Shortage Of Power Lines Looms

U.S. Consumers Face Higher Prices

By Peter Behr

Washington Post Staff Writer

The nationwide move toward deregulated and restructured electric power service, experts say, is being undermined by a growing weakness in the U.S. electrical grid system: a shortage of high-voltage transmission lines. Strained power-line capacity has added to California's energy woes, blocking the movement of surplus power from the state's south end to northern cities hit hardest by blackouts last month.

Crowded transmission lines are also heightening the risk of sharply higher electricity prices and power shortages in New York City this summer, energy analysts warn. The Washington region is one of the few in the country that is unlikely to be affected, because it is part of a strong, five-state power-sharing organization.

In other parts of the country—around the Great Lakes, and in the Southeast and Northeast—traffic jams in long-distance power lines threaten to undercut the very competition in electric service that is the purpose of deregulation. That will confront consumers with an increasing risk of electricity price shocks.

"The seeds of what has grown in California have been sown over the United States as a whole by our failure to keep up with our [transmission] infrastructure over the past decade," said Karl Seaborg, vice president of the Electric Power Research Institute, an industry-backed think...

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Power-Line Shortage May Drive Prices Up

ELECTRICITY, From A1

task in Palo Alto, Calif.

"As we look into the next decade, it gets even scarier," warned Stahlkopf. The institute predicts 20 percent to 25 percent growth in electricity demand in the next decade, but only a 4 percent increase in power lines and electric-grid equipment.

The mobility of power—the idea that market forces would move electricity from areas with excess to areas with shortages—is a fundamental assumption of deregulation. But it turns out that deregulation, as designed by most states, provides little financial or political incentive for generators or utilities to construct long-distance, high-voltage transmission lines, according to Stahlkopf and other industry officials.

Transmission capacity is falling further and further behind the demand for power, said consultant Eric Hirst, in a report for the D.C.-based Edison Electric Institute.

That would not be so troubling if electricity service had remained a local business, with communities served primarily by nearby utilities responsible for both generation and transmission.

But long-distance power transmission can be essential in a deregulated system, by increasing competitors for customers, said Ren Rose, senior economist with the National Regulatory Research Institute in Columbus, Ohio.

Texas, for example, has ample generating capacity. But weak transmission connections with its neighbors make it impossible to share much of Texas's surplus with states short of power. New York, meanwhile, may have problems even though it is next to the PJM Interconnection, the five-state consortium that supplies power to the Washington area, because there is limited transmission capacity from PJM to the north and east.

In the meantime, the FERC has called on utilities to create cooperative Regional Transmission Organizations that would decide on transmission needs and encourage member utilities to build lines where they're needed. The FERC's deadline is Dec. 15, but the process is moving slowly in some areas of the country, particularly the Midwest.

Still another obstacle is the political and regulatory turmoil over deregulation. Utilities are like deer frozen in the headlights, waiting for state and federal legislators and regulators to define the structure of the industry in which they will operate, invest and be regulated," Hirst said in his report.

A new group of "merchant" generating companies, including Duke Energy Corp., Calpine Corp., Reliant Energy Inc. and the table would run eastward, enabling utilities to export power from Minnesota toward Milwaukee and Chicago, where it might bring twice the price, Hatch said.

"We have cheap electricity in this state. It is a huge economic benefit," he said. But if some of that power can be sold outside the state for a bigger profit, that's where it's going to go, Hatch warned—and such moves could leave his state worse off.

New York City, which must import more than one-quarter of its peak electricity requirements through old, heavily loaded transmission ties, exemplifies the hazards faced by utilities with small margins of electric generating capacity and limited transmission links.

Demand for electricity in New York City this summer is expected to peak at about 24917
When power can move freely within or between regions, generators in distant cities can compete with each other, Rose said. But when bottlenecks occur, competition suffers and generators can push prices up in their home markets. "When you don't have enough transmission, it's easier for suppliers to exercise market power," Hirst said.

A major problem is that building transmission lines is fraught with political and financial challenges.

From suburbs to farms, the giant towers and the drooping lines they support are loathed and opposed. "It is easier to site a generation plant than to build a 20-mile transmission line through people's backyards," said Mike Calimano, vice president for operations of the New York Independent System Operator, the state's power grid manager.

"We haven't built any transmission lines from Canada or the West since 1978, and that was a war," said Minnesota Attorney General Mike Hatch. "We had highway patrols trying to keep the peace. It was awful then, and will be again as new power-line projects go forward, he warned.

Utilities often complain that the profit they are allowed to make on building transmission lines, as determined by Federal Energy Regulatory Commission rules, is too low to make the investment worthwhile, Calimano said.

Transmission construction has also been frustrated by a split in regulatory responsibility. The Federal Energy Regulatory Commission, whose members are appointed by the president, oversees rates charged for transmitting power. But states have jurisdiction over where the lines are built.

Sen. Frank H. Murkowski (R-Alaska), chairman of the Senate Energy and Natural Resources Committee, will soon introduce legislation seeking to speed up transmission line siting, and some analysts say that can't happen unless the federal government takes control of final decisions.

But such an approach would run into opposition from other members of Congress, such as Rep. Joe Barton (R-Tex.), chair of the House Commerce energy subcommittee, who argue that siting should remain a state responsibility.

A new group of "merchant" generating companies, including Duke Energy Corp., Calpine Corp., Reliant Energy Inc. and others, have bought utilities' generating plants in many parts of the country and could also fund transmission investments. But they, too, have difficulty predicting how such investments would pay off, analysts say.

"This grand experiment is going on, but the result is that nobody's investing now because it's far too uncertain," said Lawrence Makovich, a senior director at Cambridge Energy Research Associates in Massachusetts.

And utilities often have a powerful self-interest in dragging their feet on new transmission construction, said Illinois Public Service Commissioner Terry Harvill.

Commonwealth Edison, Chicago's major utility, has little incentive to build new long-distance transmission connections, for instance, if that would make it easier for its customers to buy cheaper power from competitors in neighboring states, Harvill said.

In fact, Commonwealth Edison has just built two major power lines from the south of Chicago to the city's western suburbs to serve customers, said Thomas Wiedman, director of transmission planning. He said he expects no electricity problems this summer.

Commonwealth Edison is obligated to build transmission if a competing generator company needs it, provided the generator is willing to pay for it, he said. "We can't build for free."

The fundamental reality, Harvill said, is that transmission in many parts of the country is no longer part of a regulated utility company's responsibility to serve customers. Rather, it is a major issue in the competitive struggle among utilities and generators, where profit considerations are paramount, he said.

Minnesota provides a case in point, said attorney general Hatch. The state urgently needs more transmission lines beyond its borders to cope with a shortage of generating capacity in the state, he said.

The best choice, from the state's standpoint, would be new lines bringing inexpensive power in from Canada and North and South Dakota, he said. But no such projects have been proposed.

Instead, the two major transmission projects currently on demand for electricity in New York City this summer is expected to peak at about 10,600 megawatts—one light 10 million homes—according to the state's electric grid manager, the New York ISO.

Add a requirement for another 2,000 megawatts of standby generating capacity in the city as an emergency cushion in case a plant fails, and the city needs to be able to draw on a total of 12,800 megawatts of power, the ISO says. Power plants in the city can produce about 8,000 megawatts at peak periods. The rest, about 4,000 megawatts, must be imported through New York or from the north—and that's just about how much power the transmission connections can carry, if all are working.

But two of three cables from New Jersey were not in operation last summer. With imports limited, the city ran short of power in June, and, as a result, saw a spike in electricity prices that cost consumers an estimated $100 million, according to regulators.

"If they hadn't had a cool summer last year, they'd have really paid the piper," Makovich said. The price escalation has led to the same political outcry and charges of generating company profiteering now heard all over California.

Across the Hudson River from Manhattan, crews will soon begin installing a new house-size transformer in Jersey City, the missing piece in the repair of one of the eastward power conduits to New York. The job will be finished by June, promised Paul Cafone, manager of systems operations for Public Service Electric & Gas in Jersey City.

"Seeing is believing," said Calimano, the New York grid operator, of his friend Cafone's assurances. Calimano also worries about the main transmission lines entering New York from the north. They haven't been upgraded or expanded since the 1970s, he said.

As long as the current transmission systems and the city's power plants hold up, "we should be able to survive the summer," Calimano said. But if New York catches the California virus, analysts and regulators agree, there will be a dramatic demonstration of the nation's power transmission weaknesses—and another blow to the public's confidence in electricity deregulation.
The other electricity crisis: transmission lines

By Ron Scherer

New York – Over the next five or six years, if all goes according to plan, there should be enough electricity to provide plenty of power for every American.

But with all the generating capacity, will electricity actually reach everyone who needs it?

The answer lies in transmission lines— those long, saggy cables strung between ungainly steel towers. They’re part of the electricity superhighway that sends kilowatts flowing from places that welcome power plants to those that don’t. And, unsettlingly, these lines are becoming congested, pushed to their limits, close to burning out during peak periods.

“It’s probably the most vulnerable part of the system, if not the most important part of the system, and the one that people pay the least amount of attention to,” says Thomas Kuhn, president of Edison Electric Institute (EEI), a trade group in Washington.

But building new transmission lines to ease the strain is not an easy task. People who live near proposed corridors for new towers, often joined by local environmental groups, have become effective at delaying or rerouting new lines. Landowners complain about lost property values and question whether the lines cause health problems. To some environmentalists, the steel towers can be an eyesore, ruining a mountain trail.

Power transmitted over the new line would not be used locally, but sold for use as far away as eastern Virginia or North Carolina.

“The transmission line would ruin landscape and property values,” says William Dougherty, president of FORCE (Friends of Regional Culture and Environment), the local group that sprang up to fight AEP’s proposal.

Eleven years later, the company has shortened the route, eliminating some regulatory hurdles. Even FORCE has grudgingly accepted that something will be built. “Keep—

“...
The tensions have not gone unnoticed in Washington. Sen. Frank Murkowski (R) of Alaska, chairman of the Energy Committee, is considering provisions to speed the siting of transmission lines. It's not yet clear if he'll proceed because of the potential controversy over such legislation, Senate sources say.

The siting controversy is heating up even as the lines are increasingly used to transfer power among regions. In just five years, power sales from one region to another jumped from 25,000 transactions to more than 2 million, according to EEI.

"The system was never designed for that," says Mr. Kuhn.

But building new transmission lines just to move power from one part of the country to another is a sensitive issue, particularly among landowners. Indeed, local objections have forced many power companies, including American Electric Power (AEP) Co. in Columbus, Ohio, to alter their plans.

When AEP said in 1990 it wanted to build a major new line from West Virginia to western Virginia, it knew getting approval would be arduous. The new line would cross the Appalachian Trail several times, as well as the New River - a route that would require approval from two state regulatory commissions and three federal agencies.

But more than tangling with the bureaucracy, AEP was also fighting an aroused local populace. One key objection was that it short will help," says Mr. Dougherty.

The process, though, has consumed more time and money than AEP expected. The plan had called for the line to be in place by 1998. Now AEP hopes to have the juice flowing by 2005 - at a cost of $203 million, up $83 million from the original price tag.

Meanwhile, to cope with rising demand, AEP installed load-shedding equipment that will let it institute rotating blackouts to protect its system. "The lesson you learn is you have to keep pace with demand - look at California," says spokesman Todd Burns.

In fact, transmission capacity is a serious problem for California. As part of a utility bailout deal, the state may take over 32,000 miles of wire - even though some reports show as much as 81 billion may be needed to upgrade the lines.

In particular, five power bottlenecks need to be corrected, according to the California Independent System Operator (ISO). One example: At transmission lines between Los Banos and Gates (outside of Bakersfield), three 500,000-volt lines are constrained into two lines - the equivalent of making a three-lane highway into two lanes at rush hour. On both days last month when California experienced rotating blackouts, these lines were operating at capacity.

in the Dakotas - and if that means more transmission lines to supply Chicago or Detroit, we might support it," he says.

Some states are net importers, relying on surrounding states for power.

That's the case with Wisconsin, which imports about 15 percent of its power during peak periods. Demand continues to grow at almost 5 percent annually in urban areas, says Larry Borgard, vice president for transmission at Wisconsin Public Service. Until new plants are built, electricity to meet that demand must flow over congested wires.

To prevent blackouts, WPS and Allegheny Power (formerly Minnesota Power) hope to upgrade the connection to Minnesota at a cost of $175 million. The company plans to complete the new line in 2004.

Wisconsin may be in the vanguard of electricity transmission. Last year, the local utilities spun off the transmission assets into a new company, American Transmission Co., which now controls 6,000 miles of wire and 500 substations. It's hoping to make money not only providing Wisconsin with power but also shutting off electricity from power generators in South Dakota to supply consumers in New York.

"It's up to us to make it a business," says Jose Delgado, the president. "If we're successful, it will show Congress and other utilities that diversification should take place."
THE REAL THREAT TO AMERICA'S POWER

Sure, California is suffering from a generator shortage—but overloaded power lines pose a much greater risk of blowing the fuses of the national economy.

by David Stipp

Ask a hard-hatted power engineer what is most needed to prevent California's electricity crisis from proliferating, undercutting America's vaunted productivity gains, cratering the economy, and erasing trillions more from our already stunningly shrunken net worths. You're likely to get an earful about peak-time congestion on high-voltage lines, level-three alerts, and unstable N-minus-five situations. That's the long answer. For the short one, nothing beats novelist E.M. Forster's timeless maxim: "Only connect." We need more wires.

Utility investments in high-voltage power lines, our electrical superhighways, have been falling since the late 1970s. That mattered little when most of our power traveled only short distances from local utilities' generators. But in 1996 the federal government ordered utilities to open their big, high-voltage transmission lines to other suppliers, triggering explosive growth in the long-distance transmission of electricity. Since then, many utilities have left the generation game to become middlemen that distribute power from vendors potentially hundreds of miles away. This trend, not the generator shortage that plagues California, is the main threat to the system nationwide. But the fallout nationwide may be much the same as in California: sky-high electric prices during periods of peak demand and a calamitous drop in the system's reliability.

If the California crisis is a heart attack, the clogging of the transmission grid is the atherosclerosis that precedes it. Consider how the Hawi'ie State got that way. The common wisdom is that bad planning and bungled deregulation caused too few generators to be built as

PHOTOGRAPHS BY SERGIO FERNANDEZ

Bottlenecks in the grid are forcing power bound from Los Angeles to San Francisco to detour through Oregon transformers like this one.

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demand for electricity soared. That is true. But zoom up high enough to look down on the whole grid west of the Rockies, the "Western Interconnection," and you'll see the deeper problem of grid congestion at work. California's worst-clogged electric artery is Path 15, a 90-mile bottleneck in the main transmission line between Los Angeles and San Francisco. Recently it has carried spare megawatts from Southern California to power-strapped Northern California. Unfortunately, Path 15 hasn't been able to convey enough electricity to prevent rolling blackouts in the north.

Grid guru John Rusert says utilities have grown increasingly willing to accept more risks and not spend money on problems until they occur.

Scrambling to keep San Francisco's lights on, California's beleaguered Independent System Operator, the state's grid controller, has resorted to shipping power on a giant detour around Path 15. The power is sent north from L.A. through the 846-mile-long "Pacific DC Inter tie" to the Cielo Converter Station, a building perched on a hillside, outside Pasadena, Calif., which is run by the federal Bonneville Power Administration, the power is converted from DC to AC (direct current to alternating current), then returned south through the "Pacific AC Inter tie," three lines linking Oregon and Northern California.

The detour worked fine until the afternoon of Jan. 21, when a 12-year-old computer at the Cielo station crashed, knocking out some of its DC-to-AC converters—monster devices reminiscent of Scotty's beloved warp drive on the starship Enterprise. That sharply cut the power going through the station. ("Captain, we can't do more than warp three.") Instantly hundreds of megawatts formerly looping from L.A. through Oregon rerouted themselves to Path 15 to reach the lights, computers, and other Northern California "loads" that were sucking them in at the speed of light.

That put Path 15 in danger of overload. To avoid it, operators in California quickly instigated a "controlled outage" of 120 megawatts—about 100,000 houses' worth of electricity. Meanwhile, Bonneville operators in Vancouver, Wash., opened massive intake gates at dams on the Columbia River to ramp up their turbines. Seconds later an emergency 500 megawatts from the dams was pouring down the AC intertie to California. Fortunately it was Sunday, a time of relatively low demand. Within 20 minutes the out-of-control flow was fixed and the outrage ended.

It seemed business as usual at Cielo when I dropped by the station four days after the emergency. But it wasn't. "We're walking on eggs," confided operations manager Bruce Lavier. "When you're pushing the capacity of the system, minor things can have major impact.

"That is, a nutshell, is why California's crisis, though largely due to blunders peculiar to the state, may portend nationwide calamities.

Several trends are conspiring to max out the grid. First, deregulation has triggered an electric land rush—more than 190,000 megawatts of new capacity is on power vendors' drawing boards, enough to boost U.S. capacity by 25%. If only half of the planned generators are built, "capacity margins will be adequate" across the land by 2004, projects the North American Electric Reliability Council, or NERC, a Princeton, N.J., nonprofit. Even California should have watts aplenty.

Here's the rub, too: There's no parallel move to upgrade the grid, which increasingly "looks like L.A. freeways on a hot Friday afternoon," says Karl Stahlkopf, vice president at the Electric Power Research Institute in Palo Alto. "And if you can't get a supply to market, you don't have a supply.

Since 1972, annual utility investments in the U.S. power-transmission system have fallen by more than half, to about $2 billion, according to a study by industry consultant Eric Hirsh of Oak Ridge, Tenn. Meanwhile, sales of power loaded onto the lines have risen more than 100-fold since mid-decade, thanks largely to the advent of hundreds of Enron wannabes—companies seeking to emulate the giant Houston energy broker. Episodes of congestion requiring grid operators to apply anti-dodging procedures, including curtailment of power transfers, more than doubled last summer compared with 1999's hot season.

Operators of the grid are forced to run it ever closer to its limits. The average number of megawatts loaded onto transmission lines during summer peak demand rose 22% from 1989 to 1999, says Hirsh. It's expected to rise another 14% by 2009. The grid is literally heating up—when lines are heavily loaded, they get hot, expand, and sag. Wires drooping onto branches or sizzling days are a major cause of voltage sags and blackouts.

The computerization of everything vastly multiplies the cost of
such mishaps. A tree shorting out a distant power line might cause a voltage sag too brief to make your lights flicker. But such blips can crush hundreds of computers controlling factory machines. Annual U.S. losses in economic output from such relatively minor glitches already total an estimated $50 billion. If bigger outages become more frequent, our bright Information Age could rapidly become a lot darker. In sum, says Hirst, we must beef up the transmission system within a few years or face a crisis.

That’s a tall order. Scary reports about thecardiogenic risks of electric and magnetic fields near power lines have greatly intensified public resistance to them. Never mind that after an exhaustive review, the U.S. National Research Council flatly concluded the “evidence does not show exposure to these fields presents a human-health hazard.” Further, power transmission remains a regulated business, overseen by the Federal Energy Regulatory Commission. Utilities’ potential returns on investments in unregulated energy businesses have been much higher than their FERC-allowed returns on transmission investments—a major deterrent to capital spending on the grid.

A seminal tract published in 1968 by biologist Garrett Hardin, “The Tragedy of the Commons,” best sums up what is going wrong. Hardin described how herdsmen sharing a pasture, or common, inevitably spoil it by quite rationally enlarging their flocks—a herdman’s gain from adding an animal goes entirely to him, while the cost is borne by everyone using the common.

For decades, utilities tended the grid in a collaborative way, knowing they could recoup the costs in their rate bases. Now they’re becoming rival electron herders, less willing to invest in the wily commons—especially given uncertainty about how transmission assets will be divided up as deregulation unfolds.

Over the next 73 seconds, HELPLESS OPERATORS watched in dismay as all 13 dynamos at McNary Dam went offline, one after the other. The grid’s gyrations went wild.

An even more harrowing story was unfolding behind the scenes. On three afternoons in late July, spinning generators all over the Eastern Interconnection, the grid east of the Rockies, had mysteriously slowed, a sign that somewhere a mammoth load had unexpectedly come online. The load alarmingly depressed the Interconnection’s AC frequency—when the grid’s normal 60-cycles-a-second rhythm dips as little as 2%, operators are forced to activate emergency “load shedding,” or rolling blackouts, to prevent damage to generators. (If generators go even slightly out of sync with the grid, terrific forces build up inside them, potentially cracking turbines or causing fires.)

NERC, the reliability council, launched an investigation that led to Cinergy. On the three days in question, the utility had quietly siphoned 5,616 megawatt-hours from power lines linking its service area to surrounding ones—in effect, it had taken electricity worth tens of millions of dollars from unsuspecting peers. Worse, it had knowingly “jeopardized the reliability of the Eastern Interconnection” in “blatant disregard for NERC policy,” raged a Dec. 6 letter to the utility’s CEO from NERC’s regional office in Ohio. Cinergy, which didn’t confess the charges, says it has taken vigorous steps to ensure such episodes don’t happen again.

In any case, simple neglect may threaten the commons more than abuse. While trying to transform themselves from poky old utilities into lean, mean energy dealers, many of the grid’s keepers have cut their maintenance budgets. The trend was a prime contributor to major outages during the hot summer of 1999, according to a study by the Department of Energy. From 1991 to 1998, for example, Commonwealth Edison’s maintenance spending on key substations in the Chicago area fell by two-thirds, setting the stage for blackouts that left up to 100,000 customers with dead fans and air conditioners over several scorching days in 1999.

A related threat, says Hauer, the national lab expert, is a “collective loss of memory” at power companies about the subtle workings of the grid, as budget cuts thin their ranks of senior engineers. In a fascinating 1999 report written with colleague Jeff E. Duck, Hauer showed how this experience drained led to the biggest outage of recent decades, which blacked out most of the Western Interconnection on Saturday, Aug. 14, 1996.

As with most big blackouts, its immediate cause was hot weather. Temperatures along the West Coast soared to 100 degrees, prompting a heavy flow of power to California from western Canada’s dams. At first, it seemed a fairly routine summer day, one in which operators might have to contend, at worst, with local glitches from a few “sagged out” lines. But the situation looked quite treacherous to Hauer.

To understand why, you have to know a bit about how the grid runs. First, the regional operators who sit in control rooms surrounded by giant grid boards can’t work like air-traffic controllers. The speeding electrons they oversee move much too fast to be managed like aircraft, and widespread outages can unfold in seconds. Thus, the operators rely heavily on automatic safeguards—"relays" on generators, for example, instantly switch them offline if they get too far out of sync with the grid.
As I boomed up on the vast system of generators behind all our plugs, I began picturing it as a choir of whales singing in union a single cosmic note, which we know as AC hum. If one singer notices the collective hum getting a little flat, it momentarily hums a little sharp to get the choir back on key. If the group is going sharp, it corrects by humming flat. The simile is rough—automatic “power system stabilizers” on generators are geared not only to help keep the grid’s AC frequency steady but also to help stabilize its voltage and power flow. Still, the whole choir helps explain why Hauer was worried.

Years of analyzing the Western Interconnection with the aid of computer models had taught him that when loss of power is being sent from Canada to California, the grid is like a choir stretched out over a very great distance, making union difficult to achieve. Weakly linked generators can wind up reinforcing off-key notes rather than dampening them out. This uncoordinated humming, in turn, can lead to “ringing”—gridwide power oscillations that aren’t damped out. Ringing can quickly lead to wild oscillations that cause the grid to crash.

Hauer and a few others had warned the West’s gridmeisters about this risk, noting that computer models used to set safety margins overestimated the amount of automatic damping that would occur during heavy power flows from Canada to California. “I thought everyone knew about the risk and would run the system accordingly,” with extra-large safety margins, says Hauer. “But the institutional memory had faded.”

The risk on that Saturday in 1996 was especially high because dams on the Columbia River east of Portland, Ore., were largely powered down for the annual “fish flush,” in which water is fed through spillways next to dams so that fingerling salmon can migrate downstream. The Army Corps of Engineers’ four dams along the lower Columbia, like the whole choir’s centrally located members, are critical for maintaining harmony—they supply strategically located “voltage support.” During fish flushes this support is much reduced.

Still, the grid was coping on Aug. 10 until 2:06 p.m., when a major line between The Dalles, Ore., and Portland sagged into a tree and shorted out. Bonneville operators in Vancouver, Wash., delayed closing the relays that would reactivate the line after getting a report that gunshots had been fired near it—they feared a trigger-happy citizen had been using a glass insulator for target practice, making it unsafe to re-energize the 500,000-volt line.

Forty-six minutes later, another big line south of Portland sagged out. Then, at 3:42, a key line linking Portland and Seattle dropped onto a hazelnut tree a few miles west of Portland, knocking it out. At that point, the Western Interconnection began ringing—the whales were losing it. When yet another line near Portland sagged into a tree six minutes later, there was a gridwide voltage drop and the onset of portentous power gyrations.

Instantly, automatic controls at McNary Dam, a key grid node 160 miles east of Portland, revved its dynamos to the max in an effort to hold up the grid’s voltage—at that moment, the dam became the Western grid’s main prop. But seconds later, faulty controls at the dam, 18 months overdue for maintenance or replacement, began disconnecting its generators. Over the next 73 seconds, helpless operators watched in dismay as all 13 dynamos tripped off, one after another. As McNary toppled, the grid’s gyrations went wild. Seconds later, relays on the Pacific AC Intertie in Oregon automatically opened, severing Canada from California.

That was the final blow—in a split second, relays protectively tripped all over the West, tearing its power system into four disconnected gridlets filled with shut-down generators and blacked-out buildings. California resembled a scene from the 1951 sci-fi classic The Day the Earth Stood Still. Some 7.5 million people lost power for six or more hours. Economic losses were estimated at more than $2 billion.

By Monday the grid was mostly back to normal, and a far-reaching effort to beef up reliability was under way. A frenzied Bonneville crew completely dismantled the defunct hazelnut orchard where the key Portland–Seattle line had shorted out. The fish flush was abruptly ended. Helicopters buzzed countless power lines, checking for overgrown trees.

In a longer-term effort, the Bonneville Power Administration has spearheaded development of high-speed grid monitors to alert operators about abnormally low voltage support and other danger signs. Over time, these monitoring devices are expected to combine into a futuristic control system that may be able to orchestrate gridwide activities by the millisecond—a computerized conductor to keep the whales in perfect union. But Hauer and other experts say such efforts are just a beginning. To fully address the national problem, policymakers must find ways to overcome the tragedy of the grid. In a first stab, the Federal Energy Regulatory Commission in December 1999 called for utilities to form regionwide companies to manage the transmission grid with the broad perspective needed to cope with long-distance power dealing. FERC also has signaled that it may allow higher returns to transmission companies that efficiently increase the amount of power their lines can carry without jeopardizing reliability. NERC, the reliability council, is lobbying for a federal law that would enable it, in collaboration with FERC, to crack down on players that jeopardize the system.

But local resistance to new power lines isn’t likely to go away, and the costs of expanding the transmission system might well be prohibitive—it would cost at least $50 billion over the next decade to add new power lines at the same rate that peak demand is expected to grow. Thus grid operators will probably be forced to run the system as hot as possible for years to come. That’s a disconcerting prospect. Indeed, data from the new monitoring systems have shown that the computer models used to guide grid operations can be way off.

This doesn’t mean we’re all about to re-enact California’s increasingly noir story. But if the tragedy of the grid isn’t overcome, we eventually may find E.M. Forster’s sunny slogan about connecting less apropos than his dark tale about what happens when a civilization’s supporting technology seizes up. Its title: “The Machine Stops.”
Los Angeles Times

Senate Panel Splits 10-8 for Ashcroft

WASHINGTON—A bitterly divided Senate Judiciary Committee voted 10-8 Thursday to advance John Ashcroft to the U.S. Supreme Court, clearing the way for his confirmation hearing next week.

He is scheduled to testify before the Senate but the outcome is uncertain.

By REESE WRIGHT

A divided Senate Judiciary Committee voted 10-8 Thursday to advance John Ashcroft to the U.S. Supreme Court, clearing the way for his confirmation hearing next week.

The vote came after a heated debate that lasted more than an hour.

Ashcroft, a Republican from Missouri, has been on the short list of potential nominees for the high court since the retirement of Justice David Souter last year.

He has faced strong opposition from liberal groups, who say his conservative views could erode civil liberties and limit access to abortion rights.

Sen. Patrick Leahy, D-Vt., the ranking Democrat on the committee, said he was disappointed in the outcome.

"This is a sad day for the Senate and for the country," Leahy said.

Sen. Sam Nunn, D-Ga., who has been a staunch supporter of Ashcroft, said he was pleased with the result.

"I believe that John Ashcroft will be a great justice," Nunn said.

Ashcroft, who has served as the Justice Department's No. 2 official under President Ronald Reagan, has been recommended by the White House for the court.

Sen. Orrin Hatch, R-Utah, who chairs the committee, said he was confident Ashcroft would be confirmed.

"I think he's going to be confirmed," Hatch said.

The vote was 10-8, with Ashcroft's home state, Missouri, the only state to vote against him.

Ashcroft's supporters say he has the experience and knowledge needed to serve on the high court.

"He's been a tireless advocate for the rule of law," Hatch said.

But his opponents say his views on civil liberties and affirmative action are too extreme.

"He's just not up to the task," Leahy said.

Ashcroft's confirmation hearing is scheduled for next week.

The committee will vote on whether to advance his nomination to the full Senate.

If confirmed, Ashcroft would become the 111th justice to serve on the court.

The Los Angeles Times does not publish names of deceased presidential hopefuls.

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Power Line Traffic Jams Add to Energy Woes

Electricity: California's transmission system is severely taxed, and the problem is expected to worsen in the next decade.

by CHRIS KRAUL

An antiquated and overworked system of electric transmission lines could leave much of California starved for power even if the state can eventually generate and import enough electricity to serve its 34 million residents.

The 28,000-mile-long system—enough wire to circle Earth—has long been neglected, a victim of poor planning, unexpected growth in electricity consumption and regulations that make the lines a poor investment from the standpoint of the big utilities.

The long-distance transmission lines, strung on 110-foot-tall steel towers spaced at quarter-mile intervals, face particularly strong local opposition. Citizen protests have also stalled plans to build power plants, but outage woes when it comes to the high-voltage wires, which many associate with radiation-related health hazards.

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CAROLYN COILE / Los Angeles Times

Power lines near Coalinga are in the Path 15 segment, a bottleneck for electricity transmission.

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