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DEAR READER,

Last spring, while people in the American West watched blackouts roll across parts of California, talk of an “energy crisis” buzzed through the nation’s boardrooms and bars. Around Washington state, large industries, the aluminum industry in particular, stood idle as reservoir levels shrank behind the state’s hydroelectric dams. In Whatcom County, jobs were lost as governments and communities searched for better ways to save energy, money and the economy.

THIS ISSUE OF THE PLANET IS A RESPONSE TO THAT SITUATION.

After watching what seemed to be the end of an era in the Pacific Northwest unfold, and witnessing the speed at which some were willing to turn back years of progress toward sustainable energy, it became clear that there could be no better topic for this edition. Planet reporters went looking for solutions to complex problems, some which seem to have been built into America’s energy economy from its inception.

To do so correctly, we looked beyond the kind of power that comes through a transmission line, to forces as complex as the Bonneville Power Administration and as simple as a guy on a bike. In searching for solutions, we found men and women who have committed themselves to a lifestyle in balance with their environment, and we found that they have not suffered.

We found a man who gave up a career in sales and an SUV for a bicycle and place in the community. We found another who has never paid a utility bill and still takes hot showers. We found a county executive who bounces around his office, pointing to light fixtures emptied to save a few watts, and a woman who traveled to the farthest corner of Alaska to see an imperiled wild place.

But not all we found was so pleasant or hopeful. We found an aluminum smelter, which employed more than 900 people, empty and dead, and we found a company pushing to build a power plant that would pump up to 144 tons of nitrogen oxides into Canada’s second most polluted airshed. We found an economic system built upon hidden costs and hidden profits, and we found that it is ours.

We found a university administration that believes postage stamp-size stickers and committees are an adequate solution to an energy problem projected to cost it $1 million.

There is a crisis, and it is larger than the one brought to a head by a number of poor decisions and a dry winter. America is facing a crisis of consumption, and, though fuel cells and windmills may mitigate it, it has one solution: CONSERVATION.

-LP
The Planet is beginning a new stage of its evolution. Since 1979, The Planet has been a voice for environmental preservation, sensible growth and simple living. It has done so as a tri-annual magazine distributed around the Western Washington University community.

Recently, the staff decided it was time to expand via the internet. By the time this issue is on the shelves, The Planet Online will offer web-exclusive content, including web-radio features, on environmental issues affecting Whatcom County, Washington state and the world at large.

We entered into this undertaking because we perceived a lack of meaningful, local reporting on environmental issues. We were tired of watching good stories go untold because of space constraints in our print edition, so we chose to, with Western’s gracious support, create a website capable of distributing the same kind of high-quality journalism The Planet magazine is known for.

The online content will be held to the same journalistic and ethical standards as that in the print edition, and it will be updated often, so keep checking back.
20 ways to conserve energy

1. Turn off lights and other electric devices when leaving a room.
2. Use lighting directed at a specific area instead of overhead or general lighting, which may light unused areas of the room.
3. Set thermostats to 68 F in winter when you're home and to 55 F when you go to bed or when you're away.
4. Dress appropriately for the season even when indoors.
5. Close heating vents in unused rooms and avoid placing furniture over or in-front of air returns.
6. Use energy-saving settings on washing machines, clothes dryers, dishwashers and refrigerators.
7. Run your washing machine or dishwasher only when you have a full load to save energy and water.
8. Drying heavy and light fabrics separately keeps drying time to a minimum. Mixing different weight fabrics causes the dryer to run longer than necessary.
9. Use a microwave oven instead of a conventional oven. It cooks food more quickly and it uses 70-80 percent less electricity.
10. Keep your freezer full to increase efficiency, but don't block the fan that allows cold air to circulate.
11. Clean your refrigerator's condenser coils once a year.
12. Close drapes and windows during sunny summer days and after sunset in the winter.
13. Make insulating shades for your windows or add insulating storm windows.
14. Leave your storm windows on all year long. They provide valuable year-round insulation and create substantial fuel savings.
15. Turn down your water heater thermostat to 120 F.
16. Wrap a fiberglass blanket around your water heater and secure it with duct tape. You can save up to 10 percent on water heating costs.
17. Insulate hot water pipes in unheated basements or crawlspaces.
18. Seal and insulate heating and cooling ducts.
19. Drive a car that gets more miles to the gallon or ride your bike.
20. Make sure the tires on your car are properly inflated to increase gas mileage.

Compiled by Mary Berkley and Colin Dietrich
Eighty miles northeast of Seattle, high in the North Cascades, Karen Lebens quickly scans through the mass of data sent to her computer screen from countless sensors and gauges throughout Seattle City Light’s Diablo Dam.

She’s Lebens’ job to monitor all of the functions of the hydroelectric dam, one of three located high on the Skagit River. Together the dams provide approximately 25 percent of Seattle’s electricity.

Today Lebens is alone. Crews on the two upper dams work 10 days on and four days off, and part of Lebens’ shift covers the days when the crew is gone. Her job requires extensive knowledge of hydroelectric power generation and the inner workings of the massive 358-foot tall, 1,180-foot long dam.

“It’s a weird job — being an operator,” Lebens said. “You’re a generalist, and everyone else is a specialist. Whatever you don’t have, you just learn on the job.”

Lebens’s job became extremely important during power shortages last summer, when one of Diablo’s generating units went out, limiting the dam’s generating capacity by nearly half at a time when electricity cost $2,000 a megawatt hour.

Lebens shares a view with many about last year’s shortages. She said it would be completely possible for generators to report false breakdowns during shortages to further drive up prices. Without knowledge of electricity generation, Lebens said it would be difficult for anyone to prove the breakdowns were illegitimate. Electricity wholesalers often experienced plant breakdowns or unscheduled maintenance closures during the shortages.

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"You can manipulate that stuff like crazy," she said. "There is no doubt in my mind that's what they did ... You can do that at any plant in the world if you want to.

"The thing you need to think about with deregulation is who stands to profit from it," she said. "Enron, Reliant, Duke ... They all made a mint."

The recent energy shortages in California meant many things. To electricity wholesale corporations they meant tremendous profits. To the Bush administration, they were an excuse to promote massive investment in electricity supply and fossil fuel extraction. To scientists and watchful environmental advocates, they meant a chance to promote more stable means of electricity production.

**WHY Deregulate?**

Electricity deregulation followed a period of massive profits gained from natural gas industry restructuring. Initially undertaking deregulation in 1993, the electricity industry is the most recent in an international trend of the privatization of anything from telecommunications to the prison industry.

"Natural gas deregulation was one of the last things implemented under the (first) Bush administration," said Arne Olson, an energy policy analyst at the Washington state Office of Trade and Economic Development. "It was the general philosophy of Reaganomics."

The OTED provides information, analysis and support for state energy decisions. Olson said he spent a long time distilling lessons from California.

Natural gas deregulation spurred massive investment into the industry. Between January 1996 and August 1998, private investors completed at least 78 natural-gas pipeline projects, adding approximately 11.7 billion cubic feet per day of capacity, according to a 2001 Energy Information Administration report.

"We tried to model much of electricity deregulation after natural gas because it was so successful," said Michelle Veloso of the Federal Energy Regulatory Commission. "The idea is that if you pool all of your resources, you'll have a greater degree of efficiency."

Economists predict a similar investment in electricity generation.

"It's already happening," said Olson, noting companies are building two giant natural gas-fired generating plants in southwestern Washington. "People on Wall Street need to know that the profits will be there. Nothing will convince them like skyrocketing wholesale prices."

Proponents of electricity deregulation argue if electricity purchasers have a choice of whom to buy their power from, electricity wholesalers must compete for business through lowering prices and improving service.

Not everyone agrees that deregulation is justified. Marjorie Cohen, a political science professor at Simon Frasier University in Vancouver, British Columbia, and a former member of the British Columbia Hydro Board of Directors, is an outspoken critic of electricity deregulation. Cohen said she questions the motives behind the trend. She said that electricity trading is now an extremely profitable industry, which has largely fueled privatization.

"It's not being driven by the people," Cohen said. "It's being driven by the big power players that see a huge amount of money to be made."

British Columbia is also deregulating electricity. Cohen said American electricity traders could soon have access to Canadian hydropower — some of the least expensive electricity on the continent. The traders could soon gain access though a proposed World Trade Organization provision called the General Agreement on Trade in Services (GATS), which gives corporations to right to invest in public power in all countries.

"It's basically an investment right," Cohen said. "GATS will give big power traders access (to public resources) whether we like it or not."

Nationally, 24 states are in different stages of deregulation, but some, including California and Texas, have postponed or suspended plans.

Along with wholesale deregulation, the FERC proposed a system of four or five Regional Transmission Organizations, or systems of electricity transmission lines divided into regions that promote efficiency. The RTOs could potentially connect United States markets with Canada. The plan also includes electricity from Mexico, raising concerns about environmental standards.

"We're trying to create a robust market," said William Longenecker of the FERC. "We're trying to get everyone on board."

The proposed RTOs would be regulated by an independent entity designed to give no single customer preferential treatment, Longenecker said.

**What Happened in California**

Deregulation seemed like a good idea during the early 90s — a period of slow growth in electricity demand. Also, throughout the late 90s the hydroelectric industry experienced very favorable water years, driving down the price of hydropower.

"Some might even say the prices were artificially depressed," Olson said. "But in May of (2000) it became evident that precipitation was going to be less than in recent years, not terrible, just about 90 percent of the average."

Major price spikes, however, didn't start until about June, when temperatures in California regularly climbed above 100 degrees. Electricity merchants restarted old, inefficient power plants to meet the demand, but many had operational problems and breakdowns were common.

"In California, creaky, old natural-gas fired plants were pulled out of mothballs and fired up," Olson said. "They were inefficient — they had to burn a lot of gas for a little energy."
In November 2000, the Northwest entered into a true drought.

"Prices then went up above $600 megawatt hour and then really broke loose," Olson said.

Demand increased, plants broke down, transmission lines diverted electricity and previously depressed power prices rose — all within a relatively short time frame.

"When these events coincide supply and demand don’t meet, and the prices could theoretically be infinite," Olson said. "(California deregulation legislators) didn’t look at the fundamentals of what the market was doing.

"There was a lack of appreciation of how volatile the spot market could become," he added, referring to the artificially depressed prices caused by almost a decade of abundant, cheap hydroelectric power and other factors.

California industry pushed for deregulation from the start. Legislators needed to make the plan palatable to the average voter if it was to pass on the 1996 ballot, so they offered a temporary, 10 percent reduction in customers’ rates. This would cut into the utilities’ profits while the deregulated market settled in, so the state offered bonds to compensate the utilities’ losses during the transition period.

In essence, when ratepayers approved deregulation, they borrowed from their taxes to get a temporary electricity price break.

"(The 10 percent reduction) was really kind of a gimmick," Olson said. "It was funded by a mortgage on the future."

Meanwhile, the utilities and their parent companies undertook state-encouraged restructuring. Utilities often became only subsidiaries of larger companies, which invested largely in wholesale generation, Olson said.

Olson points to Pacific Gas and Electric Company, the once near bankrupt utility subsidiary of the much larger Pacific Gas and Electric Corporation.

"Many of these companies started out life as a utility, and then reorganized," he said. "Most wholesale merchants out there were once utilities."

In January 1997, PG&E Company formed Pacific Gas and Electric Corporation and made itself a subsidiary. Eleven months later, while announcing expansion into the energy services market, PG&E Corporation President and CEO Robert D. Glynn Jr. announced he didn’t miss the days when monopoly utilities were the natural order in the industry.

"We are reaching for the future, not clinging to the past," he said. "We are trading our monopoly in half of one state for a wide-open opportunity in 50 states."

Since company restructuring, the corporation engaged in billions of dollars’ worth of mergers and acquisitions, lobbied for deregulation in other states and made public statements against the use of price caps in the wholesale electricity market.

By the time wholesale electricity prices started spiking, company restructuring had successfully made PG&E Company — the utility — a separate entity from PG&E Corporation — the wholesale generation corporation.

"The parent companies had no legal connection to the utilities," Olson said.

When PG&E Company bankrupted, the parent companies stayed relatively unaffected.

"The stock prices suffered a little bit," Olson said. "It’s hard to increase stock value if one of your subsidiaries is going bankrupt."

The mandated rate reduction caused another major problem when the market became volatile. Utilities could not pass skyrocketing prices on to the ratepayers. The utilities paid up to $3,000 a MW h, but the reduction protected ratepayers from paying reflected prices.

"This situation can’t go on forever without the utilities’ bankruptcy being inevitable," Olson said.

The state had to assume the floundering utilities’ role and begin purchasing power on the wholesale market. On January 19, 2001, California Governor Gray Davis signed emergency legislation directing the state government to spend $400 million of taxpayer money to buy power for Southern California Edison and Pacific Gas & Electric. Davis later approves billions more for the state to purchase electricity.

Through bonds and now through tax-supported utility bailouts, ratepayers will pay for the downturns of California’s deregulation plan twice.

"They’ll be paying off those debts for the next 10 years," Olson said.

WHAT TO EXPECT

While the California situation illustrated the potential for abuse and other inherent problems with deregulation, the state implemented a rather unique process.

"It’s safe to say that California didn’t give deregulation a chance," Olson said.

California experienced what some call a “Perfect Storm” situation. Many factors coincided, creating electricity shortages at a time when utilities could not legally pass the true prices on to the ratepayers.

A deregulated market can potentially cause static in the messages it sends to consumers. If wholesale prices are not reflected to the end user, incentives to conserve may become lost in mitigated retail pricing.

"There’s no place where wholesale prices have been passed straight on to the retail customer," Olson said, explaining that a layer between the wholesale and retail markets can be a good thing.
because it protects ratepayers from price volatility.

"It's a bad thing at times like last year when power was really scarce and customers aren't getting signals to conserve," he said.

Another problem is that investor-owned power plants need to be profitable, and conservation subtracts from profits.

"Conservation adds to their cost," Olson said. "They're not gaining from it."

Also, in a deregulated market, electricity generators can sidestep the effects of reduced demand by simply selling the electricity to a different customer or region. This essentially provides no incentive for them to reduce supply. Ever increasing supply could cause problems for a country so heavily dependent on fossil fuels.

Nathanael Greene, a senior policy analyst at the Natural Resources Defense Council said the country needs to start looking at energy production and service alternatives.

"Heating, cooling and lighting — that's where we're really consuming energy," he said. "What we really care about is things like mobility and telecommunications, not what goes into making those services available."

Greene points out new technologies in renewable and zero-polluting electricity generation and services are available, they simply need to be implemented on a larger scale.

"There are so many technologies out there that provide these services," Greene said. "We're simply not using them."

Greene said he agreed apathetic representation in the government coupled with a public unaware of the consequences of its own consumption habits further complicates the implementation of renewable energy systems.

"It's clear that the (Bush) administration doesn't take efficiency and renewable energy seriously," Greene said.

Even the recent energy shortages — which Greene noted should have been a wake up call to all Americans — made no noticeable change in Bush's energy plan.

"They're only using it as an excuse to do things like drill in ANWR," he said.

The Union of Concerned Scientists, a national, independent, nonprofit alliance of 50,000 citizens and scientists is working on getting cleaner, renewable energy sources into electricity restructuring legislation.

"It seemed like an appropriate vehicle," said Jeff Deyette, a UCS energy research associate. "The policies can work either way, but renewables in a restructured market will improve competition and efficiency."

Using market-based analysis, UCS asserts renewables can compete with fossil fuel-based electricity plants. Deyette said renewables should be attractive to the wholesale industry because they tend to produce a constant and reliable source of electricity. Deyette worked on UCS's Clean Energy Blueprint Report. The report, released earlier this year, outlines ways to include wind, biomass, geothermal and solar energy into future legislation, and ultimately to have renewables provide at least 20 percent of the nation's electricity by 2020. Deyette and the Blueprint's other authors estimate the plan could save consumers a total of $440 billion by then.

Deyette said despite population growth, renewable sources increase efficiency to such a degree that by 2020 the planet could potentially use less energy than it does now.

While deregulation may be broken in California, it is still functioning in states like New York state, but not as successfully as residents might have hoped. New York State Comptroller H. Carl McCall, issued a February report on the state's deregulation status.

"The goal of deregulation is to decrease costs for consumers by increasing competition," McCall said. "Unfortunately, the best thing that can be said about deregulation in New York is that it's not as bad here as it is in California — yet."

He went on the say that while deregulation might have been a good idea, New York legislators implemented it poorly.

"It's a pretty basic rule of economics. In a deregulated market with short supply, whoever controls that supply also controls the price," McCall said.
The Vansycle Ridge, high above the Columbia River Basin on the Washington-Oregon border, will soon be home to the Stateline Wind Power Project. The project is the largest single wind turbine development in the world. When completed, it will boast approximately 450 state-of-the-art, 242 foot towers, each with a blade pathway measuring 154 feet in diameter.

Developers expect the giant wind farm to produce approximately 300 megawatts, or enough electricity to power about 70,000 homes. “This is wind power on a grand scale,” said Terry Hudgens, PacifiCorp Power Marketing president. “Stateline is a watershed event for our company and for the region. With Stateline, wind is no longer just a small niche in our supply, but has taken a position as a very real and significant part of the new electric resources the region badly needs.”

PacifiCorp Power Marketing, an unregulated wholesale electricity marketer, signed contracts to purchase and resell all of Stateline’s electricity. Florida Power and Light, the self-proclaimed largest wind electricity producer in the nation, is building the plant and will own and operate it as well.

The massive wind project is yet another sign that governments and investors are finally realizing the potential of wind power. The federal government is now offering a 1.7-cent tax credit for every kilowatt hour a wind power plant produces during the first 10 years of production. This incentive encouraged a flurry of wind-farm construction. At least 30 projects ranging in size from 10 to 200 megawatts race for completion by December 31, 2001, the cut-off date for the government tax credit.

“No doubt about it, the tax credit makes wind farms cost-effective,” said Christine Real de Azua, American Wind Energy Association spokeswoman. “With the price of natural gas, wind power is definitely cost competitive. Companies are going ahead regardless if they make the December 31 deadline.”

According to Department of Energy models, Washington state could meet 45 percent of its current electricity needs through wind power. Several countries already depend on wind power for a significant percentage of their energy portfolio. Real de Azua said Germany, the world’s largest wind energy producer, meets 3 percent of its energy needs with wind farms; Denmark receives 13 percent and Spain 20 percent.

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SEVENTY YEARS AGO, the Columbia and Snake rivers flowed freely, their swift, unrelenting currents streaming from source to sea. But during the mid-1930s the rivers were blocked by dams and harnessed for their power. Congress created the Bonneville Power Administration in 1937 to oversee the management and sale of hydroelectric power produced by the dams.

The federal government created the dam projects during the depression to provide the Northwest with jobs, electricity and economic wealth. Today, the dams still provide benefits to the region, including flood control, irrigation, navigation, recreation and electricity. The dams made a desert bloom, provided cheap electricity to a growing economy and helped light cities across the Northwest.

These concrete giants have also sent salmon and steelhead runs to the brink of extinction. Twenty-five stocks of salmon and steelhead are now listed as endangered in the Pacific Northwest and Northern California. One species, the Lower Snake River Coho, is extinct.

In the wake of the nation’s energy crunch, those federally built dams and the BPA, which operates 29 dams and one nuclear power plant in the region, are under fire. Under pressure from industry, environmental advocacy groups, and local and state governments, the BPA faces the lowest rainfall in 30 years and is struggling to defend itself in a harsh environment.

“We assume that we’re doing our job right if everyone is mad at us,” BPA Communications Officer Dulcy Mahar said.

One of the BPA’s responsibilities, according to its mission statement, is to sell the power it generates to pay off its debts. It sells wholesale power to public and private utilities and about 15 large industrial plants in the Northwest, many of them aluminum smelters. The revenue generated from these sales is used to pay back government loans that originally funded construction of the projects.

“One of the standing jokes around here has been that we don’t get paid until the treasury payment has been made,” Mahar said. “BPA pays about $750 million a year to the national treasury. To date, the BPA has paid back about $5 billion.”

Though it produces nearly 45 percent of the Northwest’s hydropower, the BPA does not own the dams. The Army Corps of Engineers and the Federal Bureau of Reclamation share ownership of the dams and nuclear plant.

Congress created the BPA with several goals in mind. The BPA’s first task was to provide the Northwest with electricity by operating the dams and infrastructure, including transmission lines and substations, needed to power the region. The BPA also needed to form public utilities to market the power to ratepayers.

Another of the BPA’s original goals was to provide “postage-stamp rates” to its customers, which meant a rural consumer’s power would cost the same as a city consumer’s.

The BPA sells wholesale electricity at cost to utilities and industries, which either use the power or market it for consumer use.

The BPA stands out as many look to lay blame for the recent energy shortages. BPA has become a target because of its preference toward Northwest customers, seemingly endless amount of electricity and deep federal pockets.

During average summer months, the BPA usually sells excess electricity to California, and during the winter months California utilities usually sell excess electricity to the BPA. Last year, because of low snowpack, extra electricity was scarce and the agency could not sell as California suffered rolling blackouts and skyrocketing prices while the drought left the Northwest with energy shortages. The BPA released a statement in May 2001 stating that when it signed contracts for 2001, it over-committed by 3,000 megawatts. It also stated that five years ago, when the agency’s electricity costs were high relative to the market, some of its customers, such as Portland General Electric, chose to remove all or part of their load from the BPA and pursue less expensive power.

“(PGE) generates about 20 percent of its own power, about 25 percent is bought from BPA through contracts and the rest they buy from various utilities throughout the day, hour by hour,” PGE dispatcher Jim Lovely said.
'USUALLY, HERE IN THE NORTHWEST THE ONE THING WE CAN COUNT ON IS RAIN. AND LAST YEAR, WELL, IT DIDN'T REALLY HAPPEN.'

TOM PANSKY
BONNEVILLE POWER ADMINISTRATION FISH AND WILDLIFE OFFICER

'It's interesting in a sad way. We're adding grain to the river (through shipping) and barging fish around the dams.'

JUSTIN PIDOT
WASHINGTON STATE ORGANIZER FOR SAVE OUR WILD SALMON

Last winter, due to one of the lowest rainfalls in 30 years, the BPA was forced to buy more energy on the market to fulfill the contracts. Still, faced with shortages, officials asked some of the agency's largest consumers — aluminum smelters — to halt production for at least two years.

Last winter there was little rainfall and even less snowmelt. Mahar said there was not enough water to go through the dams to create regular amounts of electricity without hurting salmon runs.

"Usually, here in the Northwest the one thing we can count on is rain. And last year, well, it didn't really happen," said Tom Pansky, a BPA fish and wildlife officer.

Spring salmon runs were left with lower-than-average water levels and a lower-than-average chance for survival. Preliminary data from the Fish Passage Center, an organization tracking salmon and steelhead runs in the Columbia and Snake rivers, showed the survival rate of yearling steelhead from the Lower Granite Dam to McNary Dam was about 16 percent compared to 70 percent survival rates in recent years. Yearling Chinook salmon had about a 57 percent survival rate compared to a 72 percent rate in the past five years. Some assert the BPA could have done more to help salmon runs.

The BPA's spill procedures are outlined in a Biological Opinion issued by the National Marine Fisheries Service in December 2000. NMFS provided an emergency clause, which gave the BPA the right hold water in a power emergency. During last spring's drought, BPA officials decided to invoke this clause.

"We're trying to make fish a higher priority, but last spring we curtailed the amount of water split during the spring, hurting salmon runs," Mahar said.

In recent years, environmental groups have tried to have four dams on the Lower Snake River removed. These four dams are primarily used to allow shipping upriver as far as Lewiston, Idaho.

Justin Pidot, Washington state organizer for Save Our Wild Salmon, started working on the campaign to tear down the dams a few months ago.

"It's interesting in a sad way," Pidot said. "We're adding grain to the river (through shipping) and barging fish around the dams."

Fish barging is a common but expensive way to move fish around dams without spilling water. Pidot said fish-barging programs about $500 million a year.

"Barging returns have never returned more than one-and-a-half percent," Pidot said.

Pidot suggested Eastern Washington diversify its energy resources instead of continuing to rely on BPA's dams.

"Eastern Washington could reap huge economic benefits by investing in wind power," he said.

"Farmers that only made $200 off an acre of land can make $2,000 an acre by leasing their land for wind generation."

According to one of the BPA's publications, the agency asked for proposals for 1,000 megawatts of wind-generated power in April 2001. It received proposals for 2,600 megawatts of wind power, more than enough to replace the electricity generated from the four Lower Snake River dams.

Sixty-four years after its inception, the BPA is an organization in transition. While it takes steps toward diversification, the agency and the region continue to rely mainly on hydropower. Under changing pressures, the BPA is caught between the needs of its consumers, the changing political climate and the environment.
The announcement of the National Energy Policy came with a series of cheers from the nuclear power industry and a collective "boo" from environmentalists.

The policy is the Bush administration's recommendation for the future of electricity generation in the United States. It stresses continued use of fossil fuels but also hails nuclear power as a "clean energy source" and suggests recommissioning old reactors and finishing partially completed reactors in the existing infrastructure.

WNP-1, a partially completed nuclear reactor located on the Hanford Nuclear Reservation, could be Washington state's newest contribution to nuclear power generation. Citing rising construction costs and a shrinking demand for nuclear power, the government halted construction on WNP-1 in the 1980s. Energy Northwest, the publicly owned utility planning to complete WNP-1, estimates it will cost $4.2 billion to finish.

Some people, however, question the wisdom of any nuclear-energy generation at Hanford.

"You have a large site with some of the largest volumes of radioactive material buried underground," said Robert Alvarez, senior policy analyst with the Institute for Policy Studies in Takoma, Md.

Alvarez worked as the senior policy advisor to the U.S. Secretary of Energy from 1993 to 1999 and has written several articles about nuclear waste's human health and environmental effects.

He said nuclear waste produced at a nuclear energy generation facility is not exactly the same as waste at the Hanford site, but said "they're all equally hazardous."

"The amount of contaminated liquid dumped at Hanford is roughly equal to a lake the size of Manhattan, 120 feet deep," Alvarez said. "They used the site as a giant contamination sponge."

The federal government purchased land for the Hanford site in 1943 to produce plutonium for the Manhattan Project, a secret nuclear-weapons development project during World War II. Most of the plant was built in the following three years.

In his memoirs, Gen. Leslie Groves, head of the Manhattan Project, wrote "not until later would all concerned grow accustomed to the idea that, while normally haste makes waste, in this case haste was essential."

The government's haste created nearly 900 nuclear-waste sites spread across 210 square miles of Hanford, including 177 buried nuclear waste tanks. Alvarez said 149 of those 1 million-gallon tanks are leaking.

Contamination from Hanford leaked into the Columbia River and can be found all over the West Coast, from the Baja peninsula to Alaska, Alvarez said.

In 1989 the Department of Energy, the Environmental Protection Agency, and the Washington state Department of Ecology signed the Tri-Party Agreement as a commitment to clean up Hanford. A joint U.S. Congressional committee approved $1.8 billion for 2002 to continue the Hanford cleanup. The budget is $418 million more than Bush proposed and $362 million more than the 2001 budget.

Much of the money will pay to encase radioactive material in glass, a process called vitrification. The Department of Ecology gave the Department of Energy until 2007 to begin full-scale vitrification on-site.

The Department of Energy, however, has already failed to comply with the Department of Ecology's July 2001 deadline to begin building the vitrification plant at Hanford. The state is fining the Department of Energy $10,000 every week until it implements a catch-up plan to meet the 2007 deadline for full-scale vitrification.
“Whether the Hanford site will ever be completely cleaned up is unknown,” said David Mears, senior assistant attorney general for the Department of Ecology.

In addition to its nuclear waste problem, a deadly chemical agent associated with plutonium production at Hanford threatens Columbia River salmon populations.

“Hexavalent chromium is in the salmon beds,” Alvarez said.

Both plutonium-producing and electricity-producing reactors used hexavalent chromium as an anti-corrosive agent in nuclear cooling towers. During its early years, the Hanford plutonium plant used Columbia River water in its cooling towers, contaminating it with hexavalent chromium before returning it into the river untreated, Alvarez said.

When salmon eggs laid in contaminated beds hatch, the fry remain in the area for a few weeks. During their stay they absorb the chromium and become lethargic, which causes breathing problems and ultimately suffocation.

Although the National Energy Policy claims nuclear energy production is clean, stating “nuclear power has none of the emissions associated with coal and gas powered plants,” the policy makes little mention of the waste nuclear power leaves behind.

The plan states, “an important challenge to the use of nuclear energy is the issue of safe and timely long-term storage of spent nuclear fuel.” However, it offers no solution to this waste problem.

In Hanford’s case, the nuclear waste problem needs a solution. Although most of the waste at Hanford was hastily created some, like Alvarez, still wonder how wise it is to ascribe to a new plan supporting nuclear energy.
"It's so huge, so flat, so big," said Lindsey Kiesz, a recent Western Washington University environmental sciences graduate. "I feel like I'm on the edge of the earth.

"Looking, you see huge mountains so far away. The spongy tundra is under your feet with caribou running across it. They even run right beside you — such tough, hardy animals."

Kiesz visited the Arctic National Wildlife Refuge in the northeastern corner of Alaska last summer to study the tundra and caribou herds. Not only did she travel through one of the most isolated and pristine wilderness areas in the United States, she toured a landscape that soon may look vastly different if the federal government opens it to oil drilling.
ANWR encompasses 20 million acres, an area roughly the size of South Carolina. Within its borders lie boreal forests that give way to tundra, which eventually becomes the coastal plains. The Brooks Range's eastern portion slices through the center of the refuge.

ANWR is home to 180 species of bird, 36 kinds of fish and 43 species of mammal, including the highly publicized Porcupine Caribou herd, named for its annual crossing of the Porcupine River.

In 1964, Congress passed the Wilderness Act, a legislative action requiring some portions of the United States to remain undeveloped. In 1980, President Carter expanded ANWR's borders and designated the land as a space for wildlife conservation and ecosystem protection.

Carter's environmental protection may have been in vain. An area of ANWR known as Section 1002 is under attack.

A 1.5-million-acre finger of land wrapping along the northwestern corner of ANWR, Section 1002 is the last 5 percent of Alaska's north coast not open to oil development. Many in the oil industry, however, believe the country's largest untapped oil deposit rests below the surface of Section 1002.

"Trying to estimate how much oil there is can be a tricky thing," said Kenneth Bird, a research biologist for the U.S. Geological Survey. "There is always uncertainty as to how much there is."

Bird explained that the USGS produces a range, not an exact figure, when predicting an oil deposit's size.

"We give the most likely estimate, the mean, which is 7.7 billion barrels," Bird said. "The lowest estimate is 4.3 billion barrels; the highest is 11.8 billion barrels."

Bird said drilling operations have about a 50 percent chance of retrieving 7.7 billion barrels of oil from Section 1002 and a 5 percent chance of finding 11.8 billion barrels.

These figures estimate the technically recoverable resources; they do not factor in the cost of removal. Even if oil is in Section 1002, it may not be economically feasible to drill due to discovery, development and production costs. The presence of oil in ANWR does not ensure a financial profit.

The amount of oil is not the only topic for debate. The threat of oil development has raised questions about such action's environmental impact. Alaska Governor Tony Knowles is one of the people trying to provide answers.

"The governor believes that the human footprint will affect less than one-tenth of 1 percent of the entire refuge," said Claire Richardson, Knowles' deputy press secretary.

Richardson explained that drilling plans involve rolling equipment in on giant wheels that would eventually be removed, leaving only a drilling head about the size of a school desk.

The impact of oil development, however, could be a great deal larger. According to the Alaska Wilderness League, roads, drill pads, airports and processing facilities scattered within ANWR's borders will directly affect an estimated 12,500 acres.

Though some, including the Knowles administration, say they believe the drilling will not hurt the caribou, many involved argue otherwise.

"The caribou will not give birth in an oil field," said Faith Gemmill, project coordinator for the Gwich'in Steering Committee of Alaska.

The committee represents 15 villages and 7,000 Gwich'in people, an American Indian nation living near the Porcupine Caribou herd's migratory route in Section 1002. The caribou herd's birthing area is inside the proposed oil development area.

"We oppose any sort of development of the birthplace and nursery of ANWR," Gemmill said. "If there was oil development, it would displace the caribou.

"But where will they go? The west is all open to development. The east isn't big enough for 130,000 caribou. If they did move, the herd will decline. The young will not survive."

No one knows exactly what will happen when the herd encounters oil development equipment, but many say they believe finding out is not worth the risk.

"Beyond culture, we rely on the caribou spiritually," Gemmill said. "We live out there on the land for two months to harvest caribou. Many traditions are taught to our children in those months. We have a cultural and social system set up around the caribou."

A 1987 U.S. Department of the Interior report states that oil companies have less than a 20 percent chance of finding recoverable oil underneath the coastal plain. Even if oil is profitably recovered from ANWR, one question remains: Is it worth it?

The answer may lie just 60 miles to the west, at Prudhoe Bay where the oil industry has reduced 1,000 square miles of tundra to an industrialized area containing at least 1,500 miles of pipeline and road, and 1,400 oil wells. Over 60 contamination sites surround the bay, soaked with diesel fuel, pesticides, acids and lead.

"I remember visiting Prudhoe Bay and seeing oil fields all spread out," Kiesz said. "There were tire tracks in the tundra. You could see them for miles. I don't want to see those tracks running through ANWR. Those tracks last forever."

If the federal government opens ANWR to drilling, it may only be a matter of time before it mirrors Prudhoe Bay, leaving behind only a memory of Gemmill's caribou and Kiesz's huge, flat tundra.
Waylon Ocheltree, 11, of Sumas, Wash., gets comfortable while listening to over three hours of testimony both supporting and attacking the proposed SE2 plant.

Near the end of public comment hearings at Nooksack Valley High School's auditorium on Oct. 30, Mary Reeves sounded a bit exasperated.

"We have been fighting this," Reeves said, pausing to sigh, "for too long."

Reeves, executive director of the Abbotsford, British Columbia Downtown Business Association, was just one of several hundred who gathered last fall to voice their opinions on Sumas Energy 2.

SE2, a 660-megawatt natural gas-fired electricity generation facility proposed for construction in Sumas, Wash., has spurred one of the most heated and drawn-out battles over energy and public health going on anywhere in North America. By all indications, the fight is far from over.

The Washington state Energy Facility Site Evaluation Council (EFSEC) denied Sumas Energy 2, Inc.'s application to build the plant in February 2001. In June, SE2's backers, including parent company and project manager National Energy Systems Company, submitted a revised application, one they said addressed EFSEC's problems with the original proposal.

SE2's opponents, however, were not satisfied with the changes.

"I put it to you now," said Randy White, a member of parliament representing Abbotsford and Langley, British Columbia, "the (application) should be rejected because the plant's location is the same."

Opposition to the plant was broad-based and extremely vocal throughout the EFSEC process, aligning activists, politicians, scientists, doctors, businesspeople and outdoors enthusiasts on both sides of the border. This coalition repeatedly argued that the surrounding area is far too polluted to withstand any more industrial emissions.

The plant's expected emissions for nearly every pollutant are small percentages of any applicable state or federal air quality maximum, but opponents, such as Abbotsford City Councillor John H. Redekop, say the sheer volume of SE2's output poses too great a threat to the area's airshed.

"Yes, it's the cleanest plant in the Northwest," Redekop said. "It also produces the most volume. Those percentages mean little if you have enough output."

According to an EFSEC draft fact sheet, SE2 would emit 144.5 tons of nitrogen oxides, 88 tons of carbon monoxide, 153 tons of volatile organic compounds, 209 tons of...
particulate matter smaller than 10 microns, 69 tons of sulfur oxides, including 14.3 tons of sulfuric acid mist, and 139 tons of ammonia every year.

The Fraser River valley airshed, which includes Abbotsford and Chilliwack, British Columbia as well as areas on the American side of the border, already rates as the second most-polluted airshed in Canada. The valley extends northwest from SE2’s proposed site at an almost 45-degree angle. Residents of the area say prevailing southwesterly winds would effectively sweep most of SE2’s pollution into the valley, where it would be trapped by the surrounding ridges.

EFSEC cited Fraser Valley’s existing pollution problems as one reason it originally denied the application. According to Abbotsford officials, asthma is already the leading cause of absenteeism in the area’s schools and businesses, and one of the most common reasons residents seek emergency medical assistance.

“We have a written statement from our physicians that they will leave the area if this plant is put in,” Redekop said. “We will lose 38 percent of our physicians.”

Opponents also cited a number of environmental impacts other than air quality, including groundwater use, low-frequency noise and a history of floods in the SE2 site.

Wastewater from the plant would be added to sewage from Sumas, which is treated just across the border in Abbotsford. Officials there indicated SE2 would sour the city on renewing the long-standing arrangement in the future.

Support for SE2 became more visible in the second round of hearings, due in large part to the efforts of local labor unions. The men and women of local construction trades say SE2 has addressed every concern EFSEC had with the plant and would bring jobs and economic stimulus, as well as needed energy, to the area.

State legislators and other supporters such as the City of Sumas repeatedly cited economic and supply concerns. They also pointed to SE2’s commitment to voluntary mitigation of greenhouse gases as a positive trend in power generation.

“It’s part of the responsible development we’d like to see coming to testify.”

Fiksdal, a non-voting member of the council, said EFSEC may not build the plant even if EFSEC eventually approved it.

“Four hundred million dollars is a big chunk of change,” Owens said. “A lot of family-wage jobs are created from their $400 million investment.”

At its peak, SE2 would employ about 25 people in day-to-day operations — but, Owens points out, the impact on local workers will be far greater.

“There will probably be about 300 to 400 construction jobs at the peak,” Owens said, adding that once the estimated two-year construction process is completed, additional employment in maintenance, supply and other industries would result from the plant’s construction.

“In terms of jobs out there, this kind of thing will be the cream of the crop,” he said. “We are labor people — bottom line, we need jobs. But not at the expense of our environment.”

Dirk Petty, of local anti-SE2 activist group Generations Affected by Senseless Power, does not disagree with Owens’ assertions about employment. He just sees them as irrelevant.

“Our standard line has been ‘It’s going to kill more people than it will employ,’” Petty said. “When the plant comes in and I’m breathing the air, that’s where I draw the line.”

GASP, like other opponents, said the region does not need additional power SE2 would supply. According to EFSEC documents, “there are dozens of sizeable gas-fired power plants being proposed or under construction in the region at the present time ... The combined output potential of all proposed facilities far exceeds any forecast for demand.”

Couple that with predicted Canadian resistance to high-volume transmission lines planned to cut through British Columbia and opponents suggest the company may not build the plant even if EFSEC eventually approved it.

“This is less about power production and more about securing gas and water rights for the future,” Petty said.

Jim Fiksdal, administrative manager for EFSEC, has worked for the council for 15 years. He said SE2 ranks high in controversy and public involvement.

“For this type of project, so far, it has been the largest,” Fiksdal said. “It’s had the most number of people involved and coming to testify.”

Fiksdal, a non-voting member of the council, said EFSEC set early 2002 as a probable date for a decision, though the council is not tied to any deadline.

Part of the reason EFSEC has so much information to examine is the somewhat ambiguous mandate the council has for the scope of its investigation. EFSEC acts as a permitting body in place of more than 20 state and federal agencies. The council mainly considers environmental factors, but Fiksdal said it is not precluded from examining other variables such as economic impact and the need for employment.

“The law says (EFSEC) has to consider the broad interest of the public,” Fiksdal said. “They have a lot of work ahead of them.”
Mike Sheehan, a Puget Sound Energy engineer, is working on a more efficient way to power and heat the Pacific Northwest.

"PSE's project will be the poster child for the rest of the United States," Sheehan said, his voice exuding enthusiasm uncharacteristic of an engineer. "Fuel cells are whole a new game."

In 1838 English scientist William Robert Grove developed what he called a "gas battery," which generated electric current using techniques similar to modern fuel cells.

"Fuel-cell technology has been around since the 1860s," Sheehan said. "This is not a new thing."

Fuel cells have gone from being a mere curiosity in the 1800s to becoming part of NASA's space program in the 1960s. Today, companies are researching and developing fuel cells on a larger scale. They are hoping to provide a new, more efficient way to power cars, buses, homes and even entire cities.

A fuel cell is essentially a battery in which the fuel, hydrogen gas, is constantly replaced. Though there are many types, Proton Exchange Membrane fuel cells are thought to be the most practical for residential use because they are considered to be safest and most economical.

A PEM cell uses a platinum catalyst to chemically separate the hydrogen atom's protons and electrons. Electrons are sent to a battery for storage or used as electricity in a residential power circuit; protons pass through the fuel cell's membrane to combine with oxygen and electrons returning from the residential circuit. This combination yields clean, potable water and heat, which can also be distributed from the fuel cell to heat a home.

"The Northwest is an important market (for fuel cell development) because fuel cells have a combined use — heating and electricity," Sheehan said. "The result is a gain in efficiency."

Ideally, hydrogen would be pumped from a production facility to the fuel cell using a series of transmission pipes. Unfortunately, none of this equipment is currently in place.

"Everybody would like to cure cancer and get hydrogen," Sheehan said, pointing out the importance of hydrogen to fuel cell success.

To solve that problem, the fuel cell is coupled with a fuel converter. Proton-rich fuel, such as natural gas or ethanol, is sent through the converter where a catalytic process separates the hydrogen from the other components of the fuel. Though it operates at only 80 degrees Celsius, a temperature safe for most applications, a fuel converter emits the greenhouse gas carbon dioxide and trace amounts of other air pollutants.

According to Plug Power, one of many companies developing PEM fuel cells, a PEM fuel cell's efficiency may reach 40-50 percent, and if the fuel cell's waste heat is captured its efficiency could double. In comparison, state-of-the-art spark-ignition engines only achieve about 25-percent efficiency, according to the Energy Educators of Ontario.

PSE's fuel cell project, funded by the U.S. Department of Energy, will be the Northwest's first grid-parallel unit, meaning the fuel cell will supplement an established network of energy generators — such as dams — and miles of power lines. When a residence's fuel cell has produced a surplus of electricity it will feed power back into the grid. Conversely, if the fuel cell is not producing enough electricity, a residence can still get extra power from the grid.

PSE is currently performing studies to determine the impact of fuel-cell use on the existing electrical system.

"PSE has not selected a site yet," Sheehan said. "We need to find a builder willing to tie-up a building for several months. We also need the correct permits."

PSE's fuel cell will run on natural gas, already an established part of

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**Stationary fuel cells ... generally run on conventional fossil fuels. Some fuel cells could be considered renewable energy resources if they run on renewable fuels, such as landfill gas, other biomass-derived gases or hydrogen produced using wind or solar energy.**

Andy Abele
Quantum Technologies development manager

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**Catalyst for Change**

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A Proton Exchange Membrane fuel cell by Mary Berkley

the Northwest power systems.

"Stationary fuel cells . . . generally run on conventional fossil fuels," said Andy Abele, technology development manager at Quantum Technologies, a designer and supplier of fuel cell support equipment based in Irvine, Calif. "Some fuel cells could be considered renewable energy resources if they run on renewable fuels, such as landfill gas, other biomass-derived gases or hydrogen produced using wind or solar energy."

While large companies doing fuel cell research and development have high hopes for this technology's success, there is some doubt about the feasibility of actually implementing fuel cell technology on a large scale.

"I think the earlier expectations of fuel cell competition with the grid are unrealistic," said Frank Ignazzitto, Avista Laboratories' vice president of marketing and sales. "The immediate future for fuel cells is in back-up power generation."

Avista Laboratories, a subsidiary of Avista Corporation, plans to build fuel cells for exactly that purpose using bottled hydrogen as fuel, Ignazzitto said. Avista aims at providing businesses, such as hospitals and high-tech companies, with a constant source of power in case of power outages.

"These companies have three 9s, but they need five or six 9s of guaranteed power," Ignazzitto said. "In other words, they need at least a 99.99999 percent assurance of continual power. Annually, that means only about 37 seconds without power."

While the future of stationary fuel cells looks promising, fuel-cell companies still face problems with successfully marketing their systems.

"We have not really run into any opposition, but rather barriers," Ignazzitto said. "The high cost of fuel cells, lack of the buyer's familiarity with hydrogen and the complication of the technology have slowed us from taking our product to the market."

Similarly, Sheehan said the General Electric fuel cell PSE plans to use encountered some developmental problems.

"It was supposed to be ready last year, but now it's looking like next spring," he said.

Sheehan also said it is necessary to build fuel converters precise enough to produce pure hydrogen, as impure hydrogen reduces the lifetime of a fuel cell system and degrades its power production.

Still, many researchers believe fuel cell technology has a future.

"Education and proving the technology is key," Ignazzitto said.

Other fuel cell experts remain optimistic as well.

"There are dramatic changes taking place right now, and over the next few years there will be more," said Daniel Kammen, director of the Renewable and Appropriate Energy Laboratory at the University of California-Berkeley. "(Fuel cells) can totally change energy markets."

Despite delays in PSE's fuel cell project, Sheehan said he sees fuel cells as a part of the solution to tomorrow's energy needs.

"Fuel-cell technology is where the world is going," Sheehan said. "Power plants are too hard to build anymore."

He also said the United States may need to learn from other nations.

"The U.S. isn't going to drive this — it will be Japan and Europe," Sheehan said.

Fuel cells probably are not the all-encompassing solution to the Northwest's growing power needs some believe them to be, but the technology is becoming more efficient at a lower cost. There may come a day when Northwest residents will have to choose to either build another power plant or to install — possibly in the home — a quiet, cleaner and more-efficient power unit.

"There are a lot of bright people working on the solution to energy problems," Sheehan said. "I believe (fuel cell use) is going to happen because of quality-of-life issues."

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‘PEOPLE DIDN’T REALLY BELIEVE IT WAS ACTUALLY GOING TO HAPPEN.’

George Wolfe, Former Alcoa Intalco Works employee
Alcoa Intalco Works General Manager Jim Frederick was one of the few people who arrived for work at the Ferndale, Wash. aluminum smelter on a windy October morning. Barely six months before, the plant employed more workers than any aluminum smelter in the region.

Though Intalco shut down in early May, 2001 and will remain closed for at least two years, its more than 900 employees continue to draw paychecks because of an agreement between Intalco and the Bonneville Power Administration, the federal body that regulates the region's hydropower.

In early 2001, drought conditions caused low snowpack and precipitation levels in the Cascade Mountain Range, which meant the agency wouldn't be able to produce as much electricity as in normal years. The inexpensive hydroelectric power that supplied the Northwest since 1937 became increasingly valuable.
The BPA had contracts with local utilities and industry to provide 11,000 megawatts, but officials estimated the agency could only provide 8,000 under the near-drought conditions. The BPA negotiated shutdowns with 10 of the region's aluminum smelters to make up the 3,000 megawatt difference, agreeing to pay the plants for electricity already purchased on contract and cover the wages and benefits of its displaced workforce.

Forty-eight-year-old Tom Juchmes, an Intalco technician for the past 13 years, is one of the few employees who stayed to perform maintenance at the plant during its shutdown. Juchmes said the close was not a total surprise. "They warned us around the end of last year," Juchmes said. "It started with Bellingham Cold Storage prices; Georgia Pacific was the next sign. We thought to ourselves, 'We're glad we have contracts.'"

Those contracts turned out to be no guarantee. Once drought hit the region, hydro generation dropped and prices began to skyrocket. Open-market electricity prices soared by 200-300 percent and both the BPA and Intalco eyed October as the month when electricity prices would force a shutdown.

The BPA asked utilities such as Puget Sound Energy and public utility districts to reduce electricity use by 10 percent in an attempt to control rate hikes and avoid shutdowns. These measures, however, were not enough.

"We still had to raise the rates 46 percent after everyone took less," BPA spokesman Mike Hansen said.

Analysts say when potential shortages first became evident, the aluminum industry lobbied the BPA heavily for a two-tiered rate system. The industry proposed a plan to the BPA that would allow them to buy 75 percent of the amount of electricity they normally use at original contracted rates. Residential and commercial service utilities would get the leftover electricity and have to purchase any additional electricity on the open market, leaving ratepayers subject to price fluctuations. Aluminum industry lobbyists argued the increased prices would influence customers to conserve electricity. This proposal was similar to conditions the aluminum industry enjoyed prior to the 1980 Northwest Power Act, when utilities received only the electricity the industry didn't use.

Opponents of the plan called it a subsidy and complained the aluminum plants would simply run at 75 percent capacity, still getting at-cost power at the expense of BPA's remaining customers.

In April 2001, the BPA decided against the proposed two-tiered rate system. The agency also announced it would implement a block rate system, which sold utilities predetermined amounts of electricity at a fixed rate. Utilities were expected to satisfy additional need by purchasing electricity at higher rates, which the BPA said would influence conservation by ratepayers.

The BPA also made an offer to the aluminum plants, whom the agency knew could not operate with prices more than $30 per megawatt hour, to buy back the contracted amounts of electricity. Because the plan effectively closed plants for two years, the BPA also offered to pay the wages and benefits of workers who lost jobs.

The deal let the agency avoid buying power on the open market and passing the cost on to consumers through rate increases. The BPA saved a total of 3,000 megawatts by closing the 10 smelters, enough to cover the contracted 11,000 megawatts.

"We said 'Look guys, we know that the aluminum market is tight,'" Hansen said. "Some were already going down. With the price of aluminum, it was going to be a rough summer and it is going to be rough for the next couple years."

"We're giving them money for employees' wages and benefits and still providing them enough for profit."

The final rate the BPA agreed to pay Intalco seems unclear. Hansen said he was unable to comment on the amount, but estimated it between $250 and $22.50 per megawatt hour.

"Find a midpoint between them and that's what we're paying them to stay down," he said.

Intalco's Frederick, however, said the BPA agreed to pay Intalco $18 for every megawatt hour it didn't use. He also said Intalco was not entirely pleased with the rate the BPA offered.

"By giving us $18 for every megawatt hour we didn't use ... they didn't have to buy on the open market," Frederick said. "We felt that we were really taken advantage of."

"(The plant) shut down and the workers were not getting paid. They were laid off without much of anything."

"People didn't really believe it was actually going to happen," former Intalco employee George Wolfe said. "But it was a lot
Different to see the plant as quiet as it was.

Employees said the constant drumming and hissing sounds emitted by the plant's smelting pots were replaced by an eerie silence on May 18.

"When all those pot lines were shut down it was quiet and really strange," Juchmes said. "It was like a ghost town with the air rushing in."

After the plant shut down, union members rallied at the Mount Baker Theatre. They filled the theater and handed out white-and-blue "We support Alcoa/Intalco" signs. Seemingly overnight, the signs were posted in many store windows or stuck in the soil of local homes.

"I always knew that Intalco had community support, but this even surprised me," Frederick said. "Without people it is just a pile of steel and concrete."

Of the more than 900 employees, 262 retired or took a voluntary severance package of $10,000. More than 600 are still on the payroll and only 25 people were laid off.

In 34 years, Frederick has watched the aluminum company change many times. He is confident the plant will start up again, but said he will retire before it happens.

"After 34 years of working, I'm old and tired," he said. "I'll leave the restart to another man who's younger and has a lot more energy."
"Prices are a signal to consumers," said Dan Hagen, a Western Washington University economics professor. "They are meant to convey information on the cost of producing a good."

Hagen, a specialist in environmental economics, said the information a good's price conveys is sometimes a misrepresentation. The market often distorts the prices consumers pay for some products, such as gasoline or electricity, because it ignores environmental and human-health effects when determining price.

Economists generally divide the cost of a good into two categories: internal and external. Some production costs, such as wages or raw material prices, are "internalized" when the producer increases a good's price. Costs not directly paid by producers or consumers, such as pollution or the loss of a finite resource, are harder to assign a direct monetary value. These "external" costs often pass on to society and the environment.

"An external cost is an economic distortion," Hagen said. "All the costs of a good should be absorbed by the producer of the good. This should also reflect damage to the environment."

"The fact this is not always the case is the problem."

America's passion for the automobile provides a prime example of how the market hides external costs from consumers. For example, gasoline consumers see only one thing: the price of the gas.

This price is the only communication consumers receive from petroleum industries, but it does not include the effects of cars' pollution. When the pollution leads to respiratory ailments and other adverse health effects, patients, hospitals and insurers — not the car driver or the petroleum industry — absorb the costs of treating these ailments.

Clifford Cobb, author of "The Roads Aren't Free," a research article on the external costs of driving, said automobiles' emission of fine particulate matter is their most damaging byproduct.

"The primary source of fine particulate matter is the combustion of gasoline," Cobb said. "These ultra-fine particles are a combination of chemicals that are released from the tail pipe. One of the effects we see is the increased mortality of people who are already ill, or with decreased immune systems."

The Environmental Protection Agency defines fine particulate matter as particles 10 micrometers in diameter or smaller, roughly one-seventh the size of a human hair. The EPA began regulating fine particulate matter in 1987 when conclusive scientific studies showed it causes more health problems than any other airborne pollutant.

Additionally, the EPA reports that cars account for approximately 17 percent of total worldwide greenhouse gas emissions.

Cobb cited a cost estimate by the Intergovernmental Panel on Climate Change, which estimates the price of greenhouse energy-related climate change at $100 billion annually. Cobb said he believes this estimate is very low and that it's difficult to put a monetary value on the effect's damage.

Gross Domestic Product figures used in the estimate are a measure of the health of an economy, Cobb said, and do not accurately reflect the costs of environmental damage.

"For example, agriculture is 3 percent of GDP," Cobb said. "If global climate change reduced the production of agriculture by 50 percent, the GDP would drop by only 1 percent. Of course, this is ridiculous because it doesn't take into account the higher prices of food and worldwide starvation this damage would cause."

Hart Hodges, another Western economics professor, knows how difficult assigning cost to environmental damage can be. Hodges was part of a Department of Interior team that assessed the environmental damage of catastrophic events like oil spills. He estimated the monetary values of damage to ecosystems and disruption of natural resources.

Hodges described an oil spill: If salmon are killed, the costs can be derived starting at the marketplace of the fish.

"Assessing the value of mortality is relatively easy," Hodges said. "The cost of damage to natural resources, such as timber, or to the commercial fishing industry can also be more easily determined."

But Hodges said subsequent effects, felt throughout the ecosystem or in tribal communities that subsist on the fish, are as hard to determine as they are far-reaching.

"In the gray area are damages that are impossible to assess in terms of money, such as the loss of a culture," he said.

The American economic system leaves this damage out of the equation when determining the price of gasoline.

Rather than pass external costs on to consumers, the government helps industries offset costs incurred from excavation and transportation in the form of federal subsidies.

Regardless of automobile use or ownership, U.S. citizens support these programs simply by paying various taxes.

Friends of the Earth, Taxpayers for Common Sense and the U.S. Public Interest Group led the Green Scissors Campaign Group, which produced a report describing 74 federal government subsidies and billions of dollars in programs that support environmentally and socially harmful projects.

One of these subsidy programs, called the Petroleum Research and Development Program, will spend $280 million in 2001 supporting oil exploration and petroleum recovery.

"The issue with the gas industry is its failure to internalize costs of gasoline," Hodges said. "Most countries have substantial gas taxes of $2-$3 per gallon — we don't have this."

Department of Energy studies show that if a consumer pays $1.50 for a gallon of gas, about 18 percent of the price pays for the oil's refinement, 17 percent covers distribution and marketing costs, 28 percent pays for taxes and 37 percent pays for the crude oil. Much of the environmental damage caused by
extracting, delivering and consuming the gallon is not added to the consumer's bill.

The International Center for Technological Assessment released a study stating the cost of gas would rise anywhere from $5.60 to $15.14 a gallon if federal subsidies were removed and the market price included external costs.

"When people say gas is cheap, they are missing all the costs that are not included," ICTA spokesman Mark Briscoe said. "The cost range is broad because many of the external costs are hard to estimate.

"The report is mostly to get people to realize that they do not pay for these prices at the pump, but pay for them in other ways."

Briscoe said people should think of these costs each time they get in the car.

"When prices are increased, it cuts into the amount of driving we can do," Hodges said. "So many trips we take are unnecessary. The lowest emission car is one that sits in the garage."

"AN EXTERNAL COST IS AN ECONOMIC DISTORTION, ALL THE COSTS OF A GOOD SHOULD BE ABSORBED BY THE PRODUCER OF THE GOOD. THIS SHOULD ALSO REFLECT DAMAGE TO THE ENVIRONMENT. THE FACT THIS IS NOT ALWAYS THE CASE IS THE PROBLEM."

DAN HAGEN
WESTERN WASHINGTON UNIVERSITY
ECONOMICS PROFESSOR

PERSPECTIVE  BY  MEG  LEE

PHOTOGRAPHS  BY  CHRIS  GOODENOW
In terms of snowpack levels, this year’s drought is a perfect example of what will happen because of future climate change. There will be a 40 percent reduction in snowpacks by the middle of next century.

Philip Mote, University of Washington atmospheric scientist

Easton Glacier, a massive chunk of ice stretching across the southern side of Mount Baker, covers the mountainside like a freshly slept-on icy sheet.

In the last 100 years, the glacier has receded a half-mile, leaving a trail of rough slopes and moraines devoid of vegetation on lower elevations.

“Since the little ice age that ended in the 1850s, there has been a recession of glaciers by 30 to 40 percent in this area due to global warming,” said Jon Riedel, North Cascades National Park geologist. “Easton Glacier’s recession is pretty stunning, but it’s actually quite normal for glaciers in Whatcom County.”

Riedel, who monitors stream levels and glacier recession, said spring run-off from the glaciers is often the main source feeding the park’s streams.

“If you look at what’s happened over the last 150 years you can see that spring run-off has been mostly from glaciers,” Riedel said. “Snowpacks in general have been getting lower, although big snow years like 1997 tend to hide that fact.”

The drought of 2001 showed how heavily Washington and the western states rely on water for hydroelectric power. A dry winter and a warm summer forced utilities and other entities to buy electricity on the open market, which meant price hikes for consumers.

“In terms of snowpack levels, this year’s drought is a perfect example of what will happen because of future climate change,” said University of Washington atmospheric scientist Philip Mote. “There will be a 40 percent reduction in snowpacks by the middle of the next century.”

Mote is the lead author of a regional climate-change report by the UW’s Climate Impacts Group, a research organization documenting climate-change effects in the Northwest.

The recent drought conditions may not be an isolated occurrence. Spring runoff fills reservoirs with levels sufficient to produce substantial electricity for the region. Scientists, however, predict spring runoff consistently will be as low as this year’s due to global warming.

Mote said in addition to low snowpack, last season’s early snow melt caused more water to enter the reservoir in early spring when it could not be stored. Earlier this year, the U.S. Department of Agriculture reported reservoir levels in Washington state were 75 percent of their average.

“Because of the unusually dry winter, our reservoir at Ross Dam was 18 feet below capacity level,” said Mike Sinowitz, Seattle City Light director of wholesale power marketing. “That’s unheard of.”

Sinowitz said his department predicts the energy needs of customers, then measures snowfall levels to predict how much water will be available to run through the dams.

“We have deals with many agencies that require minimum river levels,” Sinowitz said. “If there aren’t certain levels we can’t run as much water through the dams, which affects how much electricity we can produce.”

Water must stay above minimum levels so salmon can make their runs and lay eggs, and to ensure enough water for consumption and farm irrigation, he said.

Sinowitz said because of low water levels SCL bought elec-
tricity on the open market, which led to high prices for customers in the spring.

This trend could continue. Although global warming will cause more winter precipitation, it will come down as rain instead of snow, Mote said. In turn, hydroelectric dams will feel drought-like effects because they will not be able to store all the runoff collected in the winter and receive less in the spring and summer.

Sinowitz said addressing this seasonal runoff shift would require rebuilding dam reservoirs.

During the past decade, the idea of global warming has gone from theory to commonly accepted fact. Now the question is how quickly it's happening, said Ralph Riley, director of Huxley College's off-campus programs.

Riley said global warming is caused by the greenhouse effect, the very thing that allows humans to live on earth. The greenhouse effect, simply put, occurs as the sun heats the earth's surface; in turn, the earth radiates energy back toward space where greenhouse gases, such as carbon dioxide, trap some of the outgoing energy, allowing the planet to retain heat much like glass panels on a greenhouse.

Human intervention in the form of fossil fuel burning and deforestation causes greenhouse gas levels to increase, Riley said.

Atmospheric concentrations of carbon dioxide have increased 30 percent since the beginning of the industrial revolution, while concentrations of other greenhouse gases have nearly doubled, Riley said.

"If you look at the pattern of glacial recession and thinning over the last 150 to 200 years it becomes quite clear that the earth is warming," Riedel said. "Carbon dioxide levels are higher than anytime in the last half-million years."

Fossil fuel-based electricity production accounted for 40.5 percent of carbon dioxide emissions in the United States in 1999, according to a July 2000 Energy Information Administration report.

"Not only will carbon dioxide levels double by the middle of this century as compared to before the industrial revolution," Mote said, "but the average temperature will rise somewhere around 5 degrees Fahrenheit because of the greenhouse gases emitted into the atmosphere."

Olympia-based non-profit organization Climate Solutions released a report predicting a 5-degree swing in temperature could affect earth's climate to the point where ski resorts such as Mount Baker Ski Area may need close low elevation runs by 2020. Some areas could eventually close altogether.

The 1997 Kyoto Protocol called for the United States and 37 other industrialized countries to cut emissions of carbon dioxide and five other greenhouse gases yearly by an average of 5 percent of 1990 levels. Despite prevailing evidence, President Bush decided to pull out of the Kyoto Protocol in 2001.

In 1997 the United States, which houses 5 percent of the world's population, emitted about 20 percent of total greenhouse gases according to an EPA global warming report.

Riley said the Kyoto Protocol is only a first step in addressing global warming.

"How quickly should we adopt more stringent measures is the real question," Riley said. "Even if we reduced greenhouse gas emissions by 50 percent it would just stabilize the climate, then temperatures would continue to rise for about 300 years, abnormally, because of carbon dioxide's staying power."

Climate Solutions' report also compares carbon dioxide levels in the atmosphere to a train whose momentum doesn't allow it to stop immediately; the levels are so high it will take centuries for earth's temperature to finally stop rising.

Riedel concluded that glacial spring and summer runoff contribute to seasonal river flow and play a huge role in consistent reservoir levels. Due to global warming, glaciers in the park will not be able to buffer low snowpack years, the effects of which were accurately illustrated by the recent energy shortages.
A SEARCH FOR SOLUTIONS

BY BRIAN HARRINGTON
PHOTOGRAPHS BY CHRIS GOODENOW

'Gas, water and electricity are all resources. They shouldn't be squandered ... not only because it saves money and power—it saves the environment as well.'

Pete Kremen, Whatcom County Executive

Running around his office like a child in a toy store, Whatcom County Executive Pete Kremen pauses in different parts of the casually lit room to point out places where something is missing: light bulbs.

"We took out 2,700 bulbs in the courthouse alone," Kremen said.

The light bulbs were removed as part of an energy reduction program for Whatcom County, stemming from the recent energy shortage.

County officials made similar changes in other county buildings with the goal of reducing energy costs during the shortage. One organization's goal is to build 1,000 solar panels in Whatcom County and local businesses have entered the project to save energy.

"I don't know of any other state entity that was as successful as we were," Kremen said. "We were recognized by the governor and Puget Sound Energy for our aggressive conservation efforts."

Kremen said Whatcom County officials reduced energy consumption by 25 percent in February 2001, the first month conservation efforts were implemented. The number was up to 32 percent by March.

"We not only saved therms and kilowatt hours," Kremen said. "We saved money as well."

Kremen said once energy use affected the economy, conservation efforts began in earnest.

"It became much more aggressive and acute when there were people being laid off at Georgia Pacific and Governor Gary Locke announced an emergency," Kremen said.

Georgia-Pacific West, Inc., one of the world's leading paper products manufacturers, closed its Bellingham pulp plant, citing electricity costs as the major factor. A 33-year company history came to an end March

continued on page 28
Jeffree Utter, owner of Alternative Energy Solutions, checks the angle of a solar panel support pole that he constructed at Smith and Northwest Ball and Soccer Fields. The panels were installed as part of the Whatcom 1000 solar project along with panels at the Community Food Co-Op in Bellingham, the Whatcom County Senior Center, and the Whatcom County Parks and Recreation Departments main office.
30, 2001, when around 400 employees lost their jobs. The company’s energy bill went from $13 million in 1999 to $32 million in 2001.

Whatcom County’s economy looked as if it was going to take an even larger blow one month later when Alcoa’s aluminum plant in Ferndale announced it would shut down if it couldn’t find a cheaper energy source within six months.

“I felt the county needed to set an example that we were concerned with the energy problem,” Kremen said.

“Whether or not we get affordable energy, conservation must always be practiced. Gas, water and electricity are all resources. They shouldn’t be wasted, not only because it saves money and power. It saves the environment as well.”

The most recent energy shortage may be over, but Whatcom County officials along with local residents continue to discuss and research alternative energy sources and conservation.

“To me, anything clean and meeting EPA standards is worth looking at,” Kremen said. “We would like to see the private sector come up with their own solutions to meeting our energy needs.”

Jack Hardy, director of the Center for Environmental Science at Huxley College, enjoys keeping things simple to conserve energy. This summer, he and his wife oversaw the construction of their new house, which is heated almost entirely with passive solar energy.

Passive solar uses the sun to directly heat a building. The only difference between Hardy’s home and those of his neighbors is that most of the windows in Hardy’s home are on the south-facing wall, and he has a polished concrete floor and wall.

In the winter, sunlight comes through the windows and is absorbed by the floor and back wall. After the sun goes down, the blinds are pulled and the heat absorbed by the floor and wall keep the house warm through the night.

In the summer, when the sun is higher in the sky, eaves above the windows block midday sunlight, allowing the house to stay cool during the hottest part of the day.

“I like to do my share in not contributing to global warming,” Hardy said.

This winter will be the first test of Hardy’s design.

Hardy’s route may appeal to home builders, but for people who want their existing homes to not only save energy but produce it, there is an organization that offers an energy alternative.

The Next Generation Energy Co-op is a nonprofit organization that works to spread information about, and raise money for, a solar power project in Whatcom County — Whatcom 1000. The Co-op is trying to find people willing to commit to home-based solar power.

‘The effects of energy use on the environment will wake people up. But the effect of energy use on the pocketbook will wake people up as well.’

Kathy Larson, Puget Sound Energy spokeswoman
"We have somewhere from 48 to 80 residents looking to take that next step," Co-op Executive Director Peter Tassoni said.

The Whatcom 1000 project is the product of a program started by former-President Bill Clinton that aims to have 1 million solar-paneled rooftops in the United States by 2010. Locke committed Washington state to providing 5,000 roofs to Clinton's program, and Whatcom County volunteered to have 1,000 solar panels installed by 2010. The Co-op wants to see Whatcom County reach that goal.

"We're drawing on a need for renewable energy, for sustained energy and a sustained economy," Tassoni said.

The Co-op loans money to residents who want to set up solar systems. The loans of up to $5,000 would pay for half of a solar power system that would generate one kilowatt.

"A one kilowatt system could produce one-third to all of the required power for a four-person household," Tassoni said.

Solar power is much more efficient than power off the grid, Tassoni said. He said that when power is generated and then transferred through power lines, energy is lost.

"We lose up to 20 percent in transmission loss," Tassoni said. "The longer the distance, the greater the loss."

Tassoni said, dumping out 20 percent of the gas in your tank before driving to Seattle, it doesn't make any sense.

"When we send 300 watts of energy down to California, they only receive maybe 240 watts due to transmission loss," Tassoni said.

Tassoni said companies are forced to overproduce energy to make sure the amount ordered is received. "By overproducing, we get more pollution," he said.

The Whatcom 1000 project plans to install its first panels on a home in December. Solar panels are already installed at the Community Food Co-op in Bellingham, the Whatcom County Senior Center, the Whatcom County Parks and Recreation Department's main office and recently at the Smith and Northwest Ball and Soccer fields in Bellingham.

"Solar energy doesn't pollute," Tassoni said. "Panels are very clean. Children can play on them; birds can stand on them. They also give a greater security against the loss of power."

After a system is installed, local utilities like Puget Sound Energy will install a special device called a net meter. The meter measures the amount of electricity a home takes off the power grid and then measures the amount of produced by the solar panels. The customer is charged the difference between the two numbers.

A 1998 law requires all utility providers in Washington to offer a net meter to customers.

Kathy Larson, spokeswoman for PSE, said the company encourages people to set up solar projects. "We are mandated to serve all of our customers," Larson said. "We encourage them to 'use all you need and need all you use.'"

PSE is the primary provider of electrical power to Whatcom County. Larson said the company recently created an Internet-based program to educate the public about better energy use.

The new program shows daily electricity use on colorful graphs for each household. The graphs also show the amount of electricity used at different peak times of the day.

"If people moved 10 percent of their energy use to off-peak times it would cause a significant reduction in the need to build plants for generation," Larson said.

A pilot program also offered on the Internet will allow 300,000 residents and 20,000 businesses to check their hourly energy use. The program's graphs show different colors for the peak times of the day and where the energy use is highest, Larson said.

"The effects of energy use on the environment will wake people up," Larson said. "But the effect of energy use on the pocketbook will wake people up as well."

ADDITIONAL REPORTING BY COLIN MCDONALD
We wake up in a box. Then we get in a box and drive around. We get some food out of another box, go to a different box and stare at a smaller box all day. We work in that box, and at the end of the day get back in a box to reverse the process and go home to our box.

Kyle Morris
Pedal Project Director

"When its 9 o'clock on some night in December and your ass is wet because you don't have a bicycle fender and you're at a stop-light and look over to see some people in their car all warm and dry, rocking out, it's a good time to reinforce to yourself what you're doing is right," said Dan Hammill, Bellingham resident and former car owner.

Thirty-two years of age, Hammill lived a fairly typical life. He drove his sport utility vehicle to a job where he sat in a cubicle for eight hours every day. He earned a good salary selling scuba and outdoor equipment. Left with just enough energy at the end of the day to sit and watch television before bed, Hammill's lifestyle appeared to be quite normal. But he said he began to get the feeling something wasn't quite right.

"You sell your life for X amount of dollars per week or year, but if all you're getting out of it is money, then that's not satisfying," Hammill said. "There's more to life than selling something."

After quitting his job, selling his sport utility vehicle and moving to shared housing on Bellingham's Iron Street, Hammill said he became more involved with the community, attempting to fill his life with experiences rather than possessions. In the process he began to help the environment.

"Simplifying your life, or reducing the amount of stuff you have, is such a natural, environmentally friendly thing to do," he said. "With a vehicle it's so basic; you're not being dependent on oil and not putting pollutants into the air."
'Simplifying your life, or reducing the amount of stuff you have, is such a natural, environmentally friendly thing to do. With a vehicle it's so basic; you're not being dependent on oil and not putting pollutants into the air.'

Dan Hammill
Bellingham resident

According to the Environmental Protection Agency, overexposure to fossil fuel emissions can endanger both people's health and the environment. With oil's harsh consequences in mind, many people are trying to cut down their gasoline consumption by commuting by bicycle or mass transportation. Some have turned to alternative fuels for resolution.

"(Alternative fuels) seem like a Band-Aid," Hammill said. "(They) don't change lifestyles. It's still the same car-oriented, car-centric society."

Like Hammill, some scientists are ambivalent about replacing gasoline with another fuel. Michael Seal, director of Western Washington University's Vehicle Research Institute, said natural gas is one of the better alternative fuels, but added that it has its own problems. In addition to producing some of the same pollutants as gasoline — in greatly reduced quantities — no natural gas distribution system currently exists.

"There is no way to refuel a natural gas car," Seal said.

The lack of infrastructure for many alternative fuels, combined with their inefficiency, leaves their future uncertain.

"The answer is clearly not alternative fuels," said Wayne Landis, director of Western's Institute of Environmental Toxicology and Chemistry. "You have the same problems, just different venues. If we're concerned about reducing pollution there are other ways. It's called take the bus. Take the train. Use mass transportation when applicable."

With alternative fuels' uncertain future, many people considering alternative-transportation options instinctively think of mass transportation or person-powered travel. Hammill said, however, part of the problem is exactly that way of thinking.

"We're all pedestrians first," he said. "Cars are our alternative transportation. It's stupid we got sold into the myth that cars aren't the alternative."

Like many, Hammill said he believes bicycles are a better alternative to walking than cars.

In Bellingham, a community group called The Pedal Project is promoting bicycling as an alternative to car travel and working with the city government to make Bellingham more bicycle accessible. Pedal Project Chairwoman Julie Muylraert said she believes the more bike-friendly Bellingham becomes, the more livable it will be.

"I want to see Bellingham be a great place to live 20 to 30 years from now," Muylraert said.

Pedal Project Director Kyle Morris said bicycle transportation is a sensible alternative to car travel because, unlike cars, bicycles emit no pollution, promote healthy living and give people a break from "boxes."

"We wake up in a box," he said. "Then we get in a box and drive around. We get some food out of another box, go to a different box and stare at a smaller box all day. We work in that box and at the end of the day get back in a box to reverse the process and go home to our box."

Hammill said he experienced the predicament Morris spoke of in his old life.

"That's the irony — you're in the outdoor industry but you're not even outside," he said. "Humans aren't meant to be inside all the time."

Organizations such as the Pedal Project are searching for ways to give drivers convenient, environmentally friendly transportation options.

"To move people from cars we have to provide as many choices as possible," she said. "We have to make walking and biking safe and convenient."

To do so, The Pedal Project worked with city officials to build a bicycle...
To do so, the Pedal Project worked with city officials to build a bicycle lane on State Street that connects with the Boulevard Park trail system and the Boulevard Street bicycle lane, linking downtown Bellingham with the Fairhaven district.

“Our long-term goal is to have a continuous connected bike system in Bellingham so people can move easily, safely and conveniently to places they want to go,” Muyllaert said.

The new lane, Muyllaert said, is just one link in the chain connecting Bellingham’s bicycle system. When combined with the city’s buses and sidewalks, the system begins to provide a variety of travel methods.

“A prescription doesn’t work,” Muyllaert said. “We need to develop an infrastructure, provide incentives and make it safe and convenient. Pull all this together, and people will find what works for them.”

The Whatcom Transportation Authority, which runs the county buses as well as other services, also wants to get drivers out of their cars.

The WTA’s primary role, WTA Service Element Director Rick Gordon said, is to meet the county’s public-transportation needs. He said most WTA riders have no other transportation options, such as students, low-income families and the elderly.

“Over time the WTA will move toward meeting the needs of choice riders rather than just dependents,” Gordon said.

He also said WTA employees try to work closely with community groups advocating mass transportation, such as the Pedal Project, in an attempt garner more riders.

Despite the efforts of The Pedal Project organizers and WTA employees, cars continue to be most people’s primary form of transportation.

“It’s really hard to change somebody’s views,” Morris said. “They’re fixed on driving their cars. People are stubborn.”

Morris and Muyllaert both said they feel the change from overusing cars to a balanced transportation system begins with individuals.

“Until we as people begin to say, ‘We value downtowns that are pedestrian-friendly,’ our government, our lending institutions and our developers will favor single-occupancy vehicles,” Muyllaert said. “It’s really our responsibility.”

Hammill said change is made through intentional living.

“You have to choose not to be materially driven,” Hammill said. “It’s a lifestyle decision.”

Therein lies the problem with the oil dependency. Though people like Hammill and Morris try to lead by example, they cannot force others to make that “lifestyle decision.” The problem, Seal said, goes beyond simply finding an answer.

“Coming up with a solution Americans won’t do is no solution at all,” he said.

Americans’ fickle nature makes plans developed by activists or civil servants difficult to implement. Some, like Western student Sarah Peterson, feel their cars are their transportation problems’ only solution.

“I don’t have time to ride my bike,” Peterson said. “My car is more convenient than a bus or bike. It doesn’t take as much time and you’re not out in the cold.”

Hammill said that when he stops at the light and looks over at one warm car consuming oil and emitting deadly pollutants, he sees the world, sucking up oil and caring primarily about temporary comfort and very little about the environment.

“We found the enemy,” Gordon said, “and he is us.”
Some people are blessed with perfect skin or extraordinary musical ability; Chris Soler is blessed with energy.

Soler, 44, grew up on a farm in Skagit County and favored laborious tasks over mundane tractor-riding from the start. At age 17, he took second place in the 1975 Seattle Marathon. He once rode his bicycle from his home in Bow, Wash. to Florida and back.

Today, Soler rides his bike 40 miles to work and spends the daylight hours digging trenches for hydroelectric systems. He returns home to harvest vegetables or forage for wild plants in preparation for dinner and powers his home with renewable energy.

Quite simply, Soler is one efficient man. Living completely off the electrical grid since 1984, Soler rejects the use of conventional electricity or natural gas.

"There’s power right here on the road," Soler said. "I could have hooked up but I didn’t."

Soler has never paid an energy bill. He powers his home with solar panels in the summer, switching to in-stream hydroelectric power and a wood-stove in the winter. He uses roughly 1.5 kilowatt hours of electricity each day, which is only 5 percent the average household’s consumption.

"When you’re living off your own energy, you live within your limits," Soler said.

Soler, however, seems to transcend his limits. Living on a fraction of the average American’s income, Soler hasn’t sacrificed much in terms of modern-day amenities. He has a stove, stereo, phone, toaster, microwave, refrigerator, television, VCR, washing machine and computer. He even takes hot showers.
“You can live at whatever level you want to on renewable energy as long as you have the time or the money,” he said.

Soler also has the energy and the know-how. He said he converted his home to sustainable energy for philosophical reasons, but acquired much energy-related expertise along the way.

“My girlfriend calls me a technopeasant,” Soler said.

That moniker suits him well; Soler spouts off complex information on wattage, energy economics and solar cooking while donning lined jeans, tall rubber boots and a thrift store T-shirt displaying an American Indian symbol and the words “Don’t Worry Be Hopi.”

“Rather than investing in stocks, I invest in energy,” Soler said. “This is what I enjoy.”

Aside from installing his own solar panels and hydroelectric system, Soler contracts his work out to other individuals seeking more earth-friendly energy production. Generally, his clients are unable to afford the latest gadgets, so Soler designs a cheaper rendition and charges almost nothing for his time.

In addition, Soler works to eliminate phantom loads, the electricity drawn by devices while shut off. Televisions, VCRs, microwaves, computers and other devices with a clock or remote control produce phantom loads, which can generate costly electric bills. Simply using a power strip for appliances and pulling the plug when the devices are not in use can eliminate phantom loads.

Soler said making alternative energy viable and more attractive to the general public is important. He recognized that not everyone can live as he does but insisted “everyone is capable of some measure of self-reliance.”

“Everyone is capable of screwing in a compact fluorescent light bulb or turning off a power strip,” Soler said.

Soler attributes much of his self-reliance to his Skagit Valley upbringing.

“If a tractor broke down, we fixed it. If we needed a new building, we built it. If I was hungry, I went to the garden to eat,” he said. “I worked 12 hours a day, seven days a week. Compared to my childhood, the rest of my life seems like a breeze.”

Soler’s running flair earned him a full-ride scholarship to Skagit Valley Community College, where he read the article “How to Retire Six Months of the Year” in Mother Earth News and took its advice to ditch the car, which eats up 20 percent of the average income. He also learned to keep household costs low.

When Soler graduated from college, he used his farming savings to buy land in Bow and began building a home modeled after dwellings in India. He laid starched burlap over a metal frame and coated that with a cement mixture, creating a bunker-like shell.

“Only when I drove a backhoe over it did the roof crack,” Soler said. “As long as it stays dry it should last forever.”

During construction, Soler entirely avoided building permits because he knew his house would not meet code. He said the permit system deters people from using alternative building techniques and energy systems. He said there should be two different sets of codes: one set for contractors, which serve to protect the ignorant home owner, and a separate set for informed citizens building their own homes. But Soler encourages alternative-home builders to not be deterred.

“Do it well and do it right and do it,” said Soler. “Their easy answer is no, but just be friendly.”

CHRIS SOLAR

‘Rather than invest in stocks, I invest in energy. This is what I enjoy.’

By Jenn Jacquet
Photographs by Sarah Galbraith

Ultimately, people visit Soler’s place the way they would a developing country — with a fascination for the idyllic primitiveness, but not enough of a fascination to actually live that way. In the America of multi-car families and fast-paced lifestyles, Soler, who knows and lives within his limits, is a modern-day anomaly and an efficiency guru.
Three Planet reporters set out on Western Washington University’s campus expecting to find troves of wasted energy. We didn’t find what we expected. While several monitors glowed in a dimly lit closed computer lab, most were turned off. While the empty rooms and hallways were lit well into the night, many offices were dark. Temperatures in most buildings were mild, yet archaic thermostats read conflicting temperatures, at or above 70 degrees.

Our findings sent us looking for an answer to the question that may have already crossed the minds of some university administrators: how can Western save energy?

According to Western, the university expects to spend an additional $1 million in energy-related costs, bringing the total to roughly $3.8 million for 2001.

Western is not the only Northwestern university struggling with inflating energy costs. The University of Washington now charges most students a $3-a-credit energy fee. Students challenged the fee and took UW to court.
"We here at Western would not levy a fee of that type unless we had clear legislative approval to do so," said Bob Edie, Western vice president of external affairs. "We will see the outcome of the court case and legislative reaction before we consider something like that here."

Edie explained that if Western chose to pass part of its energy costs on to students, the technology fee, currently $10 a quarter, would probably be the first one to be increased. Western could raise the quarterly fee as much as $40 before getting legislative permission.

Last year, electricity rates began rising under the threat of an energy shortage. In January 2000, Governor Gary Locke issued an energy supply alert, requiring all state institutions to cut their energy consumption 10 percent.

In response to Locke's declaration, Western President Karen Morse created a task force called Watt Watchers in February 2001.

Watt Watchers is made up of faculty, staff and students who evaluate energy consumption and look for ways to conserve. The group is supposed to consider both long and short-term solutions to Western's energy problems.

"(Daytime) temperatures were turned back 2 degrees ... in university residences to an average of 70 degrees," said Bill Managan, Watt Watchers chairman and assistant director of operations at the Western's physical plant.

Watt Watchers also depends on voluntary conservation measures to save energy. The group plans to place postage stamp-size stickers on light switches around campus to encourage people to turn off lights.

Western also uses money obtained from outside sources to purchase energy-saving technology. Puget Sound Energy gave Western one such grant, which Watt Watchers used to replace several old electric motors in Arntzen Hall and the steam plant.

"We replaced motors that were inefficient," Western Utility Service Manager Tom Thorp said. "Historically, motors that are 10 years old are inefficient."

Some of the motors in the steam plant had been there since the plant was built in the early 1940s. The old motors were about 73-85 percent efficient, while the new motors are 95 percent energy efficient.

"We could have recovered quite a bit of our cost by replacing them (sooner)," Thorp said.

While replacements such as these make Western more energy efficient, the university has not committed to any larger-scale conservation projects.

To keep up with growth, Western plans to construct several new buildings around campus. As Western's campus expands, so will its energy costs. Western administrators aim to begin construction on one of these projects, the Student Recreation Center, in February 2002. While preparations are not final, project directors plan to allow Leadership in Energy and Environmental Design to evaluate the building.

The LEED program assists designers and contractors in constructing more energy-efficient buildings by applying a scorecard of efficiency requirements. The scorecard includes 75 points evaluating a site's use of environmentally friendly materials and technology. Everything from the ecological disturbance caused by building on a site to the amount of renewable energy integrated into the structure is taken into account. LEED has evaluated many different types of buildings, from a food bank in Pittsburgh, Pa. to a Navy barracks in Great Lakes, Ill., and has trained engineers in the United States and Canada.

The more points a LEED analyst awards a project, the higher the rating it receives. A project can receive a silver, gold or platinum rating, but, more importantly, it can mean the difference between certification or inefficiency.

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While replacements such as these make Western more energy efficient, the university has not committed to any larger-scale conservation projects.

To keep up with growth, Western plans to construct several new buildings around campus. As Western's campus expands, so will its energy costs. Western administrators aim to begin construction on one of these projects, the Student Recreation Center, in February 2002. While preparations are not final, project directors plan to allow Leadership in Energy and Environmental Design to evaluate the building.

The LEED program assists designers and contractors in constructing more energy-efficient buildings by applying a scorecard of efficiency requirements. The scorecard includes 75 points evaluating a site's use of environmentally friendly materials and technology. Everything from the ecological disturbance caused by building on a site to the amount of renewable energy integrated into the structure is taken into account. LEED has evaluated many different types of buildings, from a food bank in Pittsburgh, Pa. to a Navy barracks in Great Lakes, Ill., and has trained engineers in the United States and Canada.

The more points a LEED analyst awards a project, the higher the rating it receives. A project can receive a silver, gold or platinum rat-