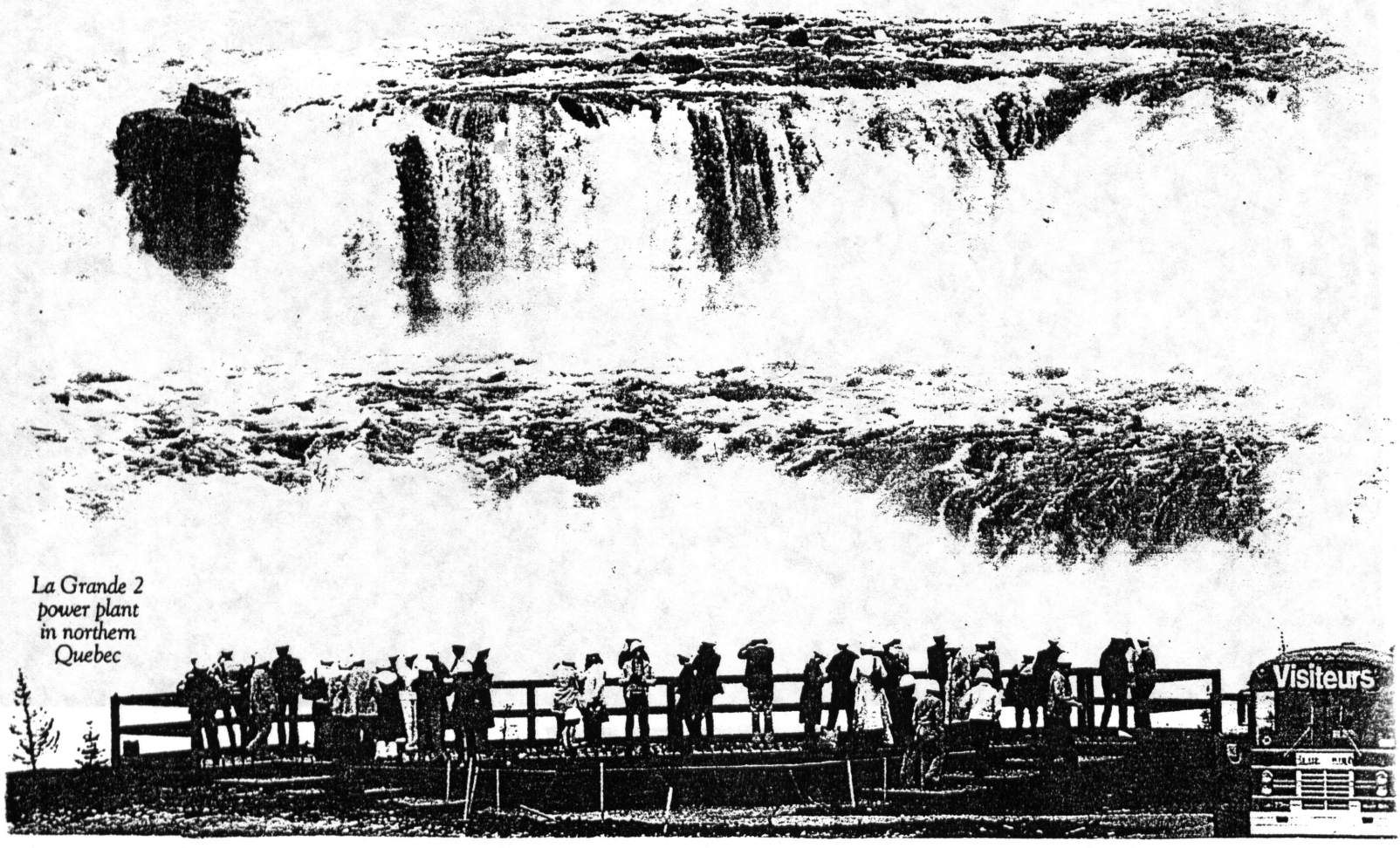
Boston Globe Magazine
August 26, 1990

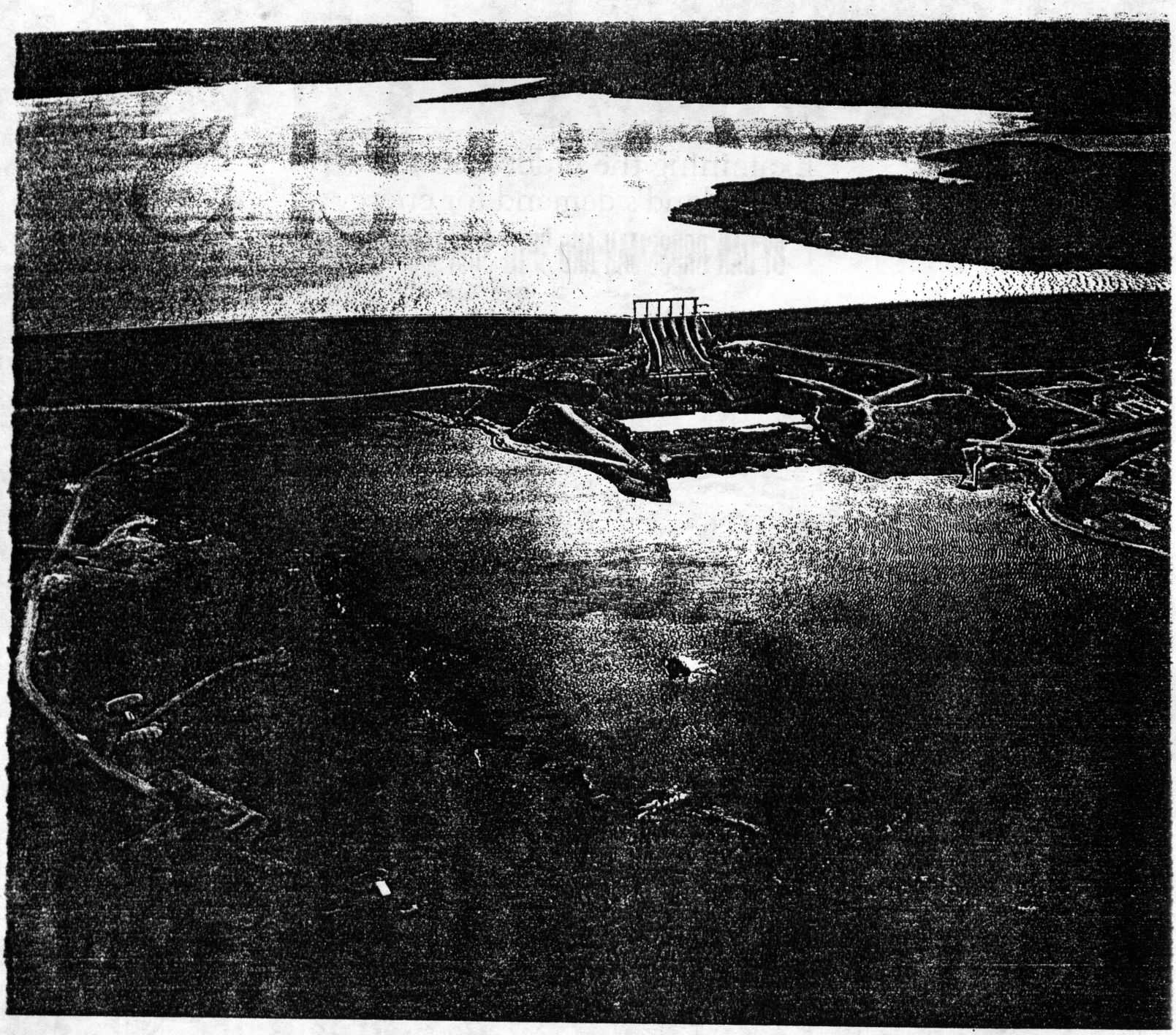
THE PRICE OF POWER

Examining the hidden cost of New England's demand for energy

BY DAN GROSSMAN AND SETH SHULMAN



La Grande 2 power plant in northern Quebec



The La Grande River complex, on James Bay

BY DAN GROSSMAN AND SETH SHULMAN

POWER SOURCE

To understand the true costs of New England's appetite for electricity, you must travel to northern Quebec, where a network of wild rivers has been harnessed for power and a once-pristine environment has been changed forever

A thousand miles north of Boston, more than halfway to the Arctic Circle, lie the farthest reaches of New England's electric grid. When you flip a light switch on Beacon Hill or in Roxbury, when you crank up an air conditioner in Hartford or Montpelier, you may well be drawing energy that huge turbines churn out of the vast La Grande River system in northern Quebec.

La Grande 2 is "the largest underground power plant in the world," a billboard near it announces in French. It is one of three powerhouses that make up the monumental La Grande hydroelectric complex. It is also New England's answer to its population's growing appetite for electric power and the newest and most remote of the region's sources of electricity.

As of this fall, New England will be getting a full tenth of its power from northern Canada, and in the coming decades this percentage could grow significantly. With few new generating plants likely to be built in New England in the foreseeable future, the region's utilities will increasingly turn to northern Quebec's hydroelectric bonanza. The La Grande River complex alone produces the equivalent of nine nuclear plants' worth of power. The Canadian utility Hydro-Quebec boasts an undeveloped power potential twice this size in the province.

DAN GROSSMAN AND SETH SHULMAN ARE BOSTON-BASED WRITERS WHO SPECIALIZE IN SCIENCE AND ENVIRONMENTAL ISSUES.

Driving along the access road to La Grande — 400 miles by land from Matagami, the nearest city — Gilles Saulnier, a guide from the Hydro-Quebec electric company, is only too happy to describe life in this remote complex. In winter, it is harsh and frigid; in summer, mosquito-ridden. But Saulnier, an agronomist by training, says he likes the solitude and beauty of the setting.

This long journey to northern Quebec had its origins months earlier, in a disagreement between friends about the environmental consequences of our overwhelming dependence upon electricity. Just how costly to the planet is our electric habit, we wondered? At home, the direct effects are hard to see. A stereo doesn't come with an exhaust pipe. A microwave oven doesn't have a cooling tower. So where are the hidden environmental effects, and just how bad are they? Last spring's Earth Day lent the question greater urgency, and so does America's rising environmental consciousness. Suggestions for rescuing our wayward globe range across the political spectrum. Some energy experts have been calling for more nuclear power to prevent global

warming; others tout the virtues of solar energy. Meanwhile, manufacturers continue to crank out new electric products to accomplish tasks people used to do by hand, like sharpening pencils or chopping vegetables. To determine electricity's true environmental costs, we decided to follow the power lines to their source, to learn more about where the electricity comes from. The journey led ultimately to this engineering marvel in a once-pristine alpine forest on the La Grande River.

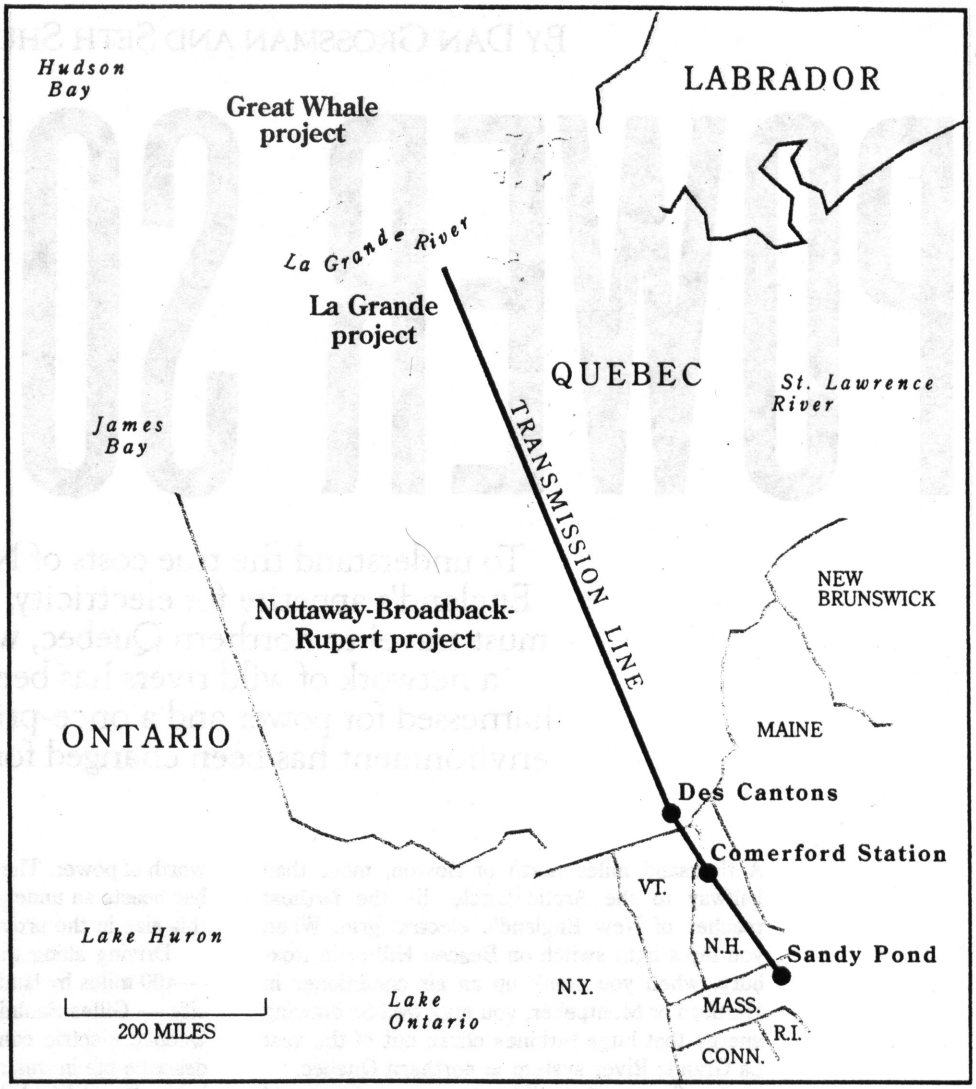
The access road to La Grande 2 ends abruptly at a sheer steel wall embedded in the cleft of a hillside. Reaching out of the car window, Saulnier pushes a button and the steel face opens slowly, like an oversized garage door. Saulnier refers to the facility and the nearby town of Radisson, where employees are housed, as an "energy base" and compares it to a base on Mars in a science-fiction novel he has just read. Like Martian colonists, Radisson's occupants face an isolated and forbidding environment. Employees dressed to negotiate the region's subarctic climate — wearing heavy boots and parkas emblazoned with Hydro-Quebec's lightning-bolt logo, in winter — do indeed look like spacemen in a sci-fi movie.

Saulnier is pleased with the opportunity to recite a few of the facility's astonishing statistics. The La Grande complex, he explains, generates a total of 10,300 megawatts of power, an output roughly equal to the total amount of electricity used every day in Vermont, New Hampshire, Maine, Rhode Island, and Connecticut combined. There are no smokestacks, but the facility has caused a different kind of environmental impact, nearly incomprehensible for its vast scale.

It is hard to believe that such a large piece of the globe has been so technologically disfigured. Hydro-Quebec's engineers, not satisfied with the flow of a single huge river, built 41 miles of dams and dikes to divert three other raging rivers into La Grande. They even forced one of these, the Caniapiscau, to flow backward. The watershed that supplies the combined torrent is bigger than all of New England; the five reservoirs created by the project have a total area greater than a hundred Quabbin Reservoirs — nearly the size of the whole state of Connecticut.

Inside La Grande 2, a rough-hewn tunnel descends steeply to the plant itself, more than 400 feet underground, where we disembark. The machine hall, nicknamed the "giant cathedral" because of its arched roof, is spotless. The spacious room stretches for a quarter of a mile, punctuated by 16 large orange cabinets of electrical equipment, each located above one of the 16 turbines. Even farther below us, a torrent of nearly one million gallons each second surges through the turbines that power these generators.

Anthony Schultz/The Boston Globe



Owen Stayner/The Boston Globe

A protest against Hydro-Quebec by Cree Indians and the Inuit: "They are telling Americans this is cheap and clean," says Robbie Dick, a Cree chief. "But it's not cheap for us."

Much of the electricity generated by the flow of this water will power Montreal and the other cities of Quebec. Some will go to New York, New Brunswick, and Ontario. And, starting this fall, a new arrangement with the six-state New England Power Pool will pump 2,000 megawatts straight to Massachusetts and into New England's electric grid — power nearly the equivalent of that from two Seabrook-size nuclear power plants. A new transmission line from La Grande 2, Saulnier says, will provide a direct link to Sandy Pond, a way station in Ayer, Massachusetts. Six new turbines under construction adjacent to La Grande 2 are earmarked for New England's sole use by 1992. A contract scheduled to take effect when the line is opened will guarantee New England a steady stream of power until the year 2000.

Utility customers will pay for this. Earlier this month New England Power Company, which serves Massachusetts, New Hampshire, and Rhode Island, filed for a rate increase that would raise the average consumer's bill by $2.90 a month, partly to finance the $200 million Sandy Pond facility.

Gov. Michael Dukakis is slated to inaugurate New England's terminus with the flip of a switch this fall. Located in an otherwise nondescript rural landscape of hardwood thickets on the northern edge of Ayer, Sandy Pond's eerie garden of oversized robotic flora will be brought to life at the opening ceremony. Although the $500 million receiving station is a high-tech, high-voltage engineering achievement, it also stands as a monument to New England's electric impotence. The entire station is oriented around the incoming transmission lines — six cables, each the thickness of a wrist, that have stretched more than 900 miles over 2,564 towering pylons like an electrical umbilical cord.

The source of the power that will make the long voyage lies in La Grande's giant cathedral. Thanks to this Canadian facility, New England will forestall the need to build highly unpopular nuclear or fossil-fuel power plants in its own back yard. The region's existing plants are often large, usually ugly, and pose a diverse set of environmental threats to neighbors. It was a visit to one such local power plant last fall that marked the beginning of our odyssey to the extremities of New England's electric grid.

Perched on the Boston-Revere line, Boston Edison's Mystic Power Station is a grimy monument to the electric age. The facility's smokestacks, visible throughout the metropolitan area by a fluke of geography, peer out over an industrial panorama of heaped coal and rusty scrap metal just upstream from Boston's Tobin Bridge. An alley called "Chemical Lane," across the street, completes a landscape suitable for Gotham City. Mystic Station is among the oldest operating power plants in the Boston area. If northern Quebec represents New England's electricity future, Mystic is its past. Its seven massive turbines, all housed within the vast plant, were built at various times over the course of more than half a century. If you have used electricity in Boston anytime since the 1940s, chances are that some of it came from here.

By virtue of its longevity and its location near downtown Boston, Mystic was a natural place to start our investigation of electricity's environmental costs. Fittingly, near the plant's entrance, Boston Edison displays a bronze bust of the eponymous Thomas Edison, the father of America's electrical industry. The likeness seems somewhat tarnished, and the pride in Edison's gaze is not without its irony. After all, in the century since the master inventor inaugurated his landmark Pearl Street Power Station in New York City, the image of electricity production has lost some of its luster because of the unprecedented pollution it creates.

While the total amount of energy we use individually (heating oil, gas for the car, and so on) has remained roughly constant for the past four decades, the proportion of that energy that we buy in the form of electricity has mushroomed fivefold. And with the burgeoning use of microwaves, VCRs, computers, and other electric appliances, dependence on

Edison's brainchild seems certain to keep growing in the years to come.

Edison veteran Al Boni ushers us into Mystic's thunderous boiler room, and we thread our way through banks of reciprocating motors, across steel catwalks, and around hissing steam pipes en route to the plant's control room. An old-timer pleased to show off his plant, Boni first came to work at Mystic in 1957 and has remained ever since. There was no control room back then, so Boni had to stand alongside the deafening generators for 8-hour shifts, adjusting the output of his machines to match Boston's shifting demand for electricity.

Today, as "watch engineer," Boni is in charge of making sure the entire plant runs smoothly. The three oldest of the facility's seven turbines, Mystic 1, 2, and 3, have since been retired, and a larger new turbine, Mystic 7, was added in 1978. Although working conditions at Mystic have improved since Boni first came to the plant (as evidenced by the soundproof control room), the facilities are still surprisingly crude. Taking off his white hard hat and heavy-rimmed safety goggles, Boni motions toward the rows of dials, switches, and meters covering the walls. Like its predecessors, Mystic 7 is operated largely by feel, Boni says, "like cooking a turkey in your oven."

Boni explains that while Mystic's other turbines run on oil, Mystic 7's giant furnace can burn either oil or natural gas. In winter, when many Boston homes are heated with gas, the furnace is stoked with oil. In summer, when residential demand for gas is slack, Boston Edison becomes the largest customer of Boston Gas. Opening a small trap door on the side of the four-story-tall furnace as though it were the door on a wood stove, Boni displays the huge, roaring fireball inside that powers Mystic 7.

The fireball, Boni yells as he walks us through the deafening plant, creates steam pressure, which drives the rotor in Mystic 7's turbine. If the furnace is Mystic 7's heart, the generator, linked to the turbine by a spinning shaft, is the muscle. A coil of wire, attached to the shaft in the generator, revolves past a series of magnets, producing a current of electricity. From there, the current begins a voyage through some of the 28,000 miles of cable in the Boston area alone, where it could end up expending its energy practically anywhere: grinding coffee in the Back Bay, lighting a Chelsea streetlight, or bringing a late movie to a TV set in Quincy.

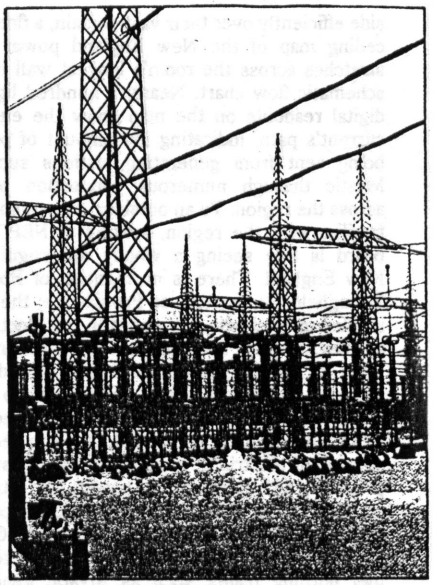
In a sense, this is where those clean electrical appliances have their smokestacks, hidden from us at home. Mystic and other plants like it in the United States that burn fossil fuels (oil, gas, and coal) emit millions of tons of sulphur dioxide and nitrogen oxide every year. These and other power plant-emissions are largely responsible for acid rain, smog, and global warming.

At Mystic, operators keep track of the plant's emissions via a small, closed-circuit television in the control room that shows the plant's four smokestacks. Boston Edison representative Mike Monahan says that plant operators need not fear that a poorly adjusted flame will go long undetected; whenever the stacks' fumes are black and sooty, the prominent plant gets angry phone calls from all over Boston. But the phone calls tell only a piece of the story. Last year, Mystic alone spewed out nearly 10,000 tons each of sulfur and nitrogen oxides into Boston's air.

Fossil-fuel plants such as Mystic generate a bewildering array of solid and liquid wastes as well, some of which are considered toxic — cadmium and arsenic, to name a few. But Mystic is only one source of Boston's electricity. There are also nuclear and hydro sources — and all are controlled from a large, windowless room 100 miles from Boston.

Part bunker, part cockpit, the New England Power Pool control center sits securely in a stormproof basement in West

Dan Grossman



No smokestacks, but hydro power leaves a mark.

Springfield, Massachusetts. NEPOOL operators oversee the ebb and flow of electricity in New England's power grid — an almost unimaginably vast web of transmission lines that connect virtually every human-made structure in the region, from the extremities of the Maine coastline to the cities of southern Connecticut. Two operators are seated at the center of the room, surrounded by a bank of computers. The atmosphere is quiet and calm, though not relaxed. Minor outages and surprises occur routinely, and years of experience have taught operators, including supervisor Steven Rourke, to stay constantly on guard for a full-blown emergency.

Rourke, at a computer terminal to the side of the control room, points out a number near the top of the screen. It reads 16,493 and is rising steadily. With a precise manner that bespeaks his training as an engineer, Rourke explains that the number is called the "instantaneous load"; it represents the total amount of electricity being used across New England at a given moment. Right now, as many of the regions nearly 13 million inhabitants are returning home from work, the instantaneous load shows that New Englanders are using nearly 16,500 megawatts — or 16.5 billion watts of electricity — the equivalent of 275 million 60-watt light bulbs.

One of many numbers shown on Rourke's screen, the instantaneous load is like the pulse of the entire region — an aggregate figure that is almost impossible to comprehend for the breadth of what it represents. If a light is turned on practically anywhere in New England, it will be counted by Rourke's computer. This evening's load figure represents untold millions of such lights, as well as an equally large number of refrigerators, street lights, printing presses, stoves, clocks, computers, radios, and television sets. It is now almost 6 p.m. The load is nearing its evening peak. Rourke explains that with office lights, machines, and ventilation systems still on and with many people already home, using appliances and beginning to cook dinner, this is usually the time of the region's heaviest usage of electricity.

To help NEPOOL control-room workers pre-

side efficiently over their vast domain, a floor-to-ceiling map of the New England power grid stretches across the room's longest wall like a schematic flow chart. Nearly a hundred lighted digital readouts on the map show the electric current's path, indicating the amount of power being sent from generating stations such as Mystic through numerous connection points across the region. To an outsider, even someone familiar with the region, looking at NEPOOL's board is like seeing a wholly unrecognizable New England. There is no mention of Boston, Springfield, Burlington, or Providence; the map is filled instead with key nodes in the electrons' journey, bearing such names as Frost Bridge, Long Mountain, Mystic, and Sandy Pond. To someone like Rourke, who knows how to read it, this map depicts the "big picture" of electricity production in New England. One can see the amount of electricity generated: that Mystic is producing 567 megawatts of power, for instance, or that Boston Edison's Pilgrim nuclear power plant in Plymouth is currently generating 663.

As Rourke can decipher from the map, fossil-fuel burning plants such as Mystic generate nearly 60 percent of New England's electricity. What the map doesn't show, however, are the plant's effects. Coal plants generally cause the most air pollution. But, as at Mystic, plants that run primarily on oil pollute, too. They also hasten global warming and keep us dependent upon imports of foreign oil, which are subject to events such as the 1973 Arab oil embargo and to instability in the Middle East, as exemplified recently by Iraq's invasion of Kuwait. Burning oil is still the largest single way New England generates electricity, but oil's share since the embargo has shrunk significantly. Half of our electricity in New England used to come from oil-fired generators; today, oil provides less than one-third of the region's electricity.

So, what other sources are there? Seven digital readouts on the map represent the nuclear power plants at Rourke's disposal. These seven giants alone produce a full quarter of the region's electricity, and the percentage will grow even larger as New Hampshire's hotly contested Seabrook plant becomes fully operational. These antiseptic readouts are labeled with quaint, old-fashioned names like Millstone, Yankee, and Pilgrim. But these plants are neither quaint nor clean, and Boston Edison's Pilgrim nuclear power plant is the worst of the bunch. With one of the worst safety records in the country, Pilgrim has been down for repairs more often in the past few years than it has been operational.

A secluded, heavily guarded facility set on the coast 35 miles southeast of Boston, Pilgrim produces 670 megawatts of power, roughly equivalent to Mystic's output at full power. Pilgrim's plain, massive exterior hides a dense tangle of pipes and valves inside. Electricity is generated by the heat emanating from highly radioactive fuel rods, which cause water to boil, making steam, as they decay. The process is complex, and the mood in the facility is somber. Employees must routinely check themselves for exposure to radiation, and armed security personnel subject visitors to no fewer than 10 separate security and radiation inspections.

With the possibility, however remote, of a

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Power source

CONTINUED FROM PAGE 27

catastrophic accident, and no place to dispose of highly radioactive waste, nuclear power from Pilgrim has well-known environmental drawbacks. Although dependence on nuclear power in New England remains significant, it is not surprising that since 1978 no new nuclear plants have been authorized in the United States, because of the high costs, controversy, and environmental concerns involved.

From Rourke's perspective, however, the source of the power and its environmental effects are secondary matters. To him, electricity distribution is the main concern — a balancing act in which all of New England walks the high wire with him. Without careful planning and constant troubleshooting, the grid will not contain enough current, and our lights won't light; too much, and the system could blow. Of the two operators in the room's inner circle, one is monitoring usage as it changes from second to second, and one is planning for the next half-hour's needs. With the help of a computer spreadsheet program, the second operator decides which plants will need to be turned on or off to keep the right amount of current in the grid.

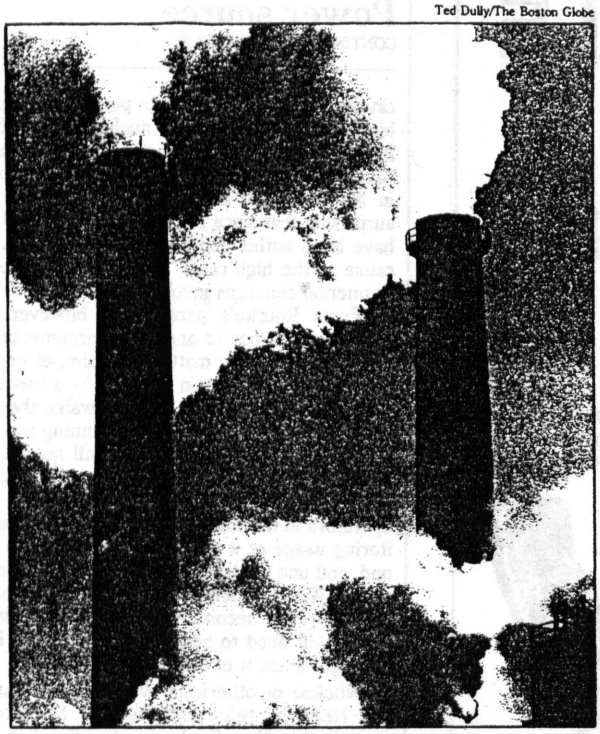
Nuclear or otherwise, what worries Rourke and NEPOOL representative Bill Sheperdson most is that New England is building few new power plants. Over the last decade, demand for electricity grew at an average of more than 3 percent annually, but only four major utility-owned power plants went on line in the whole region. Meanwhile, NEPOOL forecasts that demand for electricity in New England will grow by nearly 30 percent, or more than 5,000 megawatts by the year 2000. The problem, put bluntly, is that no one wants a new power plant, of any type, built nearby.

The net result is that demand for power in New England is getting closer and closer to the peak capacity of its plants. This means that the margin of safety, when a power plant or a transmission line needs to be repaired, is getting smaller and smaller, and the likelihood of brownouts and blackouts, especially in the summer months, is increasing yearly. "People are going to have to realize," intones Mike Monahan, "that if you want electricity you are going to have to generate it."

For the chief point man of the utility with the most poorly maintained nuclear plant in the nation, Monahan is surprisingly cheerful. His office is equipped with three television sets — each with its own VCR — to keep track of news on the three network affiliates. Reporters tend to leave him alone, he says, unless something bad happens, like a power failure.

To make up for shortfalls of power within the region, Monahan explains, Boston Edison and other New England utilities are increasingly looking north to Canada, where, conveniently, there is a surplus of energy. New England already buys about 5 percent of its electricity via long-distance high-voltage lines from Canada. Some of it comes from a nuclear plant in Point Lepreau, New Brunswick. But most is generated by Hydro-Quebec. With the Hydro-Quebec

Ted Dully/The Boston Globe



Last year Mystic spewed out 20,000 tons of sulfur and nitrogen oxides.

contract and new transmission lines to Sandy Pond Station, Monahan says, Canada's outpouring of electricity to the region will double, making up roughly 10 percent of New England's electricity for at least the next decade.

Any questions about Monahan's views on Canadian power are put to rest by a bumper sticker hanging next to his hard hat on the wall: "Interconnect with Hydro-Quebec." Monahan recalls his visit to the La Grande plant and says he'd like to go back. "It's an environmentally safe way of generating electricity," he argues, noting that with hydro power "there is no combustion."

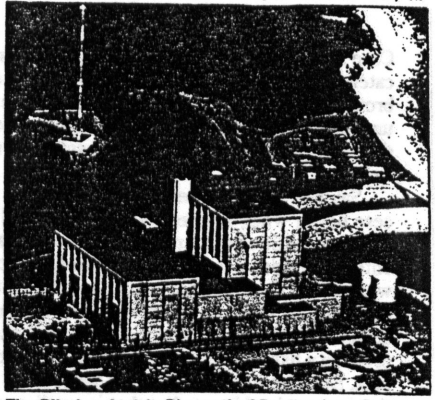
From Boston, that might sound like a relief from smoking fossil-fuel plants and radioactive nuclear reactors. But the La Grande complex doesn't look quite as benevolent when seen up close.

In 1971, when Quebec's prime minister, Robert Bourassa, announced the "project of the century," the hydroelectric development of northern Quebec, the Cree Indians and Inuit people were opposed. They did not want their ancient burial sites and fishing and trapping grounds flooded. Though initially successful in the courts, the native inhabitants eventually agreed to permit the development in exchange for an accord that included compensation of about $200 million and exclusive access to certain lands. The trusts have allowed them to purchase their own airlines and to build municipal offices, radio stations, and sewer systems. Nevertheless, many Cree and Inuit people are troubled by the equivocal legacy of the La Grande project.

Chisasibi, a small settlement downstream from La Grande 2, was one of the Cree communities most affected by hydroelectric development of the river. The town actually had to move five miles upstream to avoid being washed away when the La Grande's flow, augmented by the diversion of the other rivers, reshaped the region's geography. Many of the environmental effects of the project can be traced to alterations in the patterns of flow of the river. When the dams were completed, and the reservoirs filled in 1979, for example, broad valleys became lakes. The habitats of beaver and other fur animals that frequented these sites were flooded. Rapids once teeming with whitefish and brook trout were covered as well. For the Cree, who still derive a large share of their

livelihood and food from hunting and fishing, these were devastating changes. Joseph Pepabano, a Cree trapper, says that he can't look at La Grande 2's towering dam and monumental spillway today without feeling sad. "All that hunting and fishing," he says, "is totally gone."

According to Jan Beyea, a senior scientist at the National Audubon Society, alterations such as these threaten the ecology of the entire James Bay region, a major stopover for migratory birds. The natural cycles of ebb and flow, he explains, affect the salinity of the bay, the fertility of its grasses and mud flats, the amount of time the bay is covered with ice, and many other factors that have never been thoroughly studied. Beyea says that James Bay is one of the hemisphere's unique ecosystems — comparable in importance to the rain forests of South America. "It is hypocritical for us to complain about developing the rain forest," he says, "when we are developing Hydro-Quebec."



The Pilgrim plant in Plymouth, 35 miles from Boston.

Beyea freely admits that the La Grande complex did not bring about an ecological collapse. He is concerned, however, about the cumulative effects on the area of two major hydroelectric developments being planned — on the Great Whale River, to the north, and the Nottaway-Broadback-Rupert River complex, to the south — to double the region's hydroelectric output.

The next project is slated for the Great Whale River, about 100 miles north of the La Grande complex. If Hydro-Quebec gets its way, by 1998 the Great Whale River, like the La Grande, will have three powerhouses, which together will produce nearly 3,000 megawatts. Today, the village of Great Whale, at the mouth of the Great Whale River, can be reached only by plane or boat.

Standing on a steep bluff overlooking the river, Robbie Dick, the Cree chief of Great Whale, describes Hydro-Quebec's plans. Upstream about 25 miles, says Dick, the utility plans to build the powerhouse. After passing through the turbines, the water will not return to the stream bed passing by the town but will flow through a tunnel directly to the coast. The river below where we stand will be nearly dry and lifeless. "The land holds our way of life," Dick says, shaking his head. "If it's destroyed, our way of life is destroyed with it."

Great Whale lies just above the mouth of James Bay, on the coast of Hudson Bay. Some hundred miles to the north, the spindly pine forests disappear and are replaced with subarctic tundra. This town is unique because it is inhabited both by Cree, whose territory extends southward, and by Inuit, whose territory extends northward. The two cultures have little in common and live in separate neighborhoods, but they are united in their opposition to Hydro-Quebec.

Pepabano was particularly disturbed when Hydro-Quebec discovered excessive levels of mercury — a potent contaminant — in the fish of La Grande. Utility representative Saulnier, impressed though he is with Hydro-Quebec's remarkable technical achievements, nevertheless appears uncomfortable with this aspect of the project's legacy. He declines to discuss the impact of the project on native peoples — the

Cree Indians and the Inuit. "That is very complicated," he says. Likewise, his heavy black eyebrows knit, Saulnier is reluctant to discuss the unanticipated mercury contamination caused by the complex. "We are very ignorant," he says sadly.

Saulnier does concede that a complex process began when the reservoirs were filled and minute quantities of mercury in the soil began to enter the region's food chain. Hydro-Quebec has warned the Cree against eating any fish caught downstream from La Grande 2, and women of childbearing age are cautioned not to consume predatory fish from anywhere in the entire complex. Saulnier says that 10 to 15 years from now the danger should pass, but that is small comfort to Pepabano. "How many of us will be there at that time?" asks the aging hunter. "Only the younger generations will be able to see it."

Even downstream habitats, though not destroyed by flooding, were altered in subtle ways when Hydro-Quebec took over Mother Nature's job. Increased flow of water in the river, for example, now prevents stretches downstream from La Grande 2 from freezing over in winter. Caribou herds and Cree hunters who once traveled freely across the ice now must cross above the dam or on a Hydro-Quebec bridge instead. Seasonal patterns of flow, once determined by the weather, now depend on the demand for electricity in places such as Boston, Hartford, and Providence. The peak flow of the La Grande River used to occur during the spring's ice-melt and the fall's rainy season. Today, in contrast, utility controllers store the spring-melt in the reservoirs, anticipating New England's summer demand for electricity to power its air conditioners. The rains of the fall, likewise, fail to swell the managed stream because Hydro-Quebec is saving water for the winter heating season.

Like Inuit leaders, Dick fears that unwanted influences will accompany the new complex. The construction will require a road, he points out, and with the road, he believes, will come drug abuse, increased alcoholism, and uninvited outsiders, as occurred in Chisasibi. "If you have a road," he says, "you have no control." Though Dick seems perpetually to be smiling, his face clouds over when asked about New England's need for electricity.

"They are telling the Americans this is cheap and clean," he says bitterly. "But it's not cheap for us."

On the return flight from Great Whale, the airplane follows La Grande's high-voltage power lines for a while. They are visible, like straight white highways, through a thin layer of swirling gray clouds.

From Mystic's smokestacks to La Grande's dams, the message is not encouraging, but neither is it wholly unexpected: No process in widespread use today generates electricity for New England's electric grid without environmental costs — hidden or otherwise. The prudent, sparing use of resources can mitigate these costs but won't eliminate them. Fossil fuel has its belching smokestacks. Nuclear power has its high-level waste. Hydroelectric power permanently alters pristine land.

Cree chief Robbie Dick sums up the environmental price of our addiction to electric power this way: "When you turn on the switch, you're killing us." •