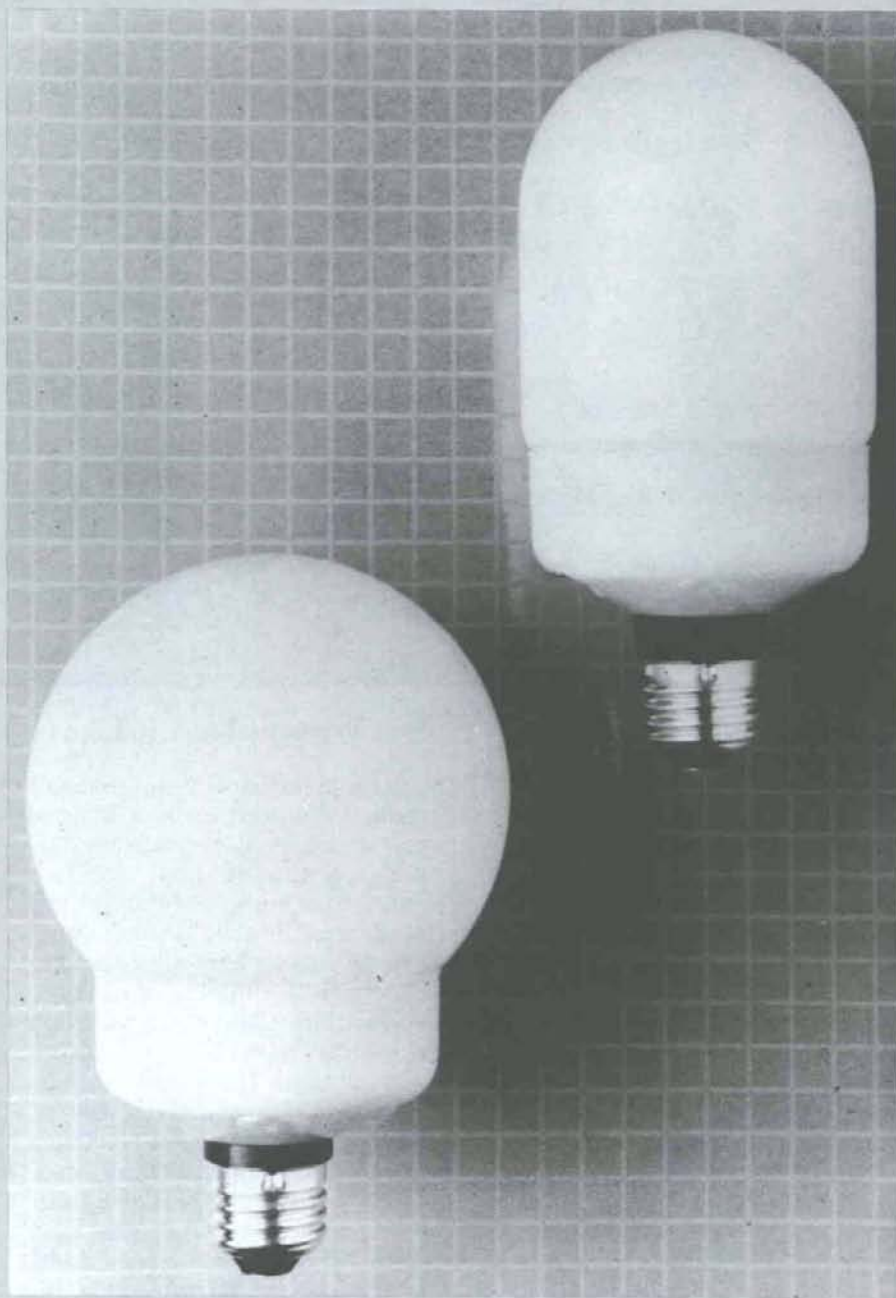
One of the most ambitious programs of this kind was instituted close to home. This May, New England's largest utility, Northeast Utilities, filed a plan with Connecticut regulators that calls for almost \$20 million in efficiency investments. Under the one-year plan, which is a settle-

At right: New lightbulbs use less than a third the electricity of a standard bulb, but shed the same amount of light. Conservationists argue that utilities should install these and other energy-efficient technologies in homes and businesses as part of their energy policy. Photo courtesy of CLF.

Free Light Bulbs

And Other Bright Ideas for Creating An Energy-Efficient New England

Lewis Milford



ment of a case brought by the Conservation Law Foundation of New England (CLF), the utility would invest the funds to pay for energy saving methods in existing homes, offices and factories, and it would provide design assistance to developers of new buildings.

The plan came into being largely because the Connecticut Department of Public Utility had issued an order requiring the utility to study conservation measures. But most important, the state endorsed a process by which the utility financed the expert team retained by CLF to conduct the technical negotiation with the company over proposed conservation measures. Without this funding, the environmental groups would not have been evenly matched with the utilities.

The details of the plan could be a model for programs throughout New England. In existing residential homes, the plan includes free installation of weather stripping; testing of air infiltration; free installation of several features for low-income customers; free installation of light bulbs; and a mail-order service for conservation measures.

In new commercial construction, the utility would provide technical assistance. In existing commercial buildings such as offices, hospitals, and malls, conservation retrofit measures such as offering bulk purchasing and installing new energy efficient equipment would be provided free or with utility financing; and energy audits are available for industrial customers. Retrofit of farms is also included, such as the free or utility-financed installation of milk heaters, ventilation fans and energy-efficient motors.

In another case filed by CLF, all seven Massachusetts utilities agreed in late July to spend hundreds of thousands of dollars to develop a future plan of direct investment conservation programs. CLF research shows that conservation investments of \$2 million in Massachusetts over the next ten years can postpone the need for two Seabrooks—more than 2,000 megawatts.

In April, the Vermont Public Service Board joined in the energy efficiency movement and opened an investigation into direct conservation investments in this state. The Board set an aggressive mandate for the Vermont utilities: Determine the potential for energy conservation in Vermont, in order to compare the cost of energy-saving measures with the cost of purchasing new power. The Board is considering studying these options before it approves a major power supply purchase such as the \$5 billion Hydro-Quebec deal. The hearings began in May and are scheduled to continue through December.

In an effort to get quickly to the implementation of energy-efficient methods paid for directly by the utilities, CLF, VNRC and VPIRG proposed a novel approach similar to that which the Connecticut and Massachusetts utility commissions used. CLF asked the Board to order the utilities to work cooperatively with CLF's experts to develop jointly an energy efficiency program. With CLF's experts paid for by the utilities, the public groups would have the capability to match the utilities' expertise, to develop the best conservation program possible.

At the time of this writing, the utilities have resisted this approach. And the Board has not decided upon the public interest parties' request for a utility-funded joint design program. The kind of programs proposed by utilities, and even by Vermont Public Service Department, fall very short of what other states in New England are pursuing.

For Vermont and the rest of the region, it is increasingly apparent that the time is right for a different approach to energy generation than relying on major construction of nuclear and other plants. Looking for a small "conservation power plant" in the home, office or business may be the cheapest, and most efficient source of electrical power available.

Lewis Milford is the Vermont attorney for the Conservation Law Foundation of New England.

(Continued from p. 13.)

energy efficiency investments similar to the profit they earn on supply-side investments."

Least-Cost Electrical Planning: The Regulatory Framework

In addition to this study of energy efficiency programs to help address Vermont's energy needs, the PSB's investigation also involves a process for planning Vermont's long-term energy future.

Least-Cost Electrical Planning

**The good news is,
technology is eliminating the "deprivation"
of energy efficiency.**

(LCEP) provides a comprehensive regulatory framework for ensuring that utilities undertake a side-by-side comparison of all electrical resources, including energy efficiency and load management (programs which shift electrical load from hours of peak use to non-peak hours.) Further, LCEP can ensure that utilities will invest in the cheapest resources first.

LCEP can be viewed as both a utility planning tool and as a regulatory policy. As a planning method, LCEP ensures that utilities will consider programs which promote energy efficiency on an equal basis with the construction of new generating facilities. As a regulatory policy, LCEP involves an examination—by the Public Service Board and the public—of utility investments, before dollars have actually been committed.

Under traditional regulatory policy, utilities have sought recovery of investments after the expenditure of funds. According to some energy advocates, this approach has been at least partially responsible for the construction of numerous uneconomical power plants.

The Vermont PSB's investigation into least-cost electrical planning

(Continued on p. 17.)

☆ How To Afford a Five☆Star Home ☆

An energy efficient building—how can you afford it? For more and more Vermonters, creative financing has been the answer—with the help of several non-profit organizations.

The Vermont Energy Investment Corporation (VEIC) in Burlington provides "one-stop shopping" to help homeowners install reliable and effective building energy improvements. The service begins with an analysis of building energy consumption, followed by an evaluation of the costs and benefits of energy investment options and written specifications of needed improvements.

With capital provided by the Vermont Housing Finance Agency, VEIC provides homeowners with below-market interest rate loans for energy improvements. The money saved from these "energy investments" can cover most or all of the monthly loan payment. To date, VEIC has loaned Vermont homeowners over \$300,000, while achieving an average reduction in energy consumption of 20-30% per home.

"Limited financing is the single biggest barrier to the actual installation of efficiency measures," notes Beth Sachs, VEIC Execu-



tive Director. "Efficiency technologies are definitely available and cost-effective today. VEIC's 'one-stop shopping' provides homeowners with needed information and makes financing affordable to homeowners who might otherwise be unable to borrow."

Another option for those wishing to make energy-efficient investments is the Energy Efficient Mortgage program (EEM), operated by the non-profit Energy Rated Homes of Vermont (ERH).

Under the EEM program, home buyers may have their potential home evaluated for its energy efficiency; they then may incorporate the cost of energy improvements into their mortgage, and be allowed larger loans from participating lenders.

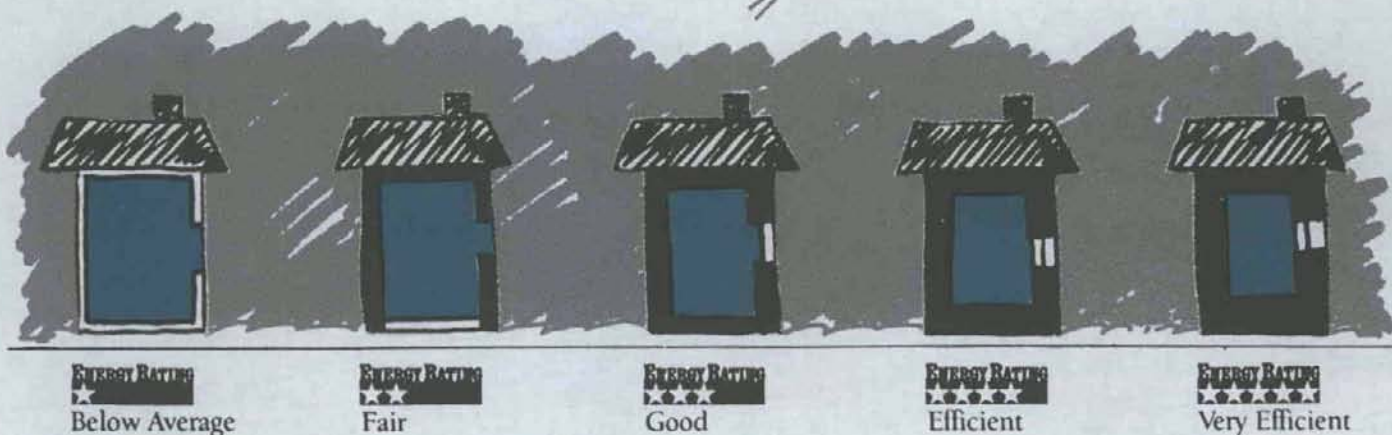
Under EEM, homes are evaluated on a star-rating system. "A four-star rating," says Richard Faesy, ERH Director, "makes any

home automatically more affordable. For example, at today's interest rates, it would take an income of approximately \$36,000 to afford a \$70,000 mortgage. If the home being financed had a 'four-star' rating," says Faesy, "then the qualifying income would be reduced to approximately \$33,600. With home prices being what they are today, this lower eligibility criteria can really make a difference for the buyer."

If the home rates below "four stars," the cost of improvement work is added into the mortgage and spread over the life of the mortgage. Energy savings that result from the improvements have been shown to exceed the increase in the monthly mortgage payments.

The EEM is being supported by a portion of Vermont's Exxon oil overcharge monies and by the Vermont Housing Finance Agency, and is available through many lenders in Vermont and to all buyers and sellers of homes.

For more information on these programs, contact: Vermont Energy Investment Corporation, 7 Lawson Lane, PO Box 5130, Burlington VT 05402, tel. (802) 658-6060; and Energy Rated Homes of Vermont, 7 Lawson Lane, Burlington VT 05401, tel. (802) 865-3926.



(Continued from p. 15.)

and energy efficiency is part of a growing national trend. According to the Washington D.C.-based Energy Conservation Coalition, twenty-three regulatory commis-

Using energy efficiency measures, New England could be using less electricity twenty years from now than it uses today, even with the level and pace of economic growth predicted by the region's utilities.

sions have either examined or implemented least-cost electrical planning policies in the last two years alone.

Across the nation, utilities and energy leaders are using LCEP to forecast energy needs, rank resources by cost effectiveness, and consider less-easily quantifiable criteria such as the socio-economic and health impacts of different energy options.

The Vermont PSB noted in its preliminary order last February that energy supply programs impose environmental costs both within and outside Vermont. According to the Board's order,

"Purchasing power from out of state will not eliminate those [environmental] costs. We cannot ignore significant environmental impacts associated with our own energy supply simply because they occur in Ontario, Quebec, or New Hampshire. Such issues must be weighed along with direct economic costs when evaluating the benefits and costs of potential demand-side and supply-side energy options."

In any case, these environmental impacts must be afforded some value; the current regulatory system essentially assigns them a value of zero by not accounting for them at all. These and other difficult questions will be addressed by all parties in the Board's investigation.

A Moratorium on New Energy Purchases?

The Vermont PSB is considering a moratorium on approval of all new major power contracts and new generating facilities until it has completed its investigation. VNRC, VPIRG and CLF support a moratorium and believe that the Board should delay consideration of all new power contracts until the potential of cheaper alternatives, such as energy efficiency and small power sources, has been fully examined.

"We need to compare the cost-effective potential of all resource options today—particularly energy efficiency," says Seddon. "Otherwise, Vermonters could find themselves locked into paying for higher cost resources, such as Hydro-Quebec, while cheaper alternatives are ultimately precluded and ignored." Notes Seddon, "If it were invested in efficient lighting, appliances and other electrical end-uses, that \$5.5-billion Hydro-Quebec price tag could potentially save Vermonters much more than the Hydro-Quebec deal and other new generating sources."

Vermont Plugs In

During the past decade, the electrical power industry has

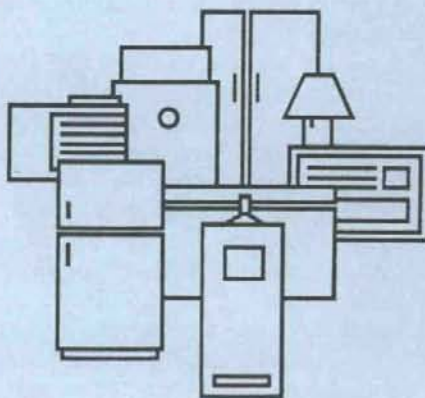
changed dramatically. The rising costs of electricity, the introduction of non-utility power producers, and the financial failure of numerous power plants have combined to pique the interest of citizens, regulators, and utilities considering alternative ways to meet electrical demand.

The Board's investigation into energy efficiency and least-cost electrical planning will provide Vermonters with a unique opportunity to participate in developing a comprehensive approach to energy planning. By anticipating Vermonters' energy needs—and the most efficient, environmentally-sound way to meet them—we can create a brighter future for Vermont.

Paul Markowitz is a utility analyst with the Vermont Natural Resources Council and the Vermont Public Interest Research Group.

For a copy of Power to Spare, contact New England Energy Policy Council, 3 Joy Street, Boston, MA 02108 (\$5/copy). For a copy of A Brighter Future: State Actions in Least-Cost Electrical Planning, contact Energy Conservation Coalition, 1525 New Hampshire Avenue, N.W., Washington, D.C. 20036 (\$10/copy).

Energy Efficiency in Your Home—Find Out More



The Most Energy Efficient Appliances, 1988 Edition

contains information and brand name tips for homeowners on kitchen, cleaning, heating and cooling appliances and more. **Saving Energy and Money with Home Appliances** helps homeowners identify energy-guzzlers in many homes, use appliances more efficiently and make cost-effective purchasing decisions.

Copies of these booklets are available (\$2 each) from the **American Council for an Energy Efficient Economy (ACEEE)**, Suite 535, 1001 Conn. Ave. NW, Washington, D.C. 20036. Ask for a complete ACEEE publications list.



Photovoltaics: A Sunny Future for Vermont

Leigh Seddon

Conventional wisdom has it that solar energy really isn't very practical in Vermont. We do, of course, rely on the sun to grow our fruits, vegetables, trees, and other crops. In fact, each year every acre of Vermont receives the energy equivalent of nearly five million kilowatt-hours of electricity, all free of charge from the sun. Somehow, however, we rarely consider tapping this energy to heat and power our homes.

But some Vermonterers, like Edith and Warner Shedd, don't put too much stock in this conventional wisdom. At the edge of the field below their house are twelve solar electric panels mounted on a tracker that faithfully follows the sun. Silently, each panel converts sunlight directly into electricity, sending it to the house to be stored in a battery bank.

Photovoltaics in Your Backyard

In engineering parlance, the solar panels are called photovoltaic modules. Ten years ago, the number of homes using photovoltaic (PV) technology could be counted on one hand. Today, there are over 15,000 homes across the U.S. that get all or a part of their electricity from the sun.

There are several reasons for this dramatic increase in the use of solar electricity. The ten-fold decrease in the cost of PV modules in just the last decade is a primary factor. Equally important are recent technological breakthroughs in energy-efficiency, often cutting lighting and appliance power requirements by 75% or more, making it possible

to power an entire residence with as little as a quarter of the electricity required by a conventional home.

But in rural states, such as Vermont, what has really opened the market for solar electric homes has been the skyrocketing cost of hooking up to the local utility. Depending on terrain, power line extensions now cost a new homeowner from \$20,000 to \$40,000 a mile. Currently in Vermont, solar electric systems can be economical if your new home is as close as 400 yards from the utility line.

Above: Warner Shedd relaxes in the sun in his solar home in East Calais.

At right: The photovoltaic panels in front of the Shedd's new home provide all the electricity they need. Photos by Craig Line.

The question I am often asked as a solar contractor is, "what does this mean for Vermont's energy future?" Will we soon be picking up our PV panels at the hardware store and unplugging the utilities?

My answer is a qualified yes. Over time, and in conjunction with the development of other technologies, photovoltaics will supply the bulk of residential electric power in Vermont. But to understand how this will happen, we must first take a look at where we are today.

The Shedd's solar electric system is a good example of what is cost-effective today. It is also a good example of the fundamental design differences between a solar electric home and a conventional

replaced every five to ten years. Old batteries will be removed and recycled, and the lead in the batteries can be reclaimed.

This power is not used directly, but used to charge a 24-volt battery bank. Power from the battery bank is then used to power both DC equipment, such as the Shedd's well pump, and an inverter that supplies 120-volt AC current for regular household appliances.

Because Vermont's weather is so variable, and because there is only half as much sunshine in the three worst winter months as in the rest of the year, the Shedd's system includes a propane-fueled generator that can be used to charge the battery bank whenever necessary. Though the sys-

The Role of Energy Efficiency

With twelve modules, the Shedd's solar system produces about 100 kilowatt-hours (kwh) of electricity per month. The aver-

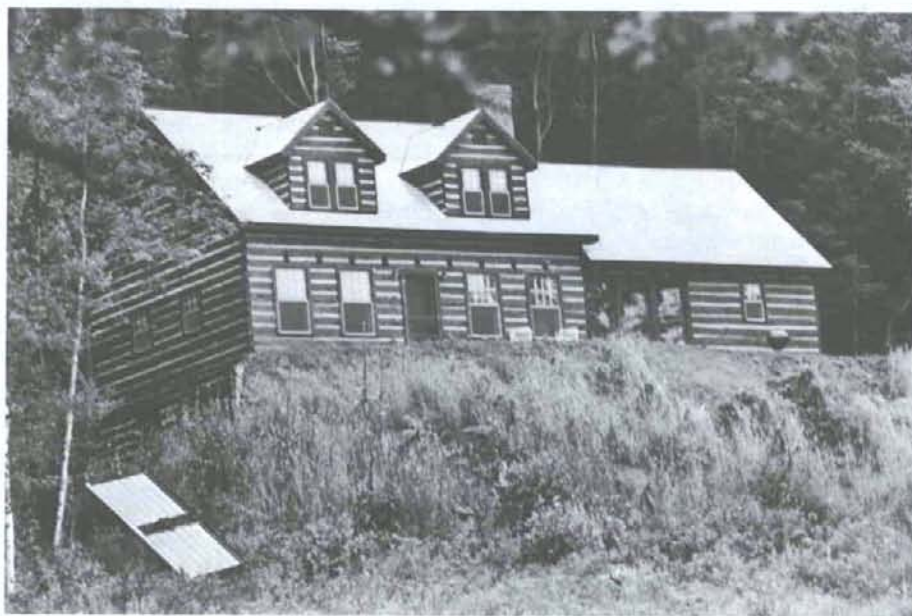
Will we soon be picking up our photovoltaic panels at the hardware store and unplugging the utilities? My answer is a qualified "yes."

age American family uses about 750 kwh per month. Understanding how the Shedd's can run their house using 15% of the power that most families do, is the key to understanding photovoltaic applications.

From the beginning, the Shedd's designed their new home for maximum efficiency and the best use of energy resources. It is a superinsulated log cabin boasting "R-40" walls—having twice the insulating capacity of conventional homes. In addition, all the windows have "low-E" glass, doubling their "R-value" (insulation value) as well.

Recognizing that electricity (whether from the sun or the utility) is an expensive, premium form of energy, the Shedd's substituted more economical and appropriate fuel sources such as wood and propane whenever they could. They use a wood stove with back-up propane heaters for space and water heating. In the kitchen there is a gas range and high-efficiency gas refrigerator/freezer.

Where they did not make substitutes for electricity, they bought only the most efficient appliances. Almost all of their electric lighting, for example, comes from ultra-high-efficiency fluorescent incandescent lights, which use only a quarter of the energy of a standard light bulb shedding the same light. If the Shedd's decided to turn on all the lights in the house at the same time, the power demand would only be the equivalent of four standard 75-watt bulbs.



one.

The heart of the Shedd's solar system is an array of twelve PV modules mounted on a tracker that uses only the sun's heat to follow it across the sky. The modules are composed of silicon wafers that produce direct current (DC) electricity when they are exposed to light. Under full sunlight, the array supplies a little more than a half-kilowatt of power.

This electricity is produced with no moving parts and no chemical reaction, making the modules extremely reliable and pollution-free. The battery bank will need to be maintained, and

tem relies primarily on solar energy, the addition of a back-up generator gives the system much more flexibility to meet changing weather patterns and household electrical use.

The use of a back-up generator also minimizes initial investment in PV modules at a time when their price is falling five to ten percent a year. Because PV panels are modular, they can simply be added on to the system in the future, a few at a time, as price decreases and the Shedd's needs dictate. In this way, the propane generator can slowly be phased out, making the power system more maintenance-free.

It is this remarkable advance in energy efficiency, as much as the progress in photovoltaic technology, that has made solar electric homes possible. Current research now indicates that it is possible and cost-effective to save over 80% of the power currently used for lighting, water heating, televisions and refrigeration in our homes. Every year, as power requirements for lighting and appliances continue to be reduced, low-power photovoltaic systems can economically handle more household tasks. And when you can light your whole house using only 300 watts, it makes very little sense to buy into mammoth, billion-dollar utility generating and transmission facilities. In Amory Lovins' apt phrase, "It's like cutting butter with a chain saw."

The Cost of Connecting

The first commercial solar cells that were used to power the Vanguard I space satellite in 1957 cost about \$400 a watt. At that

Understanding how the Shedd family can run their house using 15% of the power that most families do is the key to understanding photovoltaic applications.

time it would have required a \$40,000 investment just to power a 100-watt light bulb. In 1978, the cost had dropped to about \$15 a watt, opening up limited applications for remote lighting and telecommunications. The U.S. Coast Guard was one of the first organizations to utilize PV power for its navigational aids. In the last few years, it has converted over 10,000 of its buoys to solar power, saving taxpayers an average of \$5,000 per system in battery replacement costs.

Above: All of the Shedd's electricity, including that used to run their computer, comes from their photovoltaic panels. Photo by Craig Line.



Today, a standard 50-watt PV module retails for about \$350 or \$6.50 a watt. This has made PV power competitive within a few hundred yards of utility lines. At a Sheraton Inn in Massachusetts, for example, a heliport that is just a few yards from the parking lot and utility power is lit with PV powered flood lights. It was much less expensive for the owners to put a small solar panel and battery on each light than to dig up the parking lot and lay underground cable.

Still, however, PV power is an expensive investment. A typical residential PV system can cost \$10,000 or more. Of course, it's a one-time cost, and the power is essentially free for the life of the system. But even if Vermont utilities were charging 75 cents per kwh, it still wouldn't be financially wise today to unplug an existing house from the utility grid and convert it to solar power. It's the cost of connecting to the utility grid that makes it economically worthwhile.

In the near term—the next ten years—this means that the use of PV technology will be primarily for new houses, whose owners will be facing a utility hook-up fee of several thousand dollars or more. In new house construction, energy efficiency can be incorporated at a very small additional cost, making PV's practical and cost effective.

As photovoltaics and energy efficiency continue to advance, and as utility hook-up fees and electric prices continue to escalate, it is likely that most new single-family houses in Vermont will be using photovoltaics to generate power by the end of the next decade. It will account for only a small amount of Vermont's total electrical load, but it will be an important proving ground in Vermont's quest for energy independence and a sustainable energy future.

A Glimpse of Things To Come

A revolution is currently brewing in the PV industry concerning "thin-film" solar cells. This is a new technology that allows PV cells to be manufactured with hundreds of times less active material, cutting costs dramatically. This revolution has already touched consumer electronics: last year, over 200 million calculators were sold that were powered by these thin-film cells.

According to James Caldwell, President of ARCO Solar, the largest PV manufacturing company in the world, thin-film technology should cut manufacturing costs in half by the early 1990's. With this type of progress, by the turn of the century solar electricity should be competitive with utility power—even for existing buildings—in areas with high util-

ity rates and an abundance of sunshine (such as the Southwest). Once this happens, New England utilities and their customers will not be far behind. The next century may sound far away—but it will be here in twelve years.

A PV project undertaken last year in Gardner, Massachusetts is a glimpse of things to come. Funded by the local utility, New England Electric, the project involved installation of grid-connected PV's on thirty houses and five businesses, including the town hall, library, community college, and local Burger King. The power is fed directly into and taken out of the utility grid, eliminating the need for battery storage. Over the next few years, the utility will study the performance of these systems and the potential impact of PV's on peak power demand and system reliability.

The residential systems were completed for under \$10 per peak watt. This is the lowest cost yet for a utility-interactive system, though still about four times more expensive than building a conventional power plant. But when you look at the rapidly-escalating costs and environmental impact of new power plants and transmission facilities and also consider the impact of new thin-film PV technology, one conclusion is inescapable. Somewhere in the near future—it may be five years from now, or it may be fifteen—we will have started the transition to a solar economy out of economic and environmental necessity.

Planning The Transition

Unfortunately, today's energy planners, both on the utility and regulatory sides, have given little thought to this conclusion. Vermont utilities and state government continue to invest in expensive, long-term power contracts which, by their own admission, will ensure a surplus of power. The hope is that there will always be someone to sell the surplus to at a profit.

But what if, as some analysts predict, New England's electrical

demand actually declines due to investments in energy-efficiency? And what happens as customers begin to generate their own power with photovoltaics and other new technologies? Who is going to buy this expensive power?

This is a scenario so radically different from past experience that most planners have chosen to ignore it. But in fact, it is already happening today. From the Shedd's solar house in northern Vermont to energy efficiency retrofits of office towers in urban Boston, the seeds of a new energy economy are now being sown.

While no one can precisely predict the future, we can prepare for it if we look at the broader trends. In transitional times such as these, we should be looking toward preserving our options and maximizing our future flexibility. Cost-effective improvements and renewable energy resources will be the foundations of a sustainable energy future—not the fossil fuel and nuclear power plants that we are currently bankrupt-

ing ourselves and our children to build.

My daughter, Emily, will have just turned thirteen as we enter the twenty-first century. Vermont Yankee will be preparing to close and energy technology will be far in advance of anything I can imagine today. The opportunity to use renewable resources and create a sustainable energy economy will finally be at hand. But whether her generation will be able to pursue this opportunity depends very much on our actions today. The continuing investment by New England utilities in projects such as Seabrook and Hydro-Quebec jeopardize not only our long-term environmental quality, but also our ability to explore future energy options. This is why we must rethink today's conventional wisdom and look to our vision of the future, not the past, as a guide.

Leigh Seddon is the President of Solar Works of Vermont in Montpelier. He is the Chair of VNRC's Energy Committee.

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Vermont Travel Division

Adopt A Maple

Virginia and Craig Scharf

A 180-acre sugarbush in Underhill has been orphaned. On a frosty night last February, fire destroyed the Proctor Maple Research Center. Fortunately, the accompanying sugarbush went unharmed—but it was left without its “parent” lab. As a result, hundreds of sugar maple trees have been waiting to be “adopted” by concerned citizens interested in rebuilding this one-of-a-kind research facility.

The Proctor Maple Research Center is one of the few field-based forestry laboratories in the nation and the only one devoted to sugar maple research. The Center was established in 1947 by funds donated by former Vermont Governor Mortimer Proctor, and is affiliated with the Botany

Department at the University of Vermont (UVM).

Research has focused on the physiology of the sugar maple, the efficiency of maple sap collection and evaporation systems, the quality of maple syrup, and the impact of environmental pollutants such as acid rain.

“Research on maple trees is important for all producers, big or small,” notes Burr Morse of Morse Farms in Montpelier. Although the immediate impact of the fire may not have been felt by maple syrup producers, Morse believes that much of the research on maple tree decline, the impact of salting roads, and the influence of weather on sap flow is so critical that “it was needed yesterday.” Without this research facil-

ity, he notes, the maple industry may be adversely affected for years to come.

Developer and promoter of the the widely used 18-inch-drop plastic pipeline and vacuum pump system, the Center is a valuable resource for syrup producers, fielding questions on all aspects of maple syrup production. A major emphasis of the laboratory is to disseminate information important for syrup producers throughout the northeast through equipment demonstrations, reports and newsletters.

The February fire claimed over \$250,000 worth of equipment, several years’ of research data, and irreplaceable historical records. According to UVM Botany Department Chair Dr.

Hubert Vogelmann, however, much of the lab equipment was antiquated. "The Center has served its purpose for forty years, but now it must be replaced with a modern research facility," says Vogelmann.

According to Gerald Francis, Vice Provost at UVM, the new research facility will cost approximately \$1 million. Four sources of funding are being sought—private donations, federal and state government funds, and sources within the University.

The day after the fire, Mel Tyree, Director of the Center, began campaigning for private donations. The "Adopt-A-Maple" program is based upon forty years' research in numbering, cataloging, and measuring each sugar maple tree at the Center.

Maple lovers far and wide are helping to rebuild the Center by contributing money and thereby adopting a maple tree. Individuals are given a Certificate of Adoption and are encouraged to visit their tree anytime.

In Vermont, elementary schools in Burlington, Colchester and Waterbury have participated in the Adopt-A-Maple program. Students ran errands and did yard work to raise money. As far away as Long Island, New York, third and fourth graders sold tree-shaped cookies and donated \$60 to the rebuilding efforts.

Donations have come in other forms as well. Several companies have expressed an interest in donating computer and laboratory equipment, and the State donated its *Vermont Life* mailing list for use in fundraising.

Although months have passed since the fire, "donations keep trickling in," says Mel Tyree. Continued donations are needed in order to make the new Research Center a reality. A sweeter future for Vermont's maple groves and sugar bushes depends on it.

For more information on the Adopt-A-Maple program, contact the Proctor Maple Research Center, c/o Department of Botany, University of Vermont, Burlington, VT 05405.

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A Few Words With Eric



Photo by Craig Line.

This summer, VNRC bids a fond farewell to our Associate Director, Eric Palola.

Eric's work at VNRC ranged from intern to Acting Operations Director, before he became Associate Director in the summer of 1985. As Associate Director, Eric has shouldered an enormous variety of responsibilities—legislative lobbying, Act 250 work, as well as coalition-building and issues education. With his energy, expertise and unflagging commitment to an environmental ethic, Eric has made a tremendous contribution to VNRC. From rivers to solid waste, forestry to energy, growth management to wildlife, Eric has managed to stay on top—and keep VNRC out in front—of Vermont's myriad environmental concerns.

During Eric's tenure, VNRC and Vermont's environment have seen a remarkable list of legislative and Act 250 successes. We wish him the best of luck in his graduate studies at Harvard's Kennedy School—he will be greatly missed at VNRC.

Here, V.E.R. Editor Susan Clark talks with Eric about advocacy work, and where VNRC might be headed in the future.

SC: The past three years have shown extraordinary success in

passing strong environmental legislation in Vermont. We've seen new legislation on hazardous waste, rivers, solid waste, and growth management, just to name a few. What do you think are the reasons behind these successes?

EP: I'd say that the most important factor was that we had a core group of individuals in the legislature that identified with and helped push the environmental agenda. We also had a willing administration; although the Governor's office left most of the nitty-gritty work to the legislature, it was very helpful to have good appointments in the environmental agency. All of this combined with a general awareness that Vermont needed to revamp several obsolete programs—and initiate some important new ones.

SC: Will the next few years see similar successes? Does Vermont need more environmental legislation?

EP: Of course, as long as there are legislators, there will be more attempts at legislation. And

some legislation like solid waste and growth management may need fine-tuning. That's often the way it works—Act 250 has seen both strengthening and weakening amendments over time.

But I don't think it will be useful to try to push through any large environmental packages now. I'm afraid that many of the upcoming attempts at environmental law-making will be more regressive, and we'll need to work to protect our gains.

I also think we've reached a point where we need to focus less on making new laws than on making our current laws work. We can't ask any more of the Agency of Natural Resources until they get the current programs underway. Just getting regulations out in a timely manner has proven to be a real problem for the State.

SC: If new legislation isn't the priority, where do you think the Council should be focusing its advocacy work now?

EP: VNRC can play an extremely useful role in the implementation

and regulatory programs that flow from the new laws.

One of my biggest fears about these new laws is that we'll get sand-bagged—that the policy intentions of the legislation will get side-stepped through a mish-mash of technical regulations that leave "outs"—opportunities to evade the policy intent or excuses not to comply.

VNRC's job is to de-mystify and translate the technical information for our members and for policy-makers—and to make sure that it fits with what lawmakers had in mind.

SC: That's a tall order.

EP: In a way, the hardest part is yet to come. I don't for a minute believe that all of the legislative "victories" we've seen are victories in fact.

There will be times when we'll have to draw on expertise not currently on staff—water quality biologists, incineration experts, etc., either from our membership or hired—but we've done this in many Act 250 cases in the past.

SC: So tell me, what was your favorite thing about being VNRC's primary advocate?

EP: Well, I strongly identify with VNRC's goals, so I was truly excited about being able to represent VNRC—all the time. I also enjoyed working with such a wide range of issues. Just within the course of one day, the diversity was amazing.

And, despite everyone's haranguing about the Montpelier bureaucracy, the Vermont state government is really very small and accessible. I've enjoyed working with state representatives, and they have always been interested in getting VNRC's opinion.

SC: What was your least favorite thing?

EP: Filling out time sheet forms. Yech.

SC: Were there parts of your job that made you angry?

EP: It was extremely frustrating to see a good legislative package put together, and then as it journeyed through other committees

and out on the floor, to see it deteriorate into a simplistic, partisan, "either-or" kind of fight.

It's very discouraging when people play politics with the environment. The water quality bill was portrayed as a "pro-ski area vs. anti-ski area" fight; the growth bill became a local control debate; and in its last few hours, the fate of the rivers bill was decided on a partisan stand-off that had absolutely nothing to do with river issues.

Of course, the beauty of the legislative process is that everyone gets to give input at some point. But bills can get caught up in needless rhetoric by people who do not take environmental issues seriously. (Continued.)



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SC: What's your fondest wish for VNRC?

EP: That's easy: ten thousand members by 1990. Membership is the key to getting people involved in environmental issues, at both the state and local levels.

In advocacy, we have to continue to emphasize that there are tremendous economic forces

poised to take advantage of this state. And it's not just the huge projects—the Pyramid Malls or the Salmon Holes. We're seeing equally devastating problems from the accumulation of many small developments—habitat fragmentation, gradual pollution of a particular watershed, removal of farmland, road expansions—and the steady decline of natural

resource quality that goes with them.

Are we going to have a viable bear population in Vermont? Are there certain streams that we want to keep pristine? Although it's tempting to try to "mitigate" in some way or avoid making tough choices, these are the kinds of conscious, pro-active decisions we have to make.

As difficult as it is, we also have to get away from attempts to quantify the benefits of a quality environment—those benefits are a part of the future, and you can't measure them by today's currency alone. When you try to protect the environment through a conventional cost-benefit analysis, the environment often loses. Still, rigorous environmental protections *will* be the best economic investment the state can make in its future. VNRC can help project a statewide environmental ethic that pervades decisions made at all private and public levels.

Awards for Rivers Alliance, Hooper

The Vermont Rivers Alliance was honored this winter with a "Take Pride in America and Vermont" award; Governor Kunin made the award "in appreciation for outstanding contributions to America's natural and cultural resources." The Alliance, made up of VNRC, the Connecticut River Watershed Council and many other organizations and individuals concerned with protecting Vermont's waterways, was driving force behind the 1987 passage of Vermont's comprehensive rivers protection law.

And at the New England Environmental Conference this spring, Vermont Representative Don Hooper received the New England Environmental Leadership Award. Hooper, a former VNRC Operations Director, was lauded as a strong environmental advocate in the Vermont House. "I urge all of you to go for it—run for office," said Hooper in accepting the award, noting that conservationists are much needed in government and can make an important difference.

New Members

VNRC is pleased to welcome the following new members who joined us between March 1 and August 1: Ken Alton; Gretchen Amussen; Appalachian Trail Conference; Mr. Anderson, Lechateaubriand Enterprises; Sally Andrews; Mr. Peter D. Anthony; John Arnold; Atlantic Salmon Federation; Duncan C. Audette; Mr. & Mrs. Ronald Bacon; Randi Baker & Doug Kinzey; Jonathan Balk; Paul & Helen Barnes; Virginia M. Barrett; Mary-Claire Bavis; J. Bean; Mrs. Ellen V. Becker; Julie Becker; Lee Berk; Herb & Suana Bicek; Nita C. Billings; Leo Bisson & Laurel Stanley; Suzanne E. Blanchard; David A. Blodgett; H.H. Borden; Col. Edward H. Bort; D.W. Bostwick & Jeanne W. Bostwick; Mr. Palmer Bovie; Steven Bower; Mr. & Mrs. Robert H. Breslin, Jr.; Robert M. Browning; Jack & Jane Burditt; Mr. Vernon Carabeau, Jr.; Margaret Careccio; Charles P. Carr; Marcey Carver; P. Cersosimo; Ethelyn L. Chaffee; Stephan Chodorov; Dr. Frances B. Christie; Barbara Comfort; Edna G. Conrad; George Crombie, Director, Burlington Public Works; Donald R. Cuming; Dakin & Holme PC.; Heather Davenport; Ford Davidson; JoAnne Davies; Mrs. John P. Dawson; George DeMartin; Robert W. DeNutte; Mrs. Thera L. Dietz; Mr. John K. Dirlam; Faith Donaghue; Sarah L. Dopp; Mrs. James B. Downs; Noel W. Drury; Cynthia Eaton; Lawrence S. Eno; Rob Faivre; Laura Falk & Ted Rankin; Ned Farquhar; Barry Feinberg; Adelaide Fine; Fletcher Free Library; Bruce C. Forbes, McGill University Dept. of Geography; Mr. & Mrs. James J. Ford; Thomas L. Fulham; Alfred W. Fuller, c/o Ropes & Gray; Mary Jeanne Gaiotti; John Gardner; Mr. & Mrs. Richard L. Gardner; Mr. & Mrs. Danforth Geer; Dale Gephart; Mr. Ralph Gerstle; Dr. Michael M. Gold; Yvonne Goulard & Don Estes; Judith P. Gould; David Graf; Carole A. Graham; Mr. & Mrs. Craig & Sherrill Harbison; Barbara M. Hand; Mrs. Emmy Hayes; Mr. Hayford; Hazelett Strip-Casting Corp.; Freda V. Hebb; Michael A. Hecker; Diana Heiskell; Katrina S. Hemenway; Donald B. Hendrich; Mr. & Mrs. John H. Hewitt; Grace N. Hickley; Jerome B. Hickson; Joan D. Hill; Mr. & Mrs. Wilfred G. Hill; Alex Hoar; Edward S. Hochman, Esq.; Penelope Holden; June E. Holmes; Ellen Hovde; Mr. & Mrs. Janet & Howard Denison; Mr. & Mrs. Guerard Howkins; Don & Nina Huffer; Mr. & Mrs. David S. Hume; Arthur & Frances Hyde; Virginia M. Jackson; Mrs. E.W. Janeway; Mr. Ron S. Jansson; Karen Jaquish; Victoria Jas, Monshire Museum; Neil R. Johnson; Herman D. Jordan; Martha Judy; Susan W. Katzev, The Old Parsonage; Arthur B. Kern; Ernest P. & Barbara Kinoy; Donald Kissel; Paula Kitchel; Klaus Kleinschmidt; Kenneth J. Klingler; Carl R. Krauss; A. Kuflik; Daniel Ladd; Lake Region Union High School Library; John Lamperti; Richard J. Lednicki; Susan M. Lester; Mr. Ron Levy; Peter Losacano; Heidi Marcotte & Tom Wetmore; Mr. Tom Marrone; Mrs. Denise Martin; Karen & Dan Mayers; Amanda McCullough; Heather McKenny; Mr. John McQuillan; Randall Kay & Marjorie Meyer; Middleton Springs Public Library; Dolores L. Mitchell; Jean M. Moseley; Marilyn Moses; Native Landscape Co.; The Nature Conservancy; Mrs. Sidney Newman; Tom O'Brien; Carroll M. Oelsner; Adam F. Oertly; Glenn C. Olney; Carol Ostler; Mrs. Clifford R. Oviatt; Mary Anne Oxford-Brown; Priscilla Page; Leane Garlan Page; Dick Park; Mr. R.P. Parker; Milton Pinsker; F.A. Post M.D.; Lynne C. Poteau; Martha Pott; Marcia D. Powers; Fran Purcell; Bernard Quenneville; Ruth E. Quigley; Dena Rallis; Mr. & Mrs. Richard J. Rawson; Resolution Inc.; Dr. & Mrs. H. Clinton Reichard; Douglas S. Riggs; E. Heidi Roddis; Mr. A. Rozycki; Mr. Robert Russell; Judith E. Saltz; Ellen H. Satterwaite; John H. Savage; Anne & Suzanne Saxton; Luella Schroeder; Mr. Douglas C. Scribner; Bruce & Meg Seely; Ed Seibert; Cynthia & Peter Seybolt; Silloway Farms; Mr. Morris L. Simon; Coarlie H. Sloan; Brian Slopey; Mary Jo Smyth; Mr. Larry Sommers; Mr. Robert N. Spear, Jr.; Audrey W. Sponheimer; Willard A. Squier; Ann Gordon Steinberg; Mr. Randy Stern; Katherine Stevenson; Dr. & Mrs. Charles F. Stewart; Marcia Stone; Brian Stone, Forests, Parks & Recreation; Mark K. Sutherland; Deborah R. Swift; Mr. & Mrs. Robert Taggart; Mr. & Mrs. Howard Taylor; Howard C. Taylor; Mr. Tepfer; Mrs. E.C. Titus; Beverly Tucker; Mr. John M. Van Horn; Mary Vogel; Bradford L. Von Weise; Mrs. Evelyn M. Waikens; William D. Walker; William D. Warde; Bruce Washington; Betty Wheeler; Mr. & Mrs. Fred Wiedemann; Mr. H.J. Wilkins; Mrs. Maclean Williamson; Mr. & Mrs. Roger G. Wilson; Dr. & Mrs. George P. Winston; G. Walter Woodworth; Karen Yacos; Mark Yorra M.D.; Steve Zwicky.

Vermont Environmental Report Back Issues

We have limited quantities of the following back issues of the *Vermont Environmental Report* magazine available. Order by date and title from VNRC, 9 Bailey Avenue, Montpelier VT 05602; please enclose \$2.00 for one issue, \$.50 for each additional issue, for postage and handling.

- **20th Anniversary Issue**, Spring 1984—"VNRC: The First Twenty Years," the first installment in a two-part history of VNRC; "The Best of the *Vermont Environmental Report*," our favorite V.E.R. feature articles.
- **Coming Soon...To A Ski Area Near You!** Summer 1984—"The Coloradification of Vermont," is Act 250 equal to the challenge?; "VNRC: the First Twenty Years, Part II."
- **New Fountains In Our Mountains**, Fall 1984—"Land Spray in Vermont: At What Price?" land spray irrigation of sewage effluent; "Naturalist Journal," the moose returns to New England. *This issue out of print; photocopies of specific articles available at 20 cents/page.*
- **What About The Rivers?** Winter/Spring 1985—"Vermont Rivers: Orphans of the Conservation Movement," strategies for protecting Vermont's waterways; "Groundwater Contamination: Here Today—There Tomorrow"; "Making Headway with Energy Conservation."
- **Vermont's Rapid Growth Areas**, Summer 1985—"The Transformation of Vermont: Growth Patterns and Growth Policies for the 1980's," Vermont Law School's Growth Areas Research Project (GARP) report; "Legislating Growth Management—A Tale of Two Bills"; "Acid Rain—The Storm of Controversy Continues"; "Washington Update," a summary of major environmental legislation in U.S. Congress; "Reflections on the Citizens' Lobby for the Environment."
- **Tomorrow's Environmentalists Taking Shape**, Fall 1985—"Environmental Education in Vermont," a look at Vermont environmental education centers; "High-Level Nuclear Waste—Not in Anybody's Back Yard"; "What's That You're Breathing?" hazardous air contaminant regulations under review; "Planning Vermont's Forests," the Green Mountain National Forest 50-Year Plan; "The Great Woodchip Gamble," Burlington's McNeil wood-burning electric plant; "Conservation and Agriculture—A Travelogue."
- **Vermont's Solid Waste Game**, Winter 1986—"Solid Waste—A Time for State Leadership"; "Vicon: Rutland's Burning Question"; "Steps to Recycling"; "The Chittenden County Circumferential Highway"; "What's in the Hopper," this legislative session's bills; "The Sea Lamprey."
- **Vermont Agriculture: Keeping It Vital**, Spring 1986—"LESA and Vermont Agriculture—A Profile of Land Evaluation and Site Assessment in Vermont"; "The Whole Herd Buy-Out"; "The Making of Clean Water Laws"; "Low-Level Radioactive Waste—Where Do We Put It?"; "China—Changing Environments"; "Skunk Tales." (Also enclosed: *The Lake Champlain Committee Newsletter*.)
- **Entrusting the Land**, Summer 1986—"Land Trusts and Vermont's Growth Land Conservation Movement"; "Washington Update"; "VNRC Membership Questionnaire"; "Field Notes from Kenya"; "Bringing it Home," migrating birds show pesticide and deforestation problems in Latin America.
- **Parcellizing Vermont**, Fall 1986—"Parcellizing Vermont," VNRC study shows corporate land speculators using "creative subdivision" techniques to purchase and subdivide Vermont property with no environmental review; "How Land Speculators Avoid a Big Tax Bite"; "Saving the Family Farm"; "What's Parker's Gore? And Why Are They Trying to Save It?"; "Straddling the Seasons"; Results from the summer 1986 Membership Survey.
- **Gravel Mining in Vermont: Digging Up Trouble**, Winter 1987—"Gravel Mining in Vermont: Digging Up Trouble"; "Life Beside A Gravel Pit"; "It's Not Just the Pits," riverbed gravel operations; "The Coverts Project," neighbors teaching neighbors forest land management; "The Non-Game Check-Off"; "Ottawaquechee Land Trust Update"; "A" is for Artist—Woodcut maker Mary Azarian; "The Snowflake: Science and Mystery"; Report on the VNRC/Vermont Law School Law Conference.
- **Environmental Education: Helping Teachers Teach**, Spring 1987—"Environmental Education Curriculum Supplements," new education materials, some produced here in Vermont; "Connecticut River Watershed Council Update"; "From Russian Land," Russian land use planning; "Bluebirds Across Vermont"; "Problems with Vermont's Property Tax."
- **Vermont's Air Pollution: Sources and Solutions**, Summer 1987—"What's a Perfect Day Worth?"; "Looking to the Courts for Help"; "A Vanishing Past, A Threatening Future," Vermont's cemeteries and the threat of air pollution; "1987 Vermont Legislative Summary"; "Learning Farming and Forestry at Merck"; "The Birds of Vermont Museum."
- **Where Will the "Taking" Issue Take Vermont?** Vol. 18, No. 1, Fall 1987/Winter 1988—"Where is 'Taking' Taking Us?" An overview of the constitutional background behind recent Supreme Court land use decisions on the 'taking' issue; "Three Commentaries on Taking"; "Questions and Answers on Taking"; "Thoughts on the 'Re-Taking' Issue"; "Municipal Conservation Commissions: Conservation at Vermont's Grassroots."
- **Hitting Home on Growth**, Volume 18, No. 2, Spring 1988—"Property Tax Reform—An Environmental Issue?"; "Pyramid Mall/Maple Tree Place—How Much Has Changed?"; "When a Mall Comes To Town," interview with Williston resident Herb Painter; "More Deposits, More Returns," Vermont's bottle bill; "Recycling Hot Spots," where can you drop off your newspapers and other recyclables?; "Vermont Audubon Society Update."

Articles from the *Vermont Environmental Report* and its predecessor, *News Notes*, are indexed back to the beginning (newsletter format) issue in 1963, and limited quantities of these early issues (or copies of them) are available from VNRC (see postage and handling costs above). Members are also always welcome to peruse VNRC literature at our offices.

CALENDAR/BULLETIN BOARD

September '88-September '89

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October 2 You've heard about the damage that acid rain is causing in the northeast—now learn more, first-hand, from scientific and political experts on a **Camel's Hump Acid Rain Hike**. Bring a picnic lunch, climb at your own pace and meet at noon at the hut clearing near the summit to hear presentations from Tim Perkins, UVM scientist working with Dr. Hubert Vogelmann on acid rain research, and Robert Mello, author of *Last Stand of the Red Spruce*. One of VNRC's twenty-five 25th Anniversary activities. For map and complete details contact VNRC, 9

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September 10-October 2 Sponsored by the Forestry Communications Council, Vermont's second annual **Forest Festival** will include forty-five events statewide, from sawmill tours to woodland and wildlife walks, forest management workshops to an old-fashioned lumberjack round-up. Look for events in your area. For a brochure, contact VT Dept. of Forests, Parks and Recreation, 103 So. Main, Waterbury Vt 05676 (802) 244-8711.

October 15 As part of World Rainforest Week (October 16-23), Gardener's Supply Company is sponsoring a free one-day conference on **The Fate of Tropical Forests**. Featuring a variety of workshops and a keynote address by the National Wildlife Federation's Barbara Bramble, the conference will run from 10-4 at Delaney Hall at Trinity College in Burlington. Pre-register by calling (802) 863-4535 ext. 239.

October 26 The 45th Annual **Governor's Conference on Recreation** will be held at the Lake Morey Inn in Fairley, co-sponsored by the VT Dept. of Forests, Parks and Recreation and the VT Recreation and Park Association. Conference-goers will focus on one of four recreation areas: Community, Outdoor, Therapeutic, or Recreation Programming. For more information, contact George Plumb, VT Div. of Recreation, 103 So. Main, Waterbury VT 05676, (802) 244-8711.

December 1 The Vermont Chapter of the Soil and Water Conservation Society is the contact sponsor for the all-day **Sand and Gravel Extraction Conference** to be held at the Holiday Inn in Rutland. The conference will cover uses for and alternatives to gravel, planning and guidelines at regional and town levels, and more. For details and registration fee information, contact Rick Heaslip, VT SWCS, 69 Union St., Winooski VT 05404, (802) 951-6795.



**Here's to a great
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Please make checks out to VNRC and mail to VNRC, 9 Bailey Ave, Montpelier VT 05602.

Membership benefits include a year's subscription to the **Vermont Environmental Report**. All contributions are tax-deductible.

Becoming an Environmental Professional—1988, an 84-page booklet, is now available from The CEIP Fund (formerly the Center for Environmental Intern Programs). A summary of presentations from CEIP's annual fall conference, the book presents information on job opportunities, advice on education, experience and job search techniques, and more. Contact CEIP Fund, PDS Dept., 332 The Arcade, Cleveland OH 44114; price: \$13.45.



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