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NORTHWEST ENERGY NEWS

Northwest Power Planning Council

Special Issue
ENERGY CONSERVATION



Editor's Notes

As our cover announces, this is a special issue dedicated entirely to conservation. We focused primarily on the Council's model conservation standards and the homes and businesses that have implemented them. In each state, the Council's state office staff helped pull together houses and homeowners to feature. Jim Erickson of the Washington State Energy Office, who has become a somewhat regular contributor to Energy News, also helped.

We wanted to feature special homes that meet the Council's standards, programs that support energy efficiency and the people doing the work. This could hardly be called an exhaustive survey, but we've touched on programs in each Northwest state, and listed places to turn for more information.

This issue's cover illustration is by Stephen Sasser and Lyn Nance.

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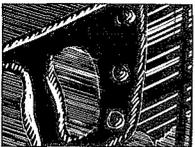


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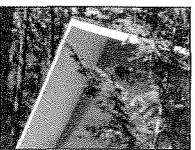
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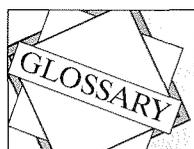


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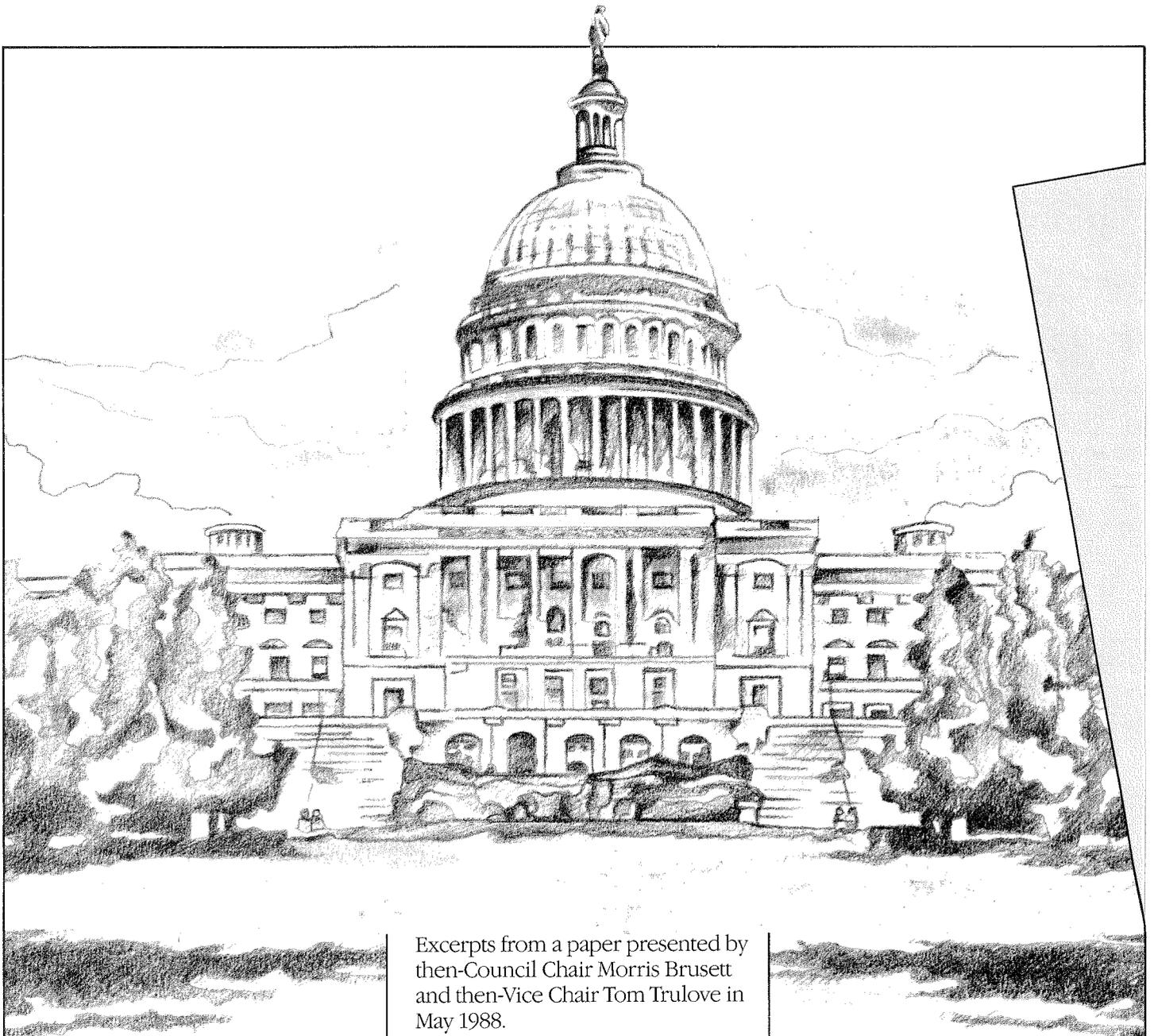
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Excerpts from a paper presented by then-Council Chair Morris Brusett and then-Vice Chair Tom Trulove in May 1988.

The Model Conservation Standards: An Historical Overview

With the Northwest Power Act's charge in mind, the Northwest Power Planning Council adopted the model conservation standards (MCS) in 1983. The standards, part of the Council's 20-year regional electric power plan, have been hotly

debated, advanced, criticized, tolerated and occasionally embraced ever since. They have even been the subject of a suit which was appealed all the way to the U.S. Supreme Court.

What follows is a "political" his-

tory — rather than a "technical" history — of the standards' first years. It shows the changes in policy affecting the standards and the influences that have shaped these changes. While the substance of the standards has altered very little, there have

Model conservation standards to be included in the plan shall include, but not be limited to, standards applicable to (A) new and existing structures, (B) utility, customer, and governmental conservation programs, and (C) other consumer actions for achieving conservation. Model conservation standards shall reflect geographic and climatic differences within the region and other appropriate considerations, and shall be designed to produce all power savings that are cost-effective for the region and economically feasible for consumers, taking into account financial assistance made available to consumers under Section 6(a) of this Act. These model conservation standards shall be adopted by the Council and included in the plan after consultation, in such manner as the Council deems appropriate, with the Administrator, states, and political subdivisions, customers of the Administrator, and the public.

Northwest Power Act—1980

been significant redirections in approach to implementation. The utilities have played a major role in these new directions.

In the simplest terms, the standards set energy-efficiency levels for new buildings. They do not stipulate how a building must be built, but instead set a standard for the

efficiency of electricity use in the building.

In the past, energy conservation was slotted onto the demand side of the supply/demand ledger. It was viewed as a *reduction* in demand. With the Northwest Power Act, energy conservation took on a new meaning, that of an *energy resource*, a resource that can be *acquired*. This puts it squarely on the supply side of the ledger.

The Council places the highest priority on the standards, seeing them as part of the lowest-cost resource available to the region. All conservation represents a sizable acquisition (over 2,540 megawatts for high-demand growth) to displace more expensive thermal acquisitions and guarantee that the Northwest can stabilize its electrical rates and retain the economic advantage of cheap electricity. New thermal resources are approximately 11 times more expensive

than power from the existing hydro-power system.

Of all conservation measures, the standards are most important, because they represent potential lost opportunities. Other conservation programs must be developed and tested so that they can be ready when the region needs them, but the acquisition of the actual energy savings can be deferred until that time.

But unless new buildings are built to be energy-efficient from the start, their potential cost-effective conservation will be lost forever. While buildings can be retrofitted with energy-efficient measures to some degree, the cost will be considerably more and the savings considerably less. Many measures simply cannot be installed cost-effectively except at the time of construction.

And since most new buildings will have a life expectancy of 50 years — standing long after the current surplus is history — they will continue to consume energy inefficiently far into the future if they are not built efficiently from the start. Each new building that does not meet the Council's model conservation standards represents a very real lost opportunity.

With the Northwest Power Act, energy conservation took on a new meaning, that of an energy resource.

The standards, like most conservation measures, have another key advantage for energy planners — flexibility. Unlike thermal acquisitions, they can come “on-line” immediately. The standards are also a near perfect marriage of supply and demand. As the regional economy grows, resulting in new buildings and increased demand for energy, the conservation savings can grow. Each new building has a potential for conservation.

How the standards were developed

The model conservation standards were the product of more than a year of discussions, analysis and testing before they were introduced in the Council's first power plan in 1983. Since that time, they have been fine-tuned when new information or better analysis indicated. The process to implement the standards in the region has also been evolutionary rather than revolutionary.

In their development, the standards were subjected to extensive analysis on both costs and performance. Existing energy codes and a survey of current construction practices helped establish base-case characteristics for residential construction. Using the base cases, the Council estimated what it would cost to improve the energy efficiency of structures built to existing codes or practices. Over 90 builders, subcontractors and suppliers in the region were surveyed. A number of other data sources were also used to verify findings, including a survey by the

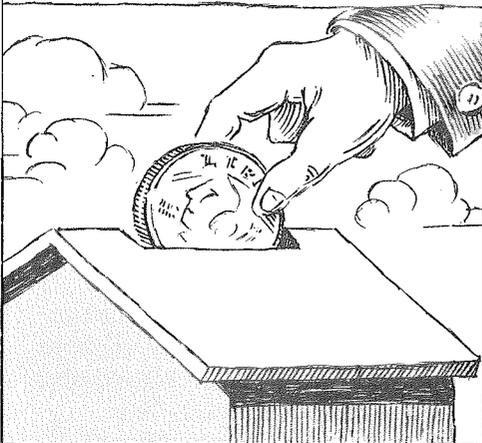
National Association of Home-builders. All cost estimates were compared to those in nationally recognized cost-estimating manuals.

To determine how much energy would be saved by each measure, a computer simulation was used to model space heating energy use on a daily basis, taking into account weather data, building thermal performance characteristics and solar radiation data. To verify computer results, the simulations were compared to actual consumption in Northwest houses.

Calculating economic feasibility posed special problems because the Act was not explicit about what this constituted. After exploring a number of approaches, the Council determined a home built to the standards must cost less to own and operate over its life than one built to current building codes.

Based on the results, the Council set total energy budgets for residential space heating, rather than component-by-component (i.e., windows, walls, etc.) performance budgets or prescriptive requirements for individual components. This allowed builders to construct any style home. However, to help the building industry and local code officials determine if a particular building would meet a performance budget, the Council provided sample prescriptive paths.

While the standards for residential buildings set energy-efficiency levels for electric space heating, the standards for commercial buildings deal with efficiency requirements for equipment used to heat, ventilate, air condition and light the buildings. In developing standards for commercial buildings, the Council reviewed the major existing standards. The Council used the “National Consensus” standard developed by the American Society



of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), but added more efficient lighting to the standards. Utilities were then asked to develop programs that would go beyond these standards. The commercial standards are currently being revised to track changes in regional and national codes.

All of this analysis was accompanied by extensive public involvement and debate. Input came from a wide variety of sources, including public and private utilities, environmentalists, members of the building industry, governmental bodies and others.

The standards in the early years

At the time the standards were incorporated into the original power plan in 1983, the Council hoped they would be widely adopted into state and/or local building codes. Codes appeared to be the most equitable route to implementing the standards, because the parties who benefit most directly from the energy savings, the homebuyers, bear the up-front costs of the energy-efficient measures.

In order to encourage code adoption, the Bonneville Power Administration developed an "early adopter" program, which included financial and technical assistance to local governments. Bonneville and the state energy agencies also sponsored a regionwide Residential Standards Demonstration Program.

Under this program, builders received financial incentives and training to construct several hundred homes in the region. The program was designed both to give the construction industry exposure in super-efficient construction and to prove the feasibility of such construction. Other programs included training for builders, architects, code officials, appraisers and lenders.

Recognizing that codes may not be the only route to improved efficiency regionwide, the Council took a new approach.

The early results were mixed. The city of Tacoma was the first to adopt the standards into its codes in 1984; several smaller cities followed. Seattle adopted a code that is equivalent to the model standards. Oregon and Washington both tightened their state codes as a result of the standards, although the revisions did not meet the level of the standards.

Recognizing that codes may not be the only route to improved efficiency regionwide, the Council took a new approach. While codes were still the ultimate objective, the Council realized that codes could not be successfully imposed involuntarily, but instead must grow out of an evolutionary process. The most successful codes were simply an institutionalization of current practice. So the Council embarked upon a program with Bonneville and the utilities that would provide builders with financial assistance to voluntarily upgrade current building efficiency measures.

The first major amendment introduces flexibility

In December 1985, after lengthy review and debate, the Council amended the section of its power plan dealing with model conservation standards. The action was subsequently incorporated into the 1986 plan. The amendment dealt with how and when the standards would be implemented and how the costs of implementation would be shared. The standards themselves did not change. The changes reflected a growing flexibility on the part of the Council and an attempt to accommodate the needs

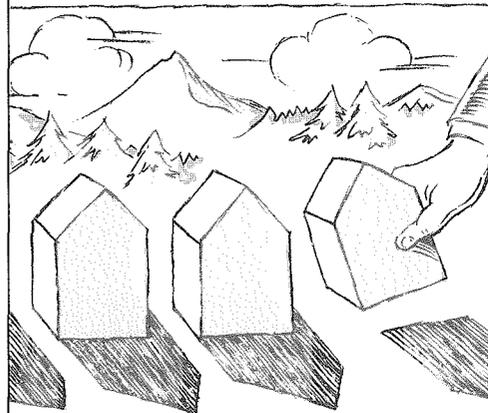
of utilities as well as state and local governments and environmental organizations.

The amendment called on Bonneville and the region's utilities to offer a program that would provide an incentive for builders to voluntarily construct new homes to the standards. This program, called the BPA/Utility Program, offers both marketing and financial assistance. Bonneville's marketing promotion is done under the name "Super Good Cents." Local utilities can buy into the Super Good Cents program or develop their alternative programs, so long as they are judged by Bonneville to produce equivalent savings.

In addition, the amendment added a stronger emphasis on maintaining indoor air quality at a level at least as good as that in homes built to current codes or practices, and Bonneville was to fund continuing research on indoor air quality.

A second amendment reflects regional consensus

In January 1987, the Council further amended the standards (again without significantly altering the level of energy efficiency). The change was something of a mile-



stone. For the first time, a model conservation standards' action reflected a consensus among Bonneville, regional utilities, and state and local governments. The changes were made in response to new data and analysis showing better cost-effectiveness and performance of current building techniques. Builders were no longer required to install vapor-barrier wraps with heat-recovery ventilators. Because some builders did find such installation cost-effective, the measure became voluntary. The revised standards became more flexible and could be more easily implemented by builders and utilities. The Council continued its emphasis on maintaining indoor air quality.

Changes responding to petitions

The Council received three petitions in 1986 to expand the coverage of the standards. The petitions asked for standards for industries that buy power directly from Bonneville, for Bonneville's federal agency customers, and for revised standards for commercial buildings, residential weatherization and space heat conversion.

In response, the Council adopted two amendments. One called on Bonneville to encourage federal agencies in the region to build to the standards; the other stated that a surcharge to enforce standards for

As the regional economy grows, resulting in new buildings and increased demand for energy, the conservation savings can grow.

existing buildings converting to space conditioning is not appropriate at this time.

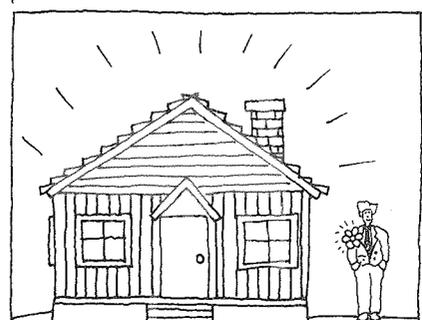
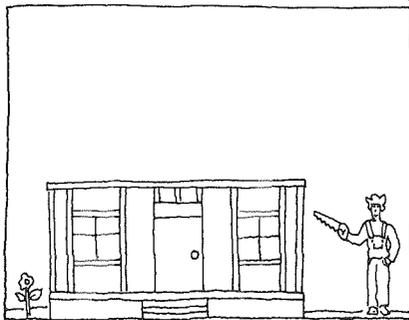
Toward the end of 1987, the Council adopted a general model conservation standard for areas not already covered by the current standards. The new standard applied to existing structures; utility, customer and governmental conservation programs; and to other conservation activities undertaken by consumers. At the time, the Council also recommended that conservation activities that could be deferred should be.

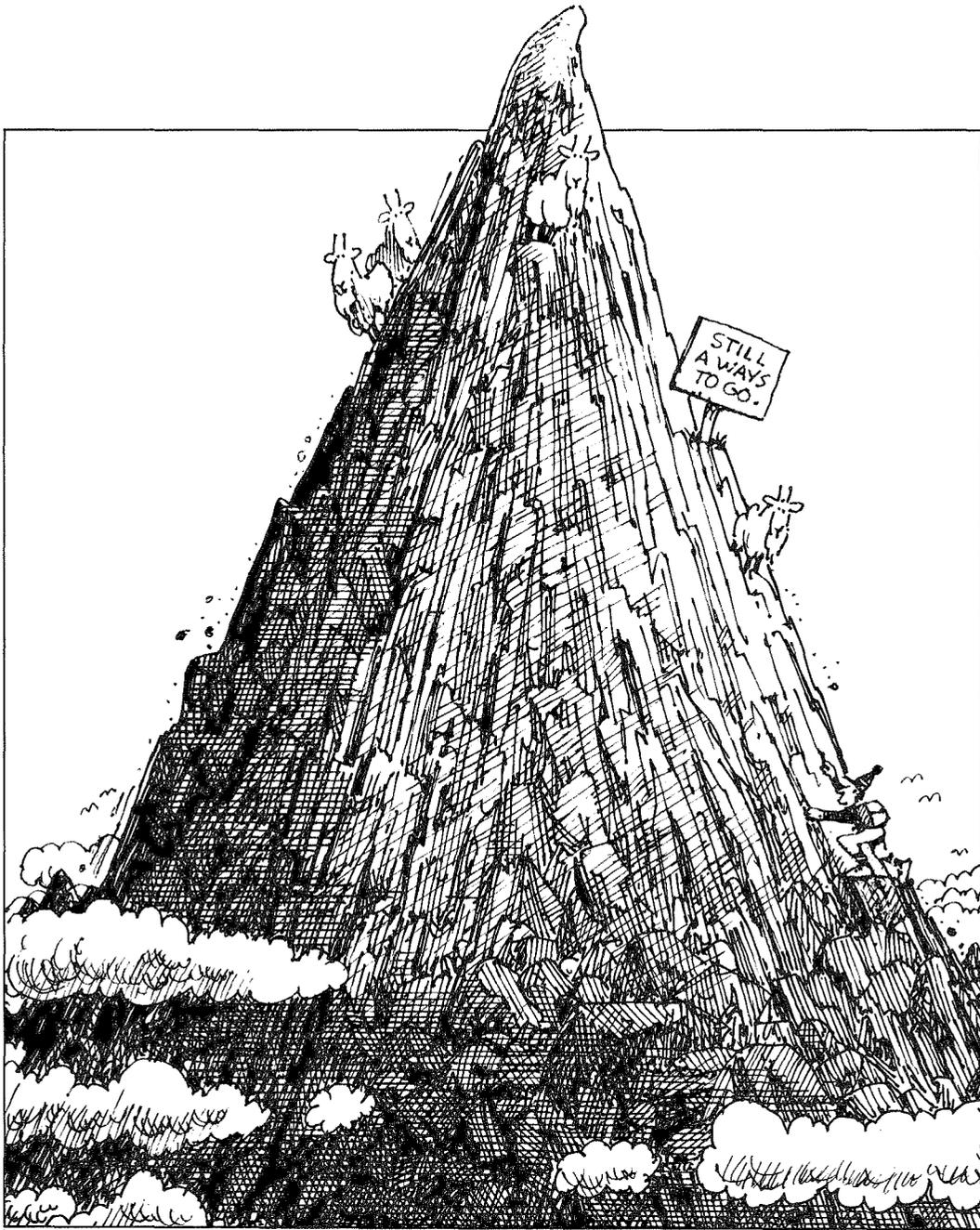
Current status: a new look at commercial standards

In its 1986 Power Plan and subsequent amendments, the Council made a commitment to review the standards for non-residential buildings. There were two major reasons for this review. First, Oregon and Washington had revised their energy codes, and Seattle had adopted a new commercial code since the time the standards had been introduced. These codes contained some elements that were more stringent than the Council's standards. Sec-

ond, the U.S. Department of Energy has released proposed energy conservation standards for new, government-owned, non-residential buildings. These standards also contain more stringent provisions than the Council's.

The Council is taking comment on the revised standards through July 14, with a decision expected sometime after that date. ■





by Gordon Lee

Conservation: The Northwest's North Slope

A report on conservation programs in the Northwest

There may be a silver lining in this spring's tragic scenes from Alaska's Prince William Sound: the Exxon Valdez's accident may force the United States to rethink its energy priorities. The 11-million-

gallon oil spill already has helped set the stage for sharp rises in the price of gasoline and other petroleum products, developments that could prompt renewed local and national support for conservation

and energy efficiency.

Any push toward conservation could have a substantial impact in Idaho, Montana, Oregon and Washington. A recent study by the Northwest Power Planning Council

points out that, while great strides have been made, conservation remains the region's ultimate untapped future resource.

In a very real sense, conservation can be seen as the Northwest's North Slope, an abundant source of power that—in some economic growth and energy consumption scenarios—could supply the region's needs well into the next century.

Conservation, in this context, means the wise and efficient use of energy. It means stretching out a given unit of energy, making it do more. It does not mean doing with less. It doesn't mean lower thermostats, long underwear or sweltering summertime indoor temperatures.

The Council study, which assessed the success the region has had in obtaining electricity from conservation and in laying the groundwork to tap into additional conservation kilowatt-hours, reveals that the Pacific Northwest has spent \$1.1 billion on a variety of conservation efforts since 1978.

Of that total, some \$805 million bought nearly 350 megawatts of power, at an average cost of 1.8 cents a kilowatt-hour. That saved the region \$1.3 billion over the cost of obtaining the same amount of power from a new coal plant.

The rest of conservation spending during the past decade went toward research, demonstration and evaluation projects and other efforts that improved the region's ability to acquire conservation-related power.

The Bonneville Power Administration's share of these conservation

outlays was \$685 million. Investor-owned utilities in the Pacific Northwest spent \$330 million, while three public utilities in Washington state kicked in another \$90 million.

But that spending has scratched only the surface of how much power may be available from conservation at competitive, reasonable prices. And as the region's surplus of electricity—which stood at 2,500 megawatts in 1986 and which, according to recent projections by Council analysts, could fall to between 400 megawatts and 800 megawatts in the 1989-90 operating year—shrinks, conservation looms as the quickest, least costly and most environmentally compatible way to meet the Northwest's growing energy demand.



If the Northwest's economy and energy demand grow at a high pace over the next 20 years, the Council estimates the region could obtain almost 2,540 megawatts from conservation measures, at 2.4 cents a kilowatt-hour. That is enough energy to supply four cities the size of Portland, Oregon, at less than half the cost of power from new, coal-fired electric plants.

In 1983 and 1986, the Council drafted power plans that laid out energy resource blueprints for the Northwest. Those plans called on Bonneville and the region's public and investor-owned utilities to treat conservation as a resource just like traditional central-station generation. Kilowatt-hours obtained through conservation measures are just as useful and reliable as ones from new power facilities, the Council pointed out. But conservation's advantage is that it can be brought on-line more quickly and can match growth in energy demand more closely than expensive power from new central-station plants.

The Northwest's utility community has given conservation greater stature as a result of those plans, helping to make the region in the 1980s a recognized national and international leader in least-cost planning and conservation resource assessment.

However, the region still falls short of being able to acquire all the cost-effective power available from conservation steps, according to the study. Only after it has built the conservation framework, meaning a capability to plug into all cost-effec-

tive energy savings, can the Pacific Northwest treat conservation as a true — rather than potential — resource.

Much of the responsibility to pursue conservation falls on the shoulders of Bonneville, the federal agency that is the main marketer of electricity in the region and the primary implementor of the Council's programs.

In the past, the Council has urged Bonneville to pursue a range of energy conservation efforts that would build capability in all sectors of the region's economy. The Council also has urged Bonneville to direct conservation spending toward resource opportunities that it otherwise would lose, such as energy savings that can be obtained economically only when buildings are under construction, not through retrofit efforts after they've been built.

"In our view, Bonneville needs to develop a long-term strategy for acquiring conservation," said Tom Trulove, Council chairman, in recent testimony before the U.S. Senate and House Appropriations Subcommittee on Energy and Water Development. "Bonneville should plan for adequate funding and staff to acquire otherwise lost opportunity resources and build capability to operate conservation programs in all sectors. There is a need to design and implement pilot programs to gain experience in and devise long-term plans for acquisition of conservation in the commercial and industrial sectors."

Those efforts have met with mixed results. Bonneville has had steady success encouraging builders to construct energy-efficient new homes over the past five years, the Council study points out. Since 1984, Bonneville has spent more than \$80 million to promote the Council's model conservation building standards for new homes. In that period, a little more than 15,000 single-family and multifamily dwellings throughout the Northwest have been built to those standards. That translates into an 11-percent share of the electrically heated housing market for energy-efficient homes.

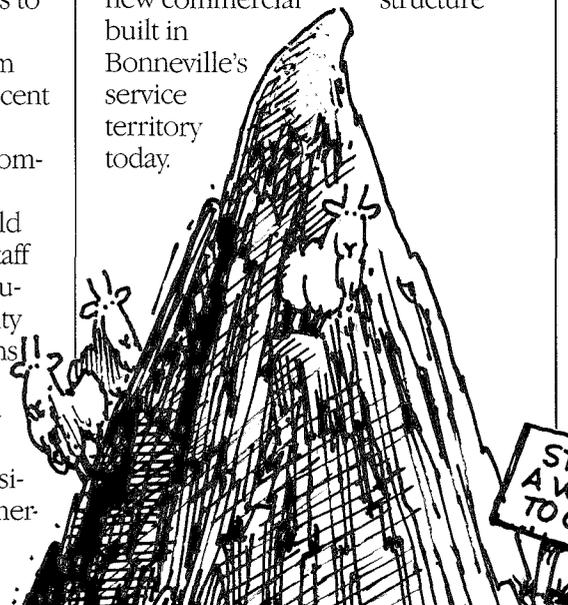
However, Bonneville has met with less success in the commercial and industrial sectors. For both new and existing commercial and industrial buildings, Bonneville's conservation programs are still in their infancy. As a result, opportunities to save energy are lost in nearly every new commercial structure built in Bonneville's service territory today.

In addition, the Council study notes that, as a group, investor-owned utilities in the region are less prepared than Bonneville to acquire conservation, especially from commercial and industrial customers. All six investor-owned utilities in the region run programs that encourage energy-efficient new residential construction. But they don't have the same kind of programs for commercial buildings, which means that new construction in that sector of their business isn't as energy-efficient as it could be.

"Six years after the first power plan, we still don't have the capability to confidently acquire all the conservation available in the Northwest," notes Ed Sheets, the Council's executive director. "We still need more information to tell us what works and what doesn't work on the industrial and commercial side. We need a higher success rate in capturing lost opportunities like the model conservation standards."

Sheets notes that the Northwest's electricity surplus has lulled Bonneville and the region's utilities into not aggressively pursuing all cost-effective electricity savings. But with the surplus shrinking, utilities may have to intensify programs to capture not only energy savings in new construction, but also in existing structures through retrofit efforts. "Utilities may need to implement these discretionary conservation programs in the near future."

Further efforts to pursue energy savings would have to build on the progress the region has made over the past eight



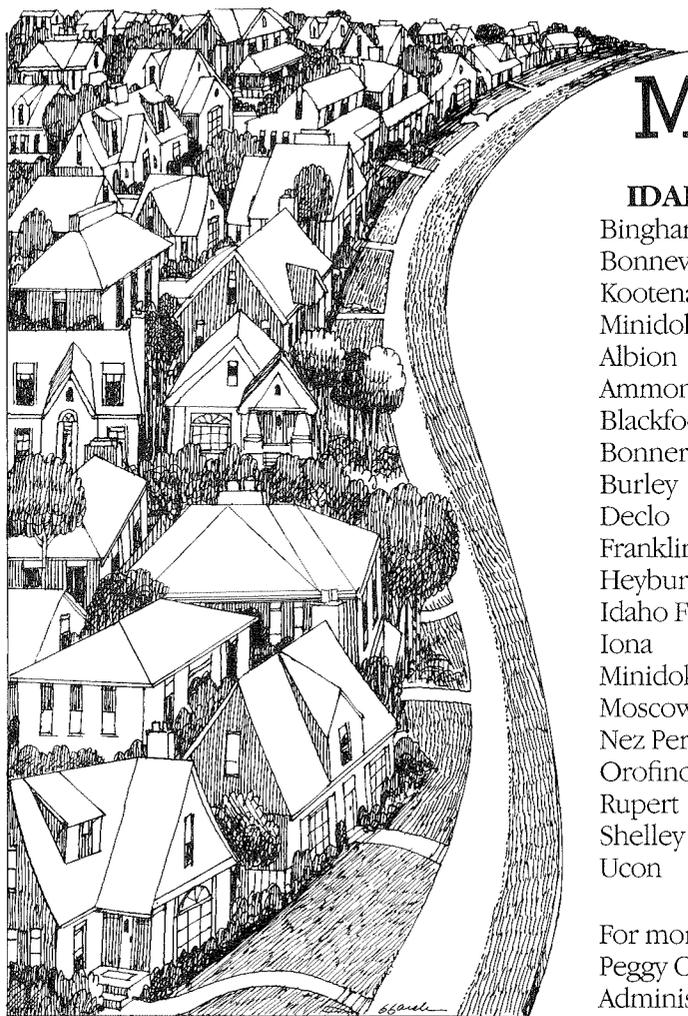
years. Here are some significant milestones to date:

- Forty-five local government jurisdictions have adopted the Council's model conservation standards into their building codes. The standards, drafted by the Council in 1983, establish energy-efficiency levels for new buildings throughout the Northwest.
- Thousands of builders and contractors have attended training sessions on the model conservation standards offered by state energy offices.
- Super Good Cents marketing programs for houses built to the model standards are operated by 109 public utilities and five investor-owned utilities. The other investor-owned utility in the region runs a program whose energy savings equals the Super Good Cents program.

- Bonneville is continuing the Blue Clue Program, a consumer-education effort that labels efficient refrigerators and freezers for prospective buyers.
- Bonneville's Energy Edge Program for new, extremely efficient commercial buildings is recognized as a national model. The program helped building owners and contractors design and pay for features that made 29 buildings in the Northwest super energy-efficient. The program demonstrates the feasibility of exceeding the Council's model conservation standards for commercial structures by at least 30 percent.
- Bonneville has offered the Smart Design Assistance Program for new commercial buildings. The program reviews building plans and recommends design changes to improve energy efficiency.

- Bonneville is helping six public utilities refine their commercial retrofit efforts. These efforts have made energy-efficiency improvements to more than 200 existing buildings.
- The Northwest's 10 aluminum smelters participate in Bonneville's aluminum smelter conservation/modernization program. The program saved 54 megawatts during its first year, and Bonneville estimates the industry's electricity demand could drop by 280 megawatts by the turn of the century.

"There is a lot of good news the region can take credit for," says Ed Sheets. "We've done a lot, we're a national leader in conservation. But more work needs to be done, especially in commercial and industrial conservation." ■



MCS Early Adopters

IDAHO

Bingham County
 Bonneville County
 Kootenai County
 Minidoka County
 Albion
 Ammon
 Blackfoot
 Bonners Ferry
 Burley
 Declo
 Franklin
 Heyburn
 Idaho Falls
 Iona
 Minidoka
 Moscow
 Nez Perce Indian Tribe
 Orofino
 Rupert
 Shelley
 Ucon

MONTANA

Missoula

WASHINGTON

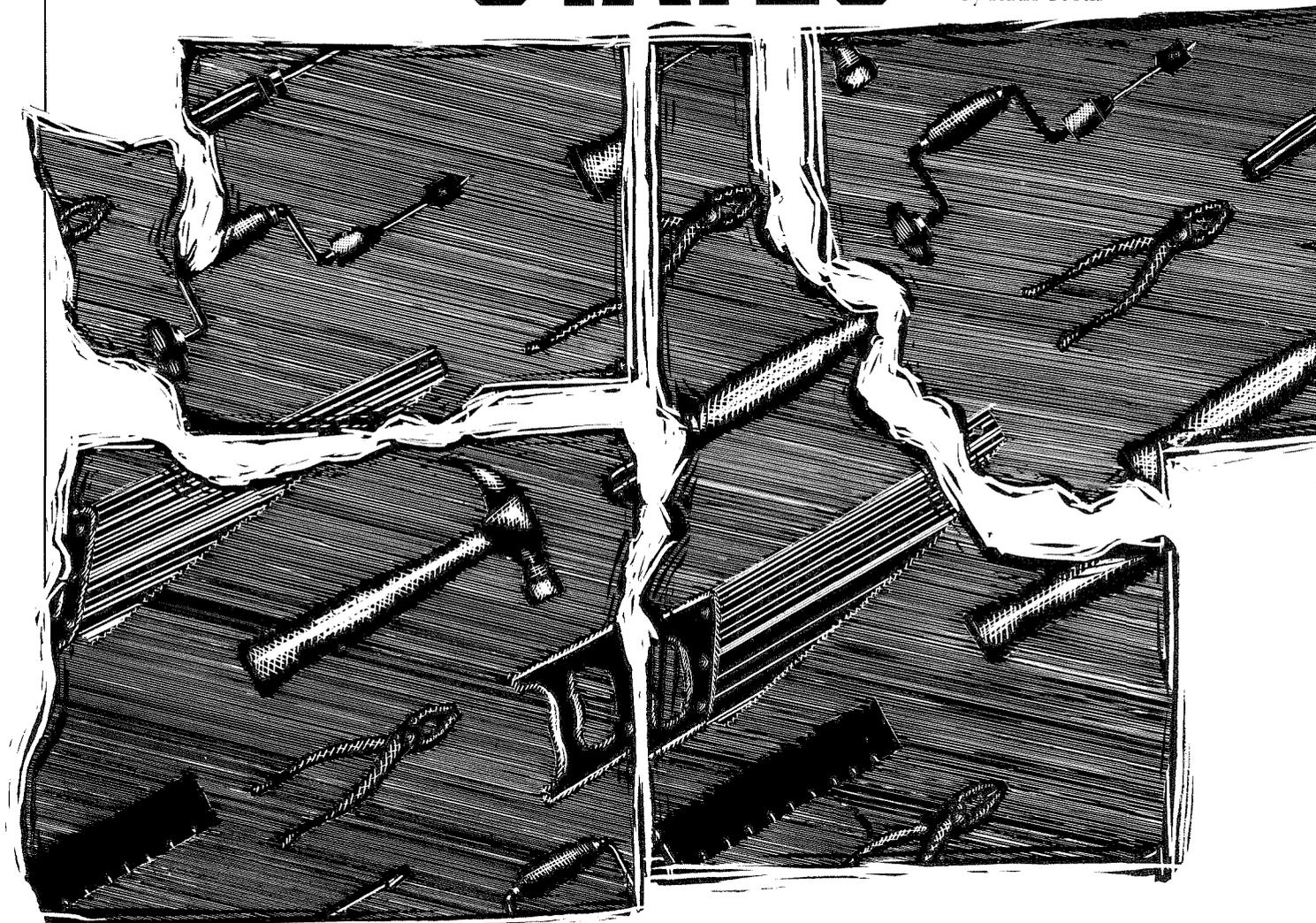
Columbia County
 Ferry County
 Franklin County
 Pend Oreille County
 Spokane County
 Blaine
 Cathlamet
 Cheney
 Cusick
 Elma
 Fife
 Fircrest
 Grand Coulee
 Ione
 McCleary
 Metaline Falls
 Milton
 Newport
 Pullman
 Republic
 Spokane
 Stanwood
 Tacoma

For more information: Contact
 Peggy Crossman, Bonneville Power
 Administration, 503-230-7516. ■

Compiled by Judi Hertz

ALTERED STATES

by Ruth Curtis



Northwest states and utilities take different paths to energy efficiency.

The idea of model conservation standards was conceived to help the Northwest postpone building new power plants for as long as possible. Originally, Congress and the Northwest Power Planning Council both assumed these standards for increased energy effi-

ciency would be assimilated quickly into the region's building codes. But this is not a homogenous region, where building codes apply universally. As a result, a number of different paths have emerged for achieving the same energy savings regionwide codes could have accomplished.

In 45 counties and cities, a building code version of the standards, called the Northwest Energy Code, has been adopted. In other areas, some utilities require that new homes meet the model conservation standards as a requirement for electric service hook-up.

The emphasis elsewhere is on a new home marketing program, called Super Good Cents, offered through utilities by the Bonneville Power Administration. The program is stimulating consumer demand for energy-efficient homes and helping builders learn the special construction techniques required to make homes substantially less expensive to heat and cool. A few utilities designed their own promotional programs to steer their new residential customers toward homes that use a minimum of electricity.

Each Northwest state is choosing for itself just how these elements fit together to realize the electrical energy savings provided by model conservation standards. Below is a summary of the direction each state is currently taking.

Idaho

Idaho has the most variety among the Northwest states when it comes to energy codes. There is a state energy code, but it is used only as a guideline for local governments. They may enforce the state code, modify it or ignore it entirely. Last year, a survey done by the energy division of the Idaho Department of Water Resources concluded that this "guideline" approach resulted in a hodgepodge of codes and enforcement.

Some jurisdictions use the current Uniform Building Code;¹ some use an older version (as much as 10 or 15 years old) and some have no code at all (largely because they lack the funds, staff or training necessary to enforce it). While approximately 90 percent of the population is covered by some type of building code, only 25 percent is covered by an energy code (in most cases the Northwest Energy Code).

All of Oregon's utilities are participating in the Super Good Cents marketing program.

Throughout Idaho, 21 cities and counties have chosen to adopt the Northwest Energy Code. Three of these use the code as an electricity hook-up requirement for new homes.

The state energy code may be updated possibly to Northwest Energy Code levels during Idaho's next legislative session. This summer, an interim legislative committee is meeting to study energy-efficiency standards and indoor air quality standards. This committee may develop draft legislation to be considered during next year's session. The Idaho office of the Northwest Power Planning Council is providing technical expertise to the committee.

Despite this emphasis on adopting codes, marketing programs have not been neglected in Idaho. The state's largest utility, Idaho Power Company, offers an equivalent program called "Good Cents," while all the other utilities offer the Super Good Cents program.

Montana

In Montana, the focus of the model conservation standards effort is on voluntary compliance through marketing programs. That these programs are having an effect is demonstrated by a recent survey conducted by the state. It showed

¹The Uniform Building Code is developed by the International Conference of Building Officials and is revised in approximately three-year intervals. The Uniform Building Code is the closest the United States comes to a national building code, as it is the basis for many building codes used in this country.

that building practices have moved significantly toward energy-efficient houses in the past few years. Most builders now build to efficiency levels set by the Department of Housing and Urban Development. Many are going beyond this level by incorporating some of the model conservation standards' components.

According to Montana's law, the state energy code is what the building industry calls "a minimum/maximum standard," meaning that cities and counties cannot adopt codes that are more or less strict than the state's. However, they can choose not to enforce the code at all. If a local government wants to adopt a different code, it must prove that it is suffering a hardship and request a variance from the state. Only one city in Montana — Missoula — has adopted the Northwest Energy Code through this process.

In January, the Northwest Energy Code was proposed by the Montana Department of Commerce (which administers the state's codes) as an optional code for local governments to follow if they desire. This proposal is still under consideration.

Oregon

Like Montana, Oregon has a minimum/maximum state building code, and local governments cannot adopt their own codes. The state code is reviewed and updated in a regular three-year administrative process (timed to keep the code consistent with the review cycle of the Uniform Building Code).

In 1986, Oregon substantially tightened the energy-efficiency part of its code to be about 60 percent of the level of the model conservation standards. This year, the state is con-

sidering tightening the code further.

Three parties are involved in this review process: the Building Code Agency, the Structural Code Advisory Board and the Energy Conservation Board, which was established by the legislature in the late 1970s to oversee development and implementation of a statewide energy code.

These parties are currently studying the state's energy code to determine if the costs and savings potential make it cost-effective to increase its energy-efficiency levels (possibly to a level comparable to the Northwest Energy Code). They are expected to develop a proposal to adopt all or portions of the Northwest Energy Code in Oregon. These changes would go into effect in 1992.

On the commercial side, Oregon has a building code taking effect this year that is equivalent to the current model conservation standards for commercial buildings.

As of this summer, all of Oregon's utilities are participating in the Super Good Cents marketing program. Portland General Electric had offered an approved equivalent program, called Good Cents, but recently switched to Bonneville's program.

Washington

Washington has been the Northwest's leader in adopting model conservation standards. The city of Tacoma was the first jurisdiction to require that new buildings be built to the standards. Twenty-three cities and counties in Washington now require that new electrically heated homes meet these standards. Seattle adopted an energy code that garners equivalent energy savings.

Washington has been the Northwest's leader in adopting model conservation standards.

In 1986, the Washington state legislature adopted a Washington state energy code that went 60 percent of the way toward the model conservation standards (slightly higher than Oregon's code). This year, the legislature considered a measure to adopt the full standards. The measure would have replaced Washington's patchwork quilt of different local codes with a single statewide residential building code. But that measure failed to reach the full Senate in the state's regular or special legislative sessions.

The bill, which in March passed the Washington House on a 96 to 0 vote, was supported by a broad range of building industry interests. In addition to Washington Governor Booth Gardner, the Washington State Energy Office, the Bonneville Power Administration and the Council, the bill was supported by an array of public and investor-owned utilities, natural gas companies, homebuilders, developers and local governments.

That coalition may re-introduce the bill during the next session of the Legislature or support a voter initiative on the issue later this year. "The potential energy savings are too important," said Tom Trulove, Council chairman and one of Washington's two representatives on the four-state body. "We've got to keep the pressure on."

On the marketing side, Washington has a variety of activities. The fastest growing part of the Northwest is the Puget Sound area — the area served by the Snohomish Public Utility District, Puget Sound Power and Light Company and Seattle City Light. Snohomish participates in the Super Good Cents program, and Puget has an equivalent program called "Comfort Plus." Half of all the new building starts in the Northwest occur in these utilities' territories, so their programs are the largest contributors to regional savings from the model conservation standards. ■

Dulcy Mahar Interview with

DOUG SUTHERLAND

Tacoma's mayor recalls the first years of life after model conservation standards.

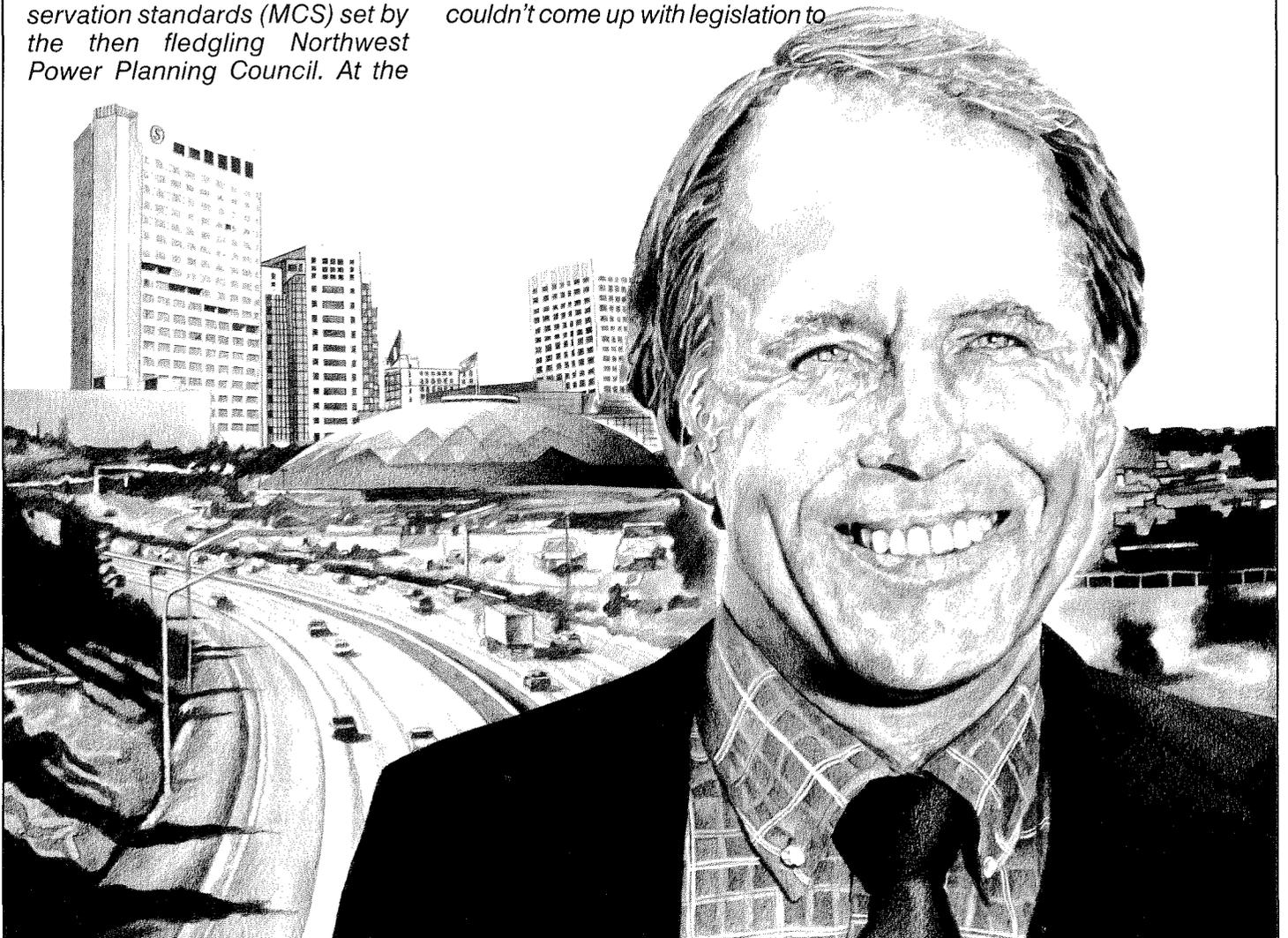
Five years ago, the city of Tacoma took an extraordinary step. It adopted the toughest energy code for new construction in the Northwest. It was very likely one of the toughest codes in the United States.

This new code met model conservation standards (MCS) set by the then fledgling Northwest Power Planning Council. At the

time, predictions ran the gamut from "... it's political suicide" to "... by 1990, everyone will have adopted the standards." So far, neither has turned out to be quite true.

Five years later, the state of Washington came close, but still couldn't come up with legislation to

bring statewide building codes up to the standards. On the other hand, Doug Sutherland, who was mayor and leader of the city council that adopted Tacoma's standards, still is mayor.



Tacoma, Washington's third largest city, with a population of 170,000, lies a half-hour's drive south of Seattle. Principally a port city that still has plenty of room for expansion, Tacoma also has a significant industrial base—chemicals, aluminum, pulp and paper, and oil refineries.

Interestingly, five years ago Tacoma had some of the lowest electricity rates in the region, and it still does. The city and surrounding Pierce County, which includes Fort Lewis and McChord Air Force Base, is served by a municipal utility, Tacoma City Light. Of the utility's 110,000 customers, 100,000 are residential. About half the city's power is self-generated by six dams, a share of the Centralia coal plant, and a soon-to-be steam plant. The rest is purchased from the Bonneville Power Administration.

For many, the symbol of Tacoma is its famous dome, the world's largest wooden-domed arena. Used for both regional sports and entertainment events, it's an apt symbol, because its construction coincided with a renaissance for the city. In the 1960s and '70s, Tacoma fell on hard times, a victim of what Rainier National Bank calls the "urban flight which afflicted many American cities."

Around the mid-'70s, Sutherland, then a local contractor, got interested in politics. "Like a lot of things, you get ticked off about something, and you decide those people are not taking care of your best interests, and somebody should go talk to them," Sutherland says. He started by becoming involved in the local Chamber of Commerce, "trying to set it up so the Chamber was more prepared to work with the city and be able to influence some of the decisions, or at least make the staff and the council understand the implications and impacts their decisions were having on small business and industry in and around the city of Tacoma."

Sutherland ended up running for and being elected to the city council in 1980. In 1982, he was elected mayor. He doesn't take sole credit for Tacoma's pioneering effort with the model conservation standards, but he was the most visible leader and continues to use that visibility by speaking about Tacoma's experience and sharing the city's expertise with others considering such a move.

Obviously, Tacoma's bold move did not mean political suicide for him.

Q. Five years ago, you took what was then a pretty radical step, becoming the first city in the Northwest to adopt these stringent energy codes. Why Tacoma? How did that start?

Actually it started even earlier than that, when the legislation [Northwest Power Act] was finalized at the federal level. When Chuck Collins and Dan Evans were appointed as the [Washington] representatives to the Northwest Power Planning Council, we started to look at what this was really going to do, and wondered how do we start developing the plan.

We were actually involved in working with them and trying to help them develop the plan. We were involved in lobbying [the Act] as well. So it wasn't like a bolt out of the blue. It was something we had done some prior work on, even before the plan was in place and conservation was an element of it. What was surprising, however, was that the city did move as fast as it did. We began considerations in June of 1983.

Quite frankly, it was Barbara Bichsel, the only woman member on our [city] council, who was absolutely adamant that we were going to initiate this conservation effort. She was one of the few people then who was not enamored of nuclear power in any way, shape or form, and this to her was an alternative to the use of nuclear power. Barbara has a unique way of convincing people.

It was a blast! It was very frustrating. It drove some of our staff nuts ... It was far more successful than any of us envisioned it to be.

We began the energy code deliberations and discussions, and there were some folks on staff who swallowed hard and said "maybe." And off we went. We had a lot of debate on the issue itself, the merits of it, whether or not we should enter into this thing, did anybody really know what the hell we were talking about, was this one of those terrible things that "Big Brother Government" was going to lay upon its constituents—all of those usual arguments.

But on the council, the discussion wasn't so much whether or not; the discussion was how soon. Because it was such a significant departure from the norm, we had to try to put into place an educated staff, ready to begin in June 1984. This gave them basically six months to have the program developed, the staff trained and the changes in our building code.

To some degree, the people who testified before us who said we didn't know what we were doing were right. There were a lot of details that had to be put in place.

The staff, however, really responded to the challenge. By the time it became part of the laws of the city of Tacoma, we were, I think, about as well prepared as we could be. Still, there were a lot of things that happened subsequent to the first of June 1984 that surprised a lot of us. By "us," I mean not only the city and myself as an elected official, but also members of our [Tacoma City] Light Division, members of our Washington State Legislature, the Washington State Energy Office, the Northwest Power Planning Council and Bonneville—of all folks.

Jake Fey, the utility's energy conservation manager, was now on staff and up to his hairline. He was working with the Bonneville folks, trying to put some kind of understanding in place. In order to make it work, there had to be a strong understanding between the city and Bonneville as to what contractually we were both obligating ourselves to do.

Q. Why Tacoma? Did you have special electricity needs?

No, more than anything else, it was that the city of Tacoma was large enough to have the resources, such as personnel and relatively sophisticated systems already in place both in public works and in the utility, to define pretty well how our enforcement was going to work in the service area.

We also had a strong sense of direction from the elected body, because the new code passed 7 to 2. Considering the controversy involved, that was a strong indication that the council was committed to pursuing this conservation code. Tacoma was unique in its willingness and desire to put the code into place. There were a number of both elected and other officials who were stubborn enough to make the model standards work.

Q. Looking back over the past five years, how do you feel about your pioneering effort? Would you do it again?

It was a blast! It was very frustrating, but I think we had a lot of fun with it. I enjoyed the whole exercise a great deal more than I had anticipated. It drove some of our staff nuts, because there were some bumps in the road that we didn't know were going to be there. It took us a little longer to get community and industry acceptance than we had thought. But at the same time, as soon as we were able to develop the market for the standards, the industry responded extraordinarily well, not just the home builders, but the supply industry.

These homes are not as expensive as they thought they would be, and the quality is substantially greater.

I think we did more education than people expected us to do. I can remember bringing people into the offices here and spending hours with them on computer programs, trying to show them how the alternatives could work and how a few relatively minor changes in the building plan could make substantial compliance with the standards.

I'm particularly pleased with Milgard Manufacturing, for example, because they've started a whole new product line as a result of our efforts with the model conservation standards. They construct windows that actually enhance buildings. These are bigger than a postage stamp, and yet they comply with the model conservation standards. This is the kind of unexpected thing that happened that was delightful.

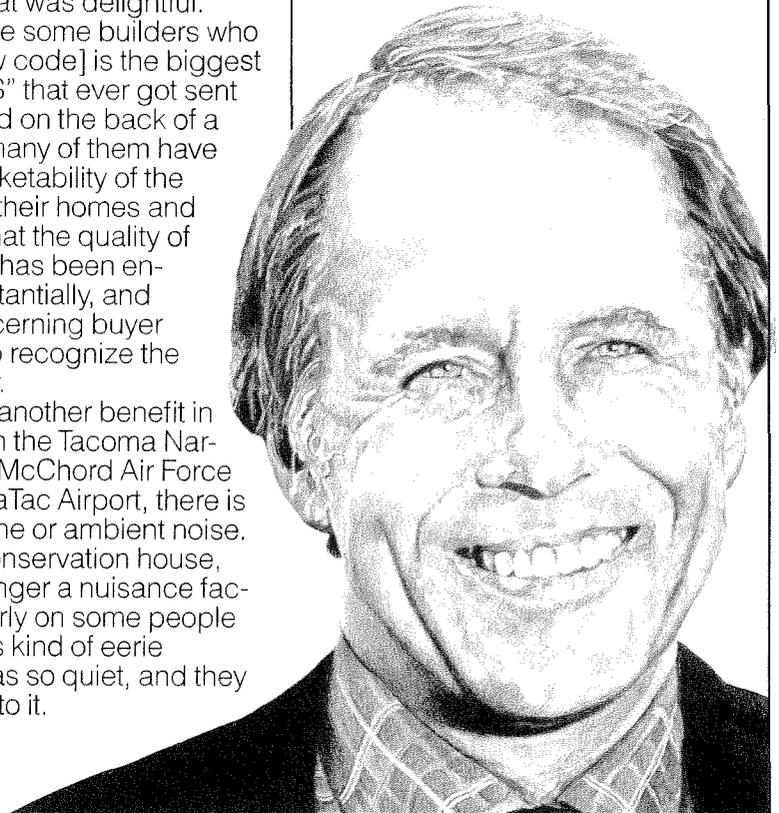
We still have some builders who think [the new code] is the biggest bundle of "BS" that ever got sent down the road on the back of a wagon. But many of them have used the marketability of the standards in their homes and have found that the quality of their product has been enhanced substantially, and there is a discerning buyer who is able to recognize the higher quality.

There was another benefit in this area. With the Tacoma Narrows Airport, McChord Air Force Base and SeaTac Airport, there is a lot of airborne or ambient noise. In a model conservation house, noise is no longer a nuisance factor. In fact, early on some people thought it was kind of eerie because it was so quiet, and they weren't used to it.

Of course there were the early bugaboos that drove all of us nuts—you know, the plastic wrap, the malfunctioning heat exchangers and some really weird outcomes of the way people interpreted the rules. There were some war stories.

Now we can sit back and laugh like crazy about them. Now that people have been able to interpret what we did and to work the rules, they find that, number one, these homes are not as expensive as they thought they would be; and number two, the quality is substantially greater.

There are benefits other than just the conservation of energy, the lower cost of energy and the saving of new resource construction for additional energy. The outcome has enabled us to prove that, in many regards, the model conservation standards made the kind of sense that we thought it would in the first place. In my opinion, it has been far more successful than any of us envisioned it to be.



A set of standards helps make sure the best quality product is still there at the least cost.

Q. What were some of the biggest problems in implementing the standards when you had no precedent to go by?

I think the biggest problem we had was making sure that our inspectors were able to work the problems on the spot and out in the field.

From a technical standpoint, not only in the city of Tacoma, but also in others that adopted early on, the problem of having on-site inspection working with builders was always a difficult bugaboo. Bonneville had indicated a willingness to help underwrite some of those extraordinary costs, and it became apparent right away that you could spend a lot of time and a lot of money in that venue, and it was really difficult to discern immediate benefit. Of course we were trying to relate all expenditures to immediate benefit as much as we could.

Q. What advice would you offer other adopters?

Education, education, education! There is a lot of experience now in the marketplace, both from a regulatory standpoint, as well as a builder and supplier standpoint. So I would strongly recommend that new adopters spend time with those with experience. There are a lot of people now who are more than willing to take time out of their otherwise busy days to spend quality time with people, because many in the industry, and I mean that in the broadest sense, are convinced of the merits of the program.

Q. Was Bonneville's assistance valuable, and was it sufficient?

Bonneville was really in a very

awkward position. They didn't know what they were wrestling with. They had no idea what the total cost would be, and one of the early hang ups was that they wanted us to give them a total cost. There was no way we could do that, so we got hung up on trying to figure out dollar equivalents to individual aspects of the code.

What finally happened was that staff reached the level of frustration where they really couldn't get anywhere. So I went down with them to talk to Bonneville. Together we went through the drill of all of the items individually that Bonneville staff and our staff had been exploring as a way to compute this thing. After listening for about three hours, I finally said, "We're going at this thing wrong. Why don't you tell us how much you're willing to spend, and we'll tell you how we'll spend it, and we'll do it on a per-unit basis. We'll tell you how many single-family and how many multifamily units we have."

Well they didn't want to talk about multifamily in the first year, or at least not in the first six months. So we were trying to give them an estimate of the total number of units, and they would tell us what they would be willing to spend. Instead of trying to sort the details, we established the boundaries, if you will, on a rather circumspect approach, and then promised to keep in close contact. Basically we came back and wrote the spending rules, and they set the parameters.

Then the arguments began as to how do you amend the contract to recognize the experiences we were having. We worked for about eight months and found that we were doing all right. As a matter of fact, we were doing a little better than we had anticipated. So Bonneville understandably got nervous that we were going to develop a program and completely use their budget for the whole four-state region in the city of Tacoma. That got a little testy for a while until we were able to work our way through that.

We were also contracting with them to make available educational services for other jurisdictions, based on the data from our

experience. We got into some interesting discussions with Bonneville, and every once in a while I would go back down to Portland. Finally, it got to the point where Bonneville staff said "Oh God, Jake, don't bring him down again."

I have got to admit very candidly that staff at Bonneville were marvelous to work with. They negotiated hard, and so did we. Each of us was trying to resolve not only the basic philosophical questions and the direction that had been put in place by the Power Council, but Bonneville was also trying to respond to a significant financial crunch. In trying to make the program work to maximize its capabilities and minimize its expense, we entered into some very interesting discussions. I think they did their job very well, and so did our people.

Q. Did you have any political repercussions as a result of adopting the new code?

Yes and no. Not nearly as many as I had thought. Initially there were some significant political repercussions, but I think as time goes on, the program has proven that it isn't the terrible thing many had envisioned it to be. We have been able to show there is a learning curve involved.

The overall cost, not only to the industry but eventually to the buyer, has not had a discernible impact on the sale of single-family homes. The marketability of the product also has been substantially better than many had anticipated. So the political ramifications tended to fall by the wayside and dissipate in time.

There is still some residue of that, however, and you can see it in the latest exercise in the state Legislature, which rejected model conservation standards on a statewide basis. So there is still the need to make sure people have factual data to get over some of the emotional issues involved.

Now, as a general contractor myself, there is nothing I hate more than having some bureaucrat tell me what I can and can't do as far as building something. I'm the "expert." I'm the one responsible for it. I know how it can go together, and I try to put

together what I consider a quality product at the least cost and still be able to make a decent profit and be competitive in the marketplace.

But at the same time, sitting as an elected official on the other side of it, I can understand the need to have some sort of regulatory approach that gives consistency in the marketplace. Just because I'm a good contractor doesn't mean the next guy is. The marketplace isn't always able to discern the difference between the good and the bad before the product is completed. So a set of standards helps substantially in making sure that the best quality product is still there at the least cost.

Q. Were there any distinctions between the implementation of commercial vs. residential codes? Was one considerably more difficult than the other?

From my perspective it wasn't. It was more difficult to get the industry to understand what we

were trying to accomplish—that we weren't putting door manufacturers out of business, for example.

Q. Are there any big things you would have done differently?

Yeah, I think that the six months we took to prepare to put [new codes] into place was too short. I felt that way beforehand, and I think additional time would have been fruitful.

Q. Have you had much consumer reaction?

Most of the consumer reaction has been very favorable, which is one of the reasons why the overall marketability of the finished product has been as successful as it has. The public has discerned it to be a beneficial change.

Q. During the time the standards have been implemented, what kind of building activity has been taking place in Tacoma?

We've built over 1,600 single-family units, 5,000 multifamily units and 1,500 other related projects.

Q. So you really are a substantial test case.

Right. It gives us a pretty good baseline to work from and to be able to develop factual information relative to it.

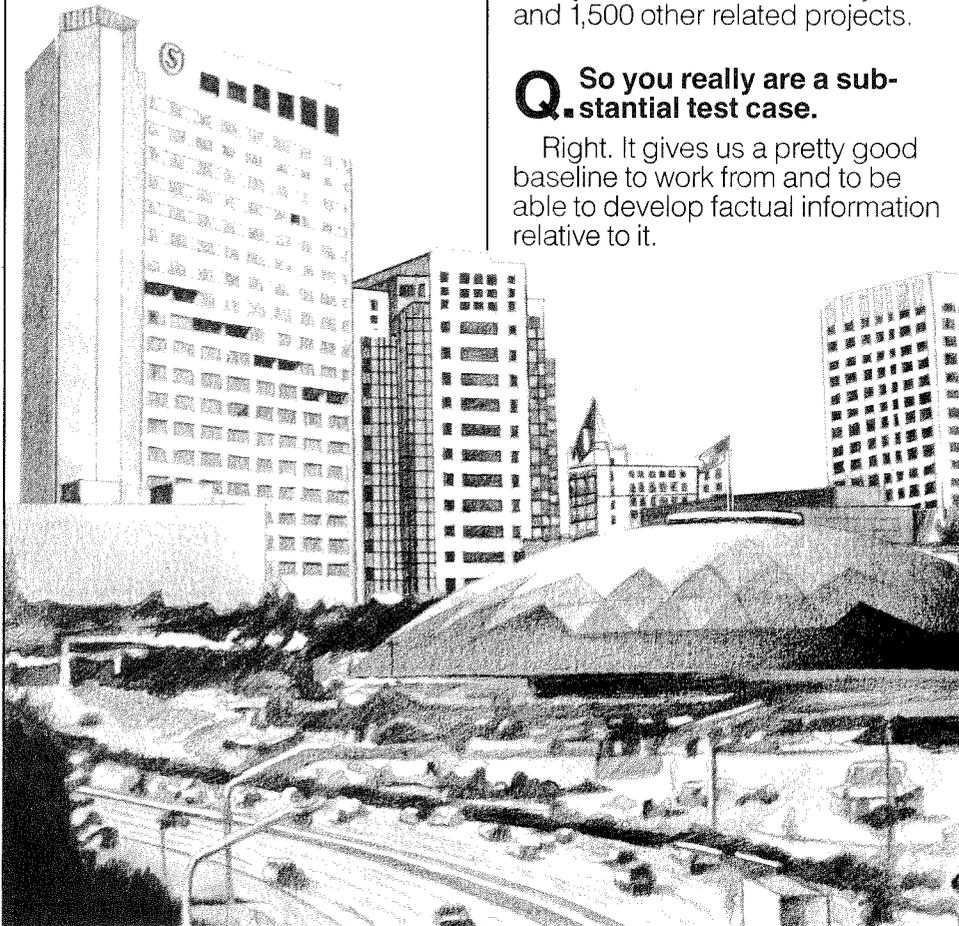
Q. I didn't realize multifamily was such a big portion of the market.

Neither did we. If we had told Bonneville at the very beginning how many units were going to be built using these standards and their support, I don't think we ever would have been able to sign the first contract. It seems to me we said something like 30 or 40 multifamily or 120 single-family houses in the first year.

Q. Has any interesting new data turned up? In the beginning, the Power Council was working a lot off computer models and estimates. Have you found they were on or off target?

We did our own analysis on both single-family and multifamily dwellings, and the results came in consistent with the Power Council and the State Energy Office's demonstration program in terms of savings.

On the cost side, the natural thing happened. The builders figured out what were the most economical ways to comply. For example, there has been a development in terms of windows. They were doing double-glazed windows with storms, and they moved to triple-glazed, many builders have now gone to "low-e" glass to cut heat loss further. There has been an evolution in terms of trading off window area for the type of window.



So they've figured things out themselves, as any good business person would do, for what is the most economical way to provide attractive housing. Originally, most people came in under the prescriptive requirements, and now we don't see very much of that.

I also think there has been a significant improvement in working relationships between architects and builders. Both of them now are becoming substantially more skilled in dealing with the complexities of the trade-offs and are able to develop some very unusual homes that still comply with the standards.

Q. You've basically got a new city council now. If the code were up for reaffirmation, do you think it would pass?

It has every year. We still authorize city staff with general fund monies, and the energy office is still a part of our overall budget. Although we shifted it from general government to utilities, it is still reaffirmed every year. Our staff has shrunk somewhat, but that is not because of our commitment. Much of the early work was completed, and Bonneville insisted that additional projects we wanted to accomplish weren't necessary. They said, "We're not going to keep financing this huge Tacoma staff. You're getting to be as big as we are, and one of those animals is enough."

Q. The Council is currently working on a potential upgrade of its commercial standards. If the Council were to adopt tougher commercial building standards, do you think Tacoma would act on that?

We've been encouraging the Council to look at commercial standards for some time. Obviously, the argument has been to put the emphasis on our single-family and multifamily units, because that's where the greatest amount of benefit is going to come.

As a general contractor myself, there is nothing I hate more than having some bureaucrat tell me what I can and can't do ... but, sitting as an elected official on the other side, I can understand the need to have some consistency in the marketplace.

Commercial standards look to a variety of other kinds of savings, not only the construction, but what's inside it, what makes that commercial establishment function. So we need to look at what other ways we can save, and what other kinds of tradeoffs can be put into place — different kinds of motors, different kinds of air conditioning — a variety of issues other than just construction. Heating of the space could very well be the minimum expenditure of electrical power.

Now that we've got the experience in single-family and multifamily, commercial is obviously the next step, and I think there can be a substantial benefit. The other side of that is, you're going to have to develop some kind of incentive package for commercial users,

and it becomes very difficult to ensure a sense of fairness in those incentives.

Q. What is your prognosis for a regionwide energy code, despite the recent failure of the Washington legislation?

There is already one in place in Washington, even if it is not as strong as it could be. It needs to be strengthened. Oregon needs to duplicate the successes in our area. We're developing factual data that will help Oregon. Idaho and Montana have a long way to go, but based on what I've been hearing, they are making strong strides in developing their building codes.

If you begin and there isn't even a code, how do you get anybody to agree? If you think it is tough to tighten up an existing code, that is nothing compared to putting a code in in the first place. There is an incredibly disparate degree of understanding and capability.

Look at the state of Montana; there are nearly 500,000 inhabitants of the state. Half of the state is exempted from the standards and half of it isn't. You've got the problem of trying to answer why the people on the eastern side of the state have to do the same thing as the people on the western half of the state, when they are not even in the same system.

Q. You have been to a number of foreign countries. Have you seen growing interest in energy conservation elsewhere?

Conservation is entered into in significantly different ways. For example, in both Japan and Korea, their limited energy resources have forced them to be conservative in the first place. They didn't have this excess of power, such as we had when we were nearly giving it away.

I remember when I first moved to Seattle in 1960. We had electric heat in the house we rented, and the only way we could save money in the winter was to turn the electric heat full bore all summer long, with the doors and windows open. We had our heaters running in the summertime to use up the excess

electricity, so we could reduce our wintertime bills. It was stupid. That was the thinking here in the early 1960s. In the 1960s, many countries were in a crunch, because they didn't have those natural resources.

Now some of these countries are starting to look at us. Their building standards are changing with the influence of the western style of living.

Q. Is there anything that I haven't asked that you think would be relevant?

Yeah, what was the funniest thing that happened?

Q. OK, what was the funniest thing that happened?

After we started with the conservation standards, we indicated both to Bonneville and the Planning Council that we would be willing to go to other places to talk about our experience. I don't know

how many places I've been to talk to different folks about our experiences. Whenever I was asked, unless it was absolutely impossible, I always went. I really think it was and is important.

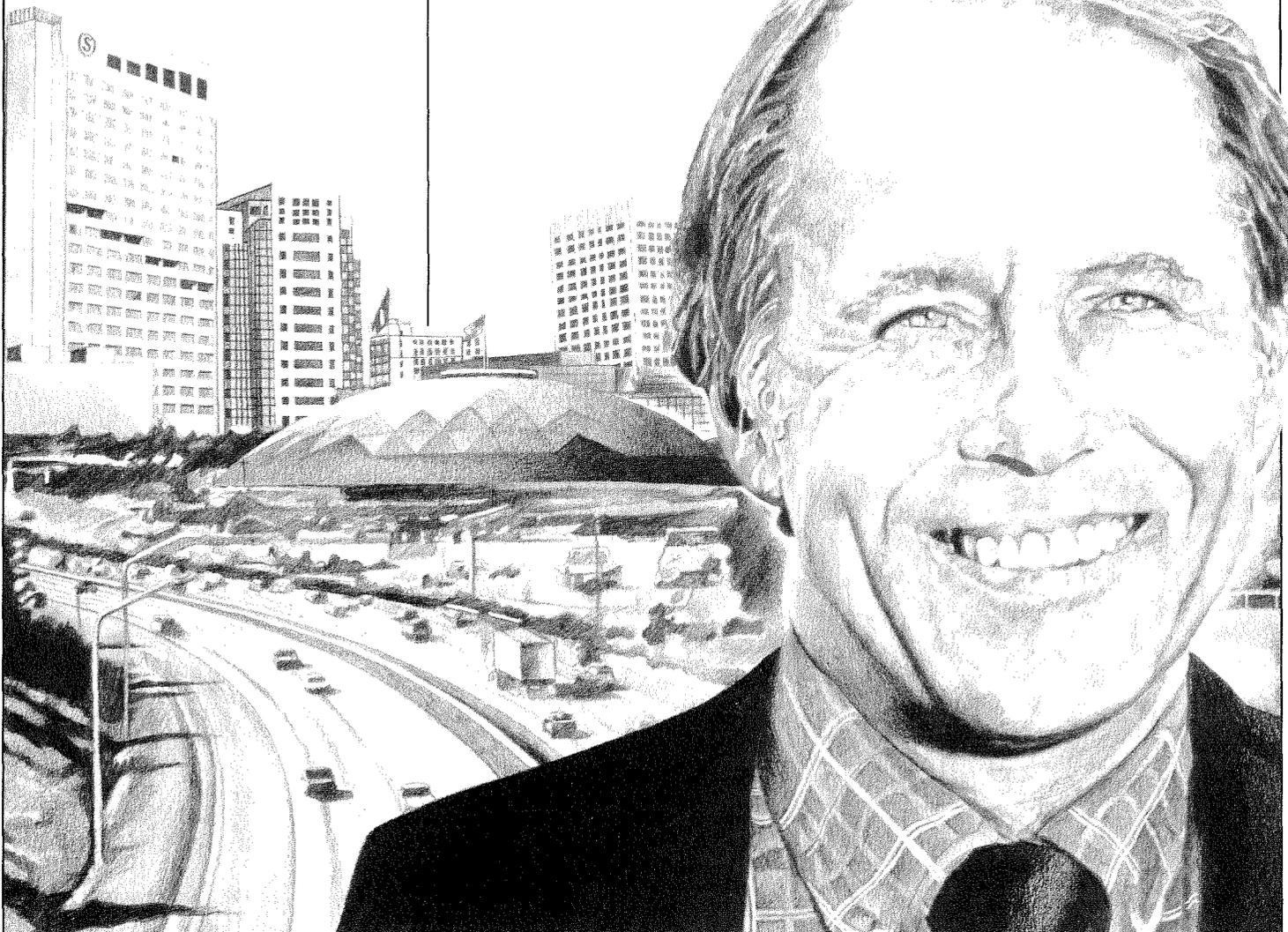
One of the first places I went was to Vancouver, Washington, to talk to the people there in Clark County about how and why MCS should be accepted. I got up and said, "It is really nice to be back home in Vancouver." That kind of made people feel warm and fuzzy because, gee whiz, this guy may be from up the road a ways, but he used to live here in Vancouver.

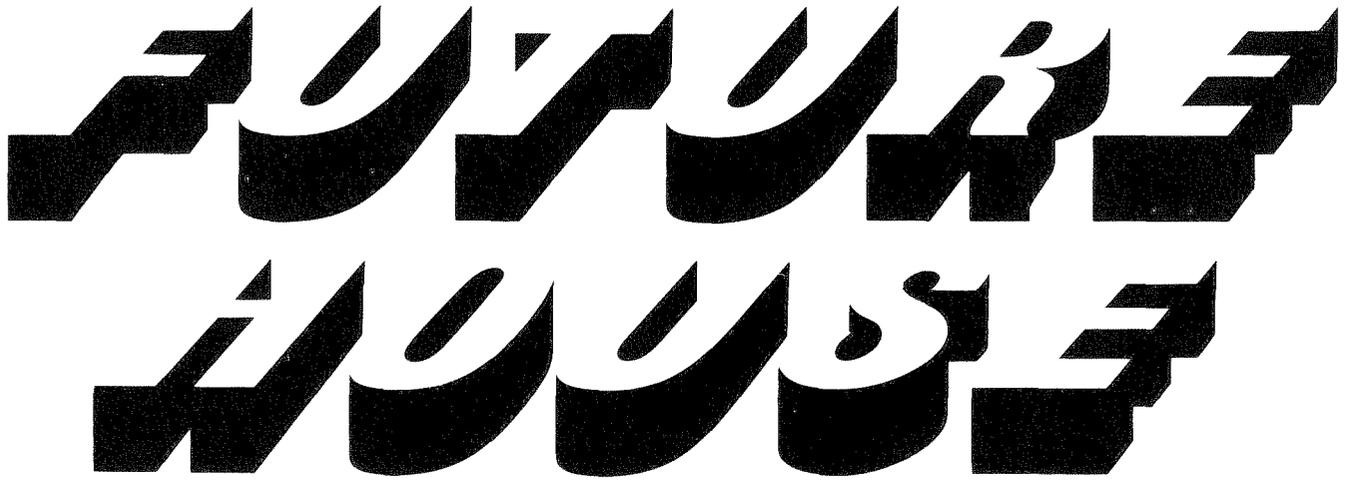
Then there was a big meeting in Spokane, and they asked me to come over and talk about our experiences. I went over to Spokane, and I said, "Gee, it's really great to be back here at home in Spokane," and that made people feel warm and fuzzy, because here is this guy from across

the mountains, but he's really from eastern Washington, and he isn't such a bad guy after all.

Then shortly after that they asked me if I would go over to Helena, Montana, and address them there. So I went over to Helena and got up in front of this group of folks and I said, "Gee, it is really great to be back home in Helena," and Jake fell off the chair and said, "God, where haven't you been?"

I was born in Helena, and during World War II I lived in Vancouver, while my father was in the Navy. After dad got back, we moved to Spokane, which is where I graduated from high school and went to school at Central Washington in Ellensburg. That's one place we haven't been yet. ■





Breathable walls, krypton/argon windows a superman fantasy or reality?

by Terri Wilner
Montana Office
Northwest Power Planning Council

Hi-tech building innovations are going on all over the region, but Montana's extremely cold climate challenges the best of them. Why then, would an energy-efficient home builder construct walls that are specifically designed to assist the outside air to filter through to the inside of the house?

Steve Loken, one of Montana's most progressive builders, believes that the "Fiberglass Canada" system, which includes the "breathable wall" design, an exhaust-air heat pump and other specific insulation products, is an elegant way to provide both the necessary ventilation and energy-efficient attributes in new homes.

Loken is an aficionado of the newest designs, products and methods when it comes to making Montana homes affordable to heat and healthy to live in. He came across the "Fiberglass Canada" system several years ago as a result of research published by the Canadian National Research Council. The idea

of using the walls or shell of the house as a component to both introduce and warm fresh air for ventilation made infinite sense to him. This innovative concept, combined with an exhaust-air heat pump to heat hot water, intrigued this Montana builder. Not long thereafter, Loken found a home buyer willing to incorporate these and other energy saving features into a new home.

Working from a "Sunterra" house plan (designed in Montana and distributed nationally), Loken conceived a new house design that included a variety of innovative energy saving features. His final plans were selected by the Bonneville Power Administration as part of a research program for residential energy-efficient construction. Loken's building scheme fit into the "Future House" category in the second cycle of Bonneville's Residential Construction Demonstration Project (RCDP).

In order to qualify as a Future House, the structure could use no more than 65 percent of the electric heat required for a standard Super Good Cents (the Bonneville-sponsored marketing program for energy-efficient homes) home. Through participation in this program, Loken was able to incorporate not only the "Fiberglass Canada" system, but introduce other novel energy saving features such as radiant, electric-cable floor heating, and "super" windows containing krypton and argon gases (R-8).

Breathable Walls

The "breathable" or "dynamic" wall system relies on the assumption that the house is under negative pressure. High-density fiberglass board, known as "Glassclad," is applied to the outside of the house, and fiberglass batts are installed in the stud cavities. The difference in pressure inside and outside the house causes outdoor air to move randomly through the sheathing material into the walls and stud



cavities. The sheathing diffuses, slows and tempers the air in the wall cavity. As the air moves to the interior side of the wall, it is warmed by recapturing some of the heat heading out through the walls. There is no vapor barrier to hinder air movement (except between the garage and the house, to prevent movement of carbon monoxide). Lap siding installed on the exterior of the building allows fresh air access to the walls.

Exhaust-Air Heat Pump

Loken was also interested in the pioneering aspects of the exhaust-air heat pump water heater. Since this Future House already included a method to bring fresh, outdoor air inside the home, a means was needed to exhaust the stale, indoor air to complete the ventilation cycle. This unique version of a heat pump captures the waste heat from air being exhausted from the home and uses it to heat domestic hot water and/or interior living space. Although it doesn't have the capacity to heat the entire house in the

winter, it can easily provide sufficient heat for western Montana's spring and fall seasons.

Radiant Electric-Cable Floor Panels

While radiant ceiling panels are familiar to many Montana builders, the floor version of this type of heating system was relatively unknown. Loken's installation method included lightweight cement used on both the ground and second floors to embed and protect the radiant cables. By installing the heating system in the floors rather than using conventional baseboard heaters, the homeowner has a more even heating system, with a potential to reduce system heating losses by up to 25 percent.

Super Windows

State-of-the-art windows add a significant feature in the energy efficiency of this Future House. The particular super window design installed in Loken's house consists of an extruded fiberglass window frame sandwiched with insulation;

two panes of glass coated on both sides of each pane to reduce heat loss and gain through the glass, and a mylar film suspended between them.

The air space is injected with a mix of krypton and argon gases, which are denser than air and less conductive to heat loss. Preliminary thermal scans reveal that these windows have an approximate R-8 insulation rating, compared to an R-2 rating for a typical double-pane window. The three layers of glazing make it somewhat difficult to see into the house; however, there is no noticeable effect from the inside looking out.

New concepts, materials and products are the hallmark of Loken's approach to building. This Future House has all state-of-the-art components. But knowing Steve Loken, it won't be long before he moves into the next version of the future — if he can figure out how to get past the krypton. ■

A BETTER DREAM HOUSE

Rooms with a view and efficiency, too!

This could be a misleading story. Instead of the common misconception of the energy-efficient home as a snug little bunker for two, the following vignettes describe manifest visions. Each home meets or exceeds the Northwest Power Planning Council's model conservation standards for new, electrically heated homes. But each was selected for inclusion in this spread because of qualities beyond conservation.

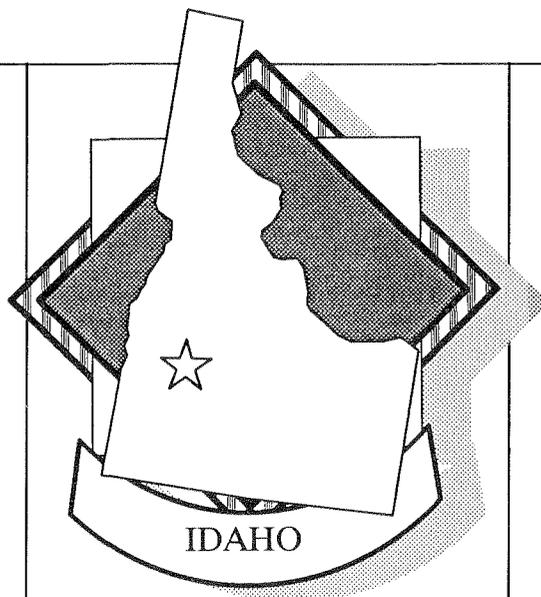
These are houses on which the owners spent long hours planning details, whether technical or aesthetic. They represent long-held dreams. They feature banks of windows, custom finishes, greenhouses and solariums. A couple of the houses are considerably larger than the average Northwest home, yet their heating bills are comparable or less.



Some are live-in energy-use laboratories. They have built-in monitoring equipment that tracks the fine points of the homes' energy performance. Meticulously monitored or not, all of these homes use substantially less electricity than their more conventional counterparts.

So these are not necessarily "typical" energy-efficient homes. They could better be described as the favorite homes of the story authors, Council or energy office staff in each state. They were selected on that basis to dispel the myth that energy efficiency precludes expansive windows or other comforts.

They are intended here to inspire similar dreams. — CC



by Karen Nelson

The wind usually blows in Idaho Falls, sometimes 40-45 miles-per-hour. It gets cold too. The temperature can drop below zero several times during the winter months. But, regardless of what the weather is outside, it's always warm and cozy in the Joseph Call family's Super Good Cents home.

"Most of the main-floor windows are on the south side of the house," says Joe Call. "It can be 20-degrees below zero outside during the day, and the furnace won't kick on because the house stays so warm."

This beautiful colonial-style, red brick home has six bedrooms, an office and sewing room, and three-and-a-half baths, amounting to 4,800 square feet of heated space. Joe and Nola Call have five children ranging in age from 5 to 14 years.

According to Joe Call, "The last house we lived in was half the square footage of this house. Now we pay 15 percent less for our total electric bill [including heat] than we did for just the heat bill before."

For the builder, Richard Hanks, this was the first home he built after the City of Idaho Falls adopted the Northwest Energy Code. Idaho Falls was the first city in the state to adopt and enforce the code, which is based on the Northwest Power Planning Council's model conservation standards.

Comments Hanks, "I had been in the home construction business for nine years and had built maybe 24

homes before this energy code was adopted. When I first heard about the passage of the code, I felt negative. No builder wants more regulation and more inspections. However, the code hasn't been a problem to adjust to. I've never had a problem getting a house design to meet the code."

Hanks had been building energy-efficient homes before the city adopted its new code, but two things caught him totally by surprise: the amount of caulking required and the air-to-air heat exchanger.

"I had always insulated and caulked, and now I'm required to caulk around the electrical boxes and plate lines. That's the most significant change I had to make in my construction practice," relates Hanks. "The first time we installed the air-to-air heat exchanger in the Call's

house, we had to take it out and try again. It was just so new to everyone. Now I use "Fresh 80s" [operable slots in exterior walls that allow air intake] for ventilation. But back then the heat exchangers were required."

The City of Idaho Falls experienced such success and acceptance by the building industry of its energy code that it decided, approximately a year-and-a-half ago, to upgrade the code. Mechanical ventilation is still required, but a heat exchanger is no longer mandatory.

The Call home was built to the earlier Zone 2 requirements and has R-49 ceiling insulation; basement perimeter walls of R-11; R-19 exterior wall insulation; high-performance "low-e" windows, which cut heat loss and gain through the glass; double-pane glass on the main and



upper floors; and triple panes on the basement windows. All of the exterior doors have insulated foam cores. The Call's have a forced-air electric furnace, an air-to-air heat exchanger and no air conditioning. Call says that, "even with all the windows, the house doesn't get too warm in the summer."

The Call's have lived in this home for almost two years and are still thrilled. They feel that the home is of better quality and maintains a more comfortable temperature than other houses they have lived in, along with being quieter and, thanks to mechanical ventilation, healthier.

"Last winter it was 20 below zero, so the schools were closed," Call recounts. "Then the power went out. For six hours we had no heat. I had my son wash the windows in the living room and dining room, and he was sweating. He wanted to open the windows! We stayed comfortable the entire time the heat was off."

The wind does blow consistently in Idaho Falls. And the Call's home, on the edge of a new subdivision, has no wind buffers. With ongoing nearby construction and strong winds, the Call's were prepared to dust the furniture everyday.

But they discovered otherwise. "This house is tight. Even with all the dust whirling around outside, very little of it actually gets in if all the windows are closed."

The family bought a cord of wood two winters ago, and two-thirds of it is still left. "We use the fireplace for special occasions only, because our house just gets too hot," explains Call.

There is a demand for attractive, energy-efficient homes in Idaho Falls. The builder, Richard Hanks, feels that the local market has been solid.

"They are excited to find they can have a large, energy-efficient home and also have lots of windows. I've never had to cut back the window area on a design to get it to meet the code. Homeowners are pleased with these homes," he added.

The Joseph Call family certainly is. ■

THE BETTER DEBT DEAL

There's more than enough convincing evidence around to prove that energy-efficient houses are a bargain to live in. Simply said, they cost about half as much to heat and cool as comparable houses built to current non-Northwest Energy Code standards.¹

But, this efficiency comes at some expense. Construction costs for houses built to the new standards can be as much as \$2,500 higher than for less efficient houses. And while homeowners quickly recover this investment through their energy-bill savings, they are often hard pressed to convince lending institutions that such savings should be considered when factoring the debt-to-income ratios on which mortgages are calculated.

This reluctance on the part of the mortgage community to fairly value energy efficiency has had a discouraging impact on efforts to market houses that meet higher standards. Instead of accounting for the reduced monthly expense of "operating" energy-efficient houses, loan appraisers are more likely to use standard formulas.

Not so in parts of the Northwest, where "pilot lender programs" are helping both mortgage financiers and prospective homeowners learn how to account for energy savings in the home-loan equation. Idaho Falls, Idaho, was the setting for the first demonstration of the lending option sponsored by the Bonneville Power Administration and managed by the Idaho Department of Water Resources.

Pilot project director Jim Nybo began by surveying local lenders and appraisers to determine what they knew about more-efficient houses, how they were dealing with efficiency in the lending process and what they needed to account more effectively for energy savings when determining loan qualifications. He then worked with the Idaho department to develop an information packet for use by home appraisers and lenders. The packet included new mortgage forms, references to underwriting guidelines and sources for technical assistance — everything the lender or appraiser might need to fully credit the economic advantage of the Northwest Energy Code home.

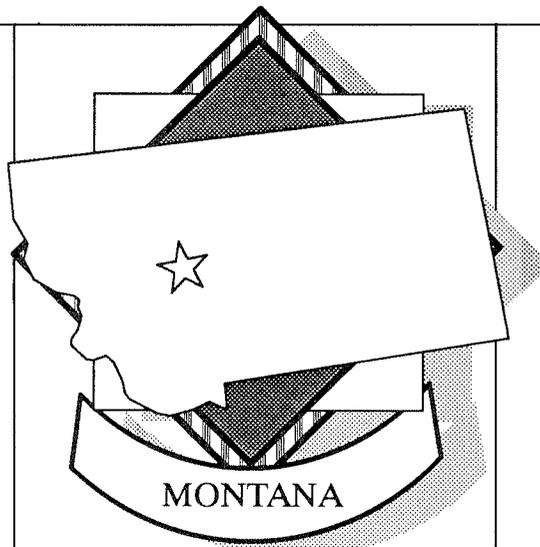
The Washington State Energy Office helped by developing a computerized means of estimating the value of energy saving features. This makes it easier for appraisers to complete a new energy addendum (form 70-A) to the standard residential appraisal report (form 70) used by the Federal Home Loan Mortgage Company (more commonly known as Freddie Mac).

Then last fall, the U.S. Department of Housing and Urban Development, which includes the Federal Housing Administration (FHA), acknowledged Northwest Energy Code houses' lower utility bills by creating new cost schedules for its loan underwriting practice in the Northwest. For example, people who qualify to buy a \$60,000 conventional home now can qualify to buy a \$62,000 energy-efficient home.

Building on the Idaho Falls project, Nybo worked with the Washington State Energy Office and the Northwest Power Planning Council to expand the project into Washington, beginning in the Spokane area. A task force from the lending and home-building communities, the utilities and energy planners was formed to scope out the project.

To date, each of the four Northwest states (Idaho, Montana, Oregon and Washington) has developed and is operating training programs for lenders, builders and appraisers. Only a few loans have actually gone through the process, so far, because the emphasis has been on education and developing the materials that can ease the loan-application process. In Idaho Falls, four loans were completed during the Pilot Lender Program, and the new forms and procedures have practically become the new standard. Idaho is planning to offer 16 additional lender and appraiser training workshops throughout the state over the next year. Washington's State Energy Office is also proposing a statewide push for more training and new loans, beginning July 1. — CC

¹The Northwest Energy Code is based on the model conservation standards developed by the Northwest Power Planning Council for new buildings in the region.



by Terri Wilner

A spray of phalaenopsis orchids graces an oak occasional table. Floor-to-ceiling windows frame a magnificent Montana panorama—the craggy Bitterroot Mountains and fertile valley. Native Americans first enjoyed this naturally productive land, followed by white settlers enticed by slick advertising heralding the Bitterroot as the “apple growers heaven.” Today the area is home to many diverse people, including this family of orchid hobbyists who recently built what some might call a “dream home”—an energy-efficient dream home built to last centuries!

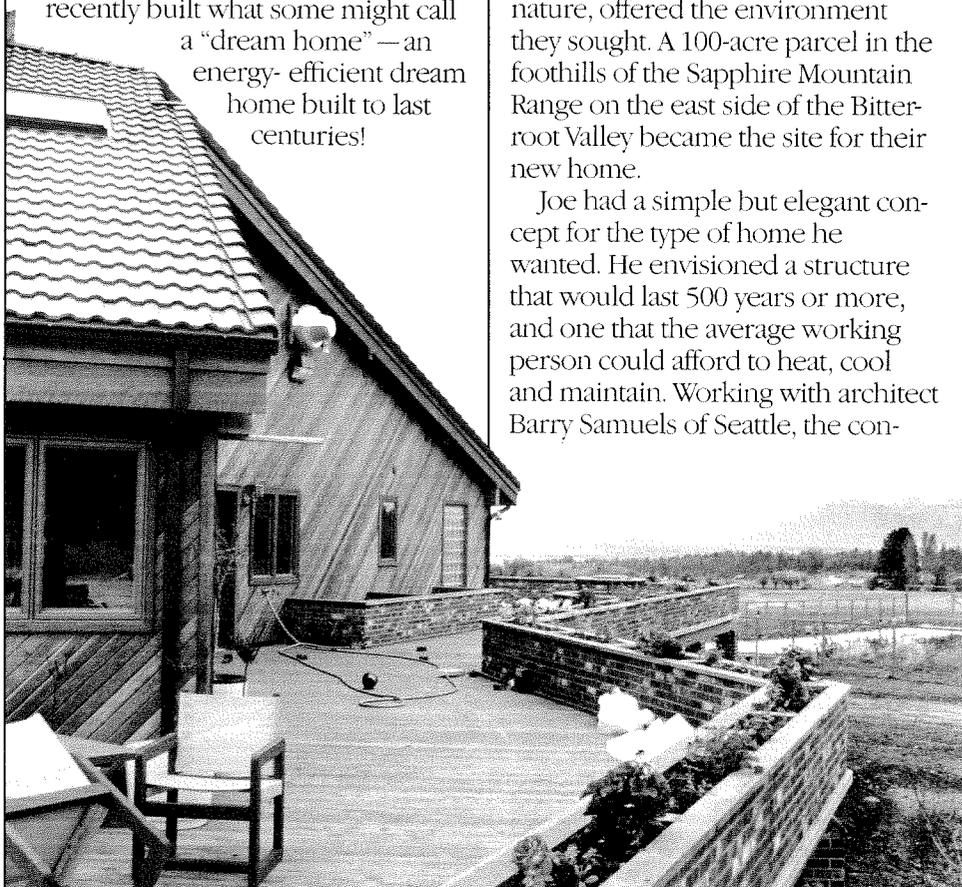
Joe and Joy Gray of Corvallis, Montana, have experienced a variety of landscapes over the years. Joe’s work as a geologist, mining engineer and nuclear power plant construction engineer took the family, including seven children, to locations throughout the United States. When semi-retirement appeared feasible, the couple gave serious thought about where they might want to settle. The Bitterroot Valley, with its unobstructed vistas and rural nature, offered the environment they sought. A 100-acre parcel in the foothills of the Sapphire Mountain Range on the east side of the Bitterroot Valley became the site for their new home.

Joe had a simple but elegant concept for the type of home he wanted. He envisioned a structure that would last 500 years or more, and one that the average working person could afford to heat, cool and maintain. Working with architect Barry Samuels of Seattle, the con-

cept became a reality—at first, in blueprints. Then, with the diligence of the Bitterroot’s best craftsmen, the boards and bricks and mortar evolved into one of the most beautiful homes in western Montana.

How does one build a home to last 500 years? First of all, Joe Gray’s engineering knowledge and experience in nuclear plant construction lent itself well to design features intended to withstand the vagaries of Mother Nature. Second, Joe hired Eugene Towner of Corvallis—the best contractor he could find to represent the Grays in lining up workers, purchasing materials, and to provide overall supervision of the project. Top quality materials were used, and the craftsmen were challenged to provide their best workmanship. These high standards are obvious in the finished product.

Structural aspects such as the foundation, floor joists, headers and ceiling beams, all greatly exceed both building codes and common building practice. The exterior walls, more than 14-inches thick, are abundantly insulated and faced with vapor barriers. A special, 100-foot long concrete tunnel was constructed as a service aisle for access to television, telephone, water, electrical and plumbing systems.



Photograph by Terri Wilner

In addition, the house was designed with back-up systems for essential services. If the electricity goes off, a diesel generator will be ready to meet basic household needs; domestic water supply is protected by a 1,200-gallon reserve tank; and if the water supply to the fire sprinkler system fails, a secondary gravity-fed water supply from ponds on the property can be activated. The house is also fully accessible to handicapped people, featuring extra-wide doors and hallways, and spacious bathrooms.

The heating scheme for this 7,000 square-foot, three-story home is also replete with back-up features. It includes a unique combination of passive solar, two automatic pellet-fed fireplaces that also preheat hot water, and individual room electric wall heaters. Further heat will be provided by a 4,000-square-foot greenhouse to be built on the south side of the dwelling (remember the orchids!).

Fresh outdoor air will be ducted through the ceiling of the greenhouse and adjusted for moisture content by a humidistat. It will then flow into the house to heat the living quarters. The greenhouse will also provide solar-heated hot water. Despite an expanse of over 40-percent glass on the southwest face, the Gray's house far exceeded the Super Good Cents requirements for energy efficiency, according to staff at the Ravalli County Electric Cooperative.

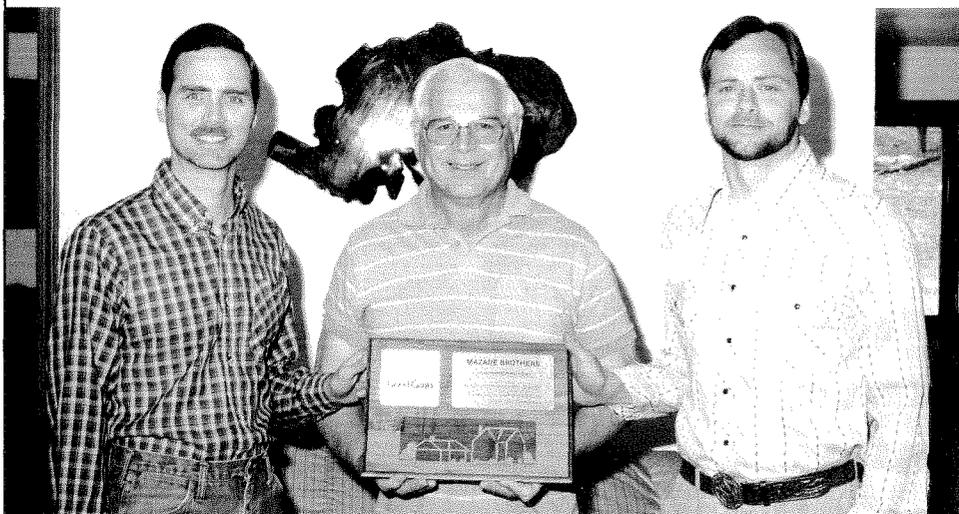
While all agree that the structural and thermal aspects of the building are outstanding, it is the beautiful interior design and decorating features that capture attention once inside. Joy Gray conceived the interior space as both artistic and pragmatic. Skylights, for instance, shed natural light onto curved, glass block walls that partially enclose two circular staircases. A two-story interior brick wall that houses a fireplace commands attention in the sitting area.

Tiered birch cabinets in a white redwood kitchen provide an excellent backdrop for a robust scarlet Scheherazade orchid, whose glossy leaves spill over the window shelf above the sink. Joy's pale turquoise and rosy beige color scheme in the main living area compliments and highlights the naturally dark redwood walls. Stained glass embellishes windows and lighting fixtures. Kitchen appliances and bathroom fixtures are state-of-the-art in design, function and appearance. Joy's ingenious design sense has created a home that is both beautiful and comfortable.

What more could one ask for? Well, consider brick flower beds that serve as a deck railing encircling the second story of the house; a gazebo downstream from a series of ponds; a half-acre vegetable and fruit garden with an automatic sprinkler system; apple trees in the front yard; and pheasants, deer and birds in abundance feasting on specially planted grain and other feed.

And, of course, the huge greenhouse, where hundreds of orchid plants, currently in temporary shelters, are waiting to settle comfortably into their new western Montana home. ■

As Good As It Gets

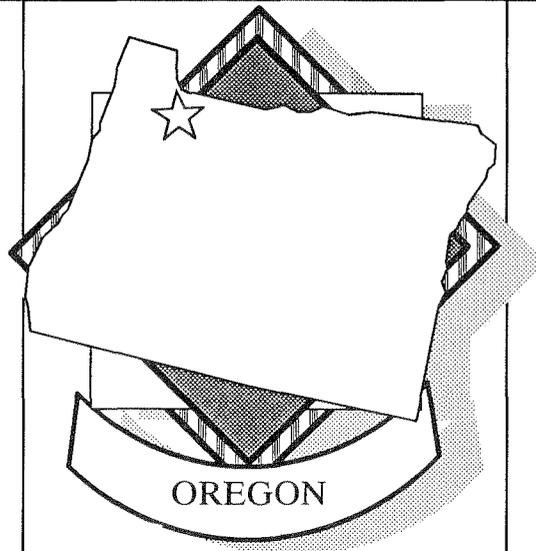


Brothers Gregg and Gary Mazade flank Ravalli County Electric representative Rudy Kratofil with the award they share for super efficiency.

The Mazade brothers of Victor, Montana, have won a regional award for the most efficient home in the Super Good Cents Program. Working through the Ravalli County Electric Cooperative, Mazade Construction designed and built a 3,100-square-foot brick home on Bear Creek, west of Victor. Based on monitored energy use, the heating costs of this home during October, November and December 1988 were only \$16.65 per month! These are actual costs, not computer projections.

Energy saving characteristics in the Mazade home include R-36 walls, R-60 ceiling, R-25 basement walls (except the crawl-space portion, which has R-30 walls and R-19 perimeter insulation), and high-performance windows. An air-to-air heat exchanger provides the necessary ventilation and recaptures heat from exhaust air. The heating system consists of individual, electric wall room heaters.

The award provides Mazade Construction with a \$3,100 grant for Super Good Cents advertising and continuing education. The Mazade brothers have since built two more houses based on their award-winning design. — Terri Wilner



by Diane Walton

Roger Spring is a lucky guy. He is also a smart guy. Is that because he's a man of many talents at Portland General Electric? Or because he has a way with words?

No. Roger Spring is a lucky guy and also a smart guy because his heating bill last year was \$135.

Roger, his wife Debbie and their two children have lived in their 1,840 square-foot home in Tigard, Oregon, for three years. Roger and Debbie made, as do all new home buyers and builders, many decisions as they developed the plans for their home. They also shared some of the work with the building contractor; insulating, wallpapering and interior painting were three big jobs they took on.

Roger's hands-on experience with Portland General Electric's residential conservation programs was invaluable in raising energy use questions at every step of the decision-making process. He knew, for example, both the financial and comfort benefits of installing a heat pump. He knew the trade-off of energy loss with the installation of larger windows or skylights.

Not every decision was made solely in response to its specific energy impact. The energy saved in the Springs' home is a result of making the effort to consider energy savings among the other goals they articulated for their home.



Saved energy from new homes is a key element in Oregon's state energy policy. In 1974, Oregon adopted the first statewide energy standards in the Northwest. Oregon amended its energy building codes in 1979 and in 1986, as construction practices and products improved.

This year, the three-year cycle of building-code review begins again.

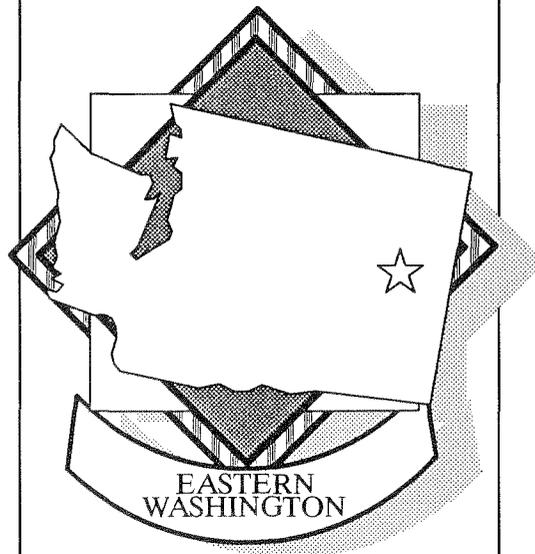
As the building code amendment process goes on, Oregon utilities and the Bonneville Power Administration have continued to provide financial support for building energy-efficient houses. Approximately 20 percent of the new electrically heated homes being built in Oregon today meet the model con-

servation standards designed by the Northwest Power Planning Council. The Springs' home is one of those.

Walking through Roger and Debbie's home, one hears the discussion shift into the jargon of residential conservation programs. Theirs is an "RCDP" home — referring to the Residential Construction Demonstration Project supported by Bonneville for innovative energy features and extensive monitoring. They were required to have an "AAHE" — an air-to-air heat exchanger for indoor air quality. The windows are "thermally improved," with a rubber break in the metal frame to discourage heat loss. The walls yield a final measure of resistance to heat loss of R-26.

As part of its participation in the Residential Construction Demonstration Project, the Springs' home, along with another 150 homes in the region, is carefully monitored. During 1987 and early 1988, the Springs' home was comparatively low in space-heat energy use, and just above average on monitored average inside temperature. Their heating bill for the year was \$105.

Nonetheless, the irresistible feeling, is not to say "Good job!" but, simply, "What a lovely home you have." ■



by Carol Raczkowski

Watching a house “perform” — whether checking temperature levels in each room or watching the water drip from a condenser — probably wouldn’t excite a lot of people. But, Mike Nuess and his new, super energy-efficient house are a perfect match. “I can be a ‘tech-no-twit’ all day long, if I want to,” says Nuess. “I love it.”

Mike Nuess and his wife Linda are the proud new owners of one of the only “Future House” energy-efficient homes in Washington. [Qualifying for the Bonneville Power Administration’s new program that tests the latest home technologies.] The Nuess’ built their home under the Residential Construction Demonstration Project (RCDP) operated by the Washington State Energy Office. The demonstration project looks at new building technologies as they emerge and evaluates them to better understand

the performance and energy efficiency of houses.

There are several categories of homes in the Future House project, depending on what factors are being tested. For example, air-tight drywall testing may be the focus in one home, and energy-efficient appliances in another. The Nuess home combines a number of these factors, and its performance is monitored constantly.

Ten times a minute the Nuess home is electronically scrutinized. Temperatures from several places in the house, air flows in the duct work, relative humidity levels at certain key locations, amount of hot water used and more, are measured and sent to a “data logger” located in the garage. The data logger stores the information until a remote computer in Syracuse, New York, calls up the data logger once or twice a

week to retrieve the data. The data logger then erases itself and is ready for another week of information.

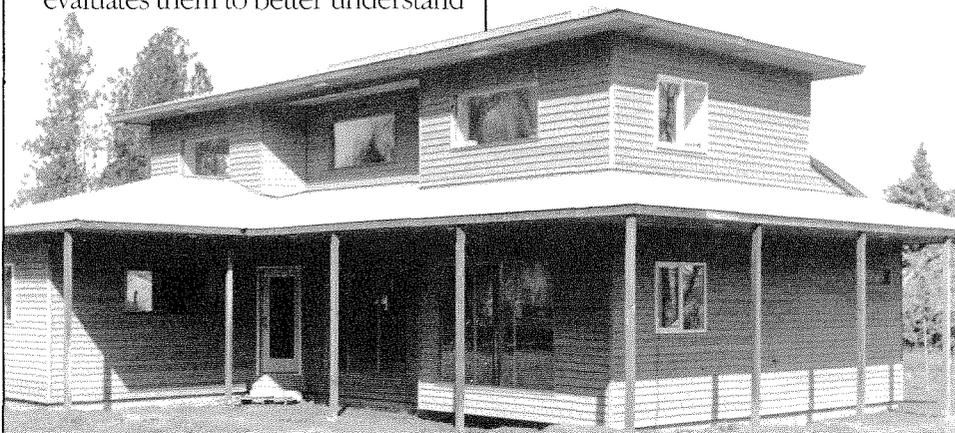
The average person would probably not welcome all the technical apparatus temporarily placed in the Nuess home, but Mike Nuess, who is with the Washington Energy Extension Service, considers it an incomparable learning experience.

“A fun thing we did was to find out how much flow was coming out of our shower,” says Nuess. “We discovered it was 1.5 gallons per minute. Now we can test low-flow shower heads for everyone,” he jokes.

The home presents other advantages for the Nuess family — reduced energy costs, improved indoor air quality, greater comfort levels and a quieter interior. Hidden advantages also exist. Linda Nuess suffers from allergies, and the pair hopes their new home will help alleviate many indoor contaminants.

Nuess took this, and many other factors, into consideration when designing his home.

The house features double-wall construction — a sandwich with two 2-by-4 framed and fiberglass-filled walls and between them a 5½-inch layer of insulation. The ceiling has extended trusses with loose-filled



fiberglass, for an R-value of 60.

Unique to this Future House is the inclusion of the crawl space in the "thermal envelope." The wall insulation stops at the footing (below the frost line), and the floor insulation actually lays on the crawl-space floor. Typically, the insulation would be installed in the floor of the structure.

Windows with coatings that help cut heat loss through the glass (called "low-e") round out the thermal envelope package to create a thermally efficient shell.

"We tried to make it [the house] as tight as a coke bottle," says Nuess about his home. He estimates that as much as one third to one half of a typical home's energy consumption comes from reheating cold air that's brought in through leaks and cracks in the structure. He stresses that extra care needs to be taken in choosing the correct materials to alleviate air leakage.

"It's like the old story about the early days of the auto industry," he explains. "An engineer went to one auto maker and said 'I've discovered alloys. By putting in a little bit of nickel and chrome in our steel we can make it more flexible, durable, stronger and non-corrosive.' The auto maker said 'Good idea, you're really thinking,' and he shelved it. This auto maker wanted cars to rust so that he could sell more cars. Later, his competitor came along and started using alloys. He blew the first cars out of the water with a higher quality product.

"That's kind of happening in the housing industry with the smaller custom builders or builders who are in the business for some level of satisfaction or to do something new or better. They are using alloys — using the proper sealant in a particular gap. But it may be a while before the codes reflect what's known and new in the industry."

Another characteristic of the Nuess home is its means of controlling moisture. Nuess argues that this is one of the major problems in homes built today.

"For a long time, builders got away with not building correctly. Their homes were leaky," says Nuess. "Now they need to pay attention to moisture control. The MCS [model conservation standards] homes have done a good job of paying attention to moisture. Done right, there is no reason to have a moisture problem."

His home combines a vapor-barrier paint, tight building practices and the ventilation system to take care of any moisture problems. The vapor-barrier paint used in the Nuess home stops water vapor diffusion through the sheet rock and is readily available on the market.

The ventilation system, in addition to helping the moisture problem, aids in pollutant control. It is constantly bringing in fresh, dryer air and removing stale air that contains moisture and other pollutants. The ventilation system creates a negative house pressure above the crawl space and a positive pressure within the crawl space, thus eliminat-

ing moist air escaping above grade and controlling radon [a naturally occurring radioactive gas] entry below grade. The ventilation system, which uses a heat pump, also heats water, helps warm indoor air during winter and cools it in summer.

Energy-efficient appliances are also used in Nuess' home. All together, the energy package will allow the home to consume 30-40 percent less energy than a model conservation standards home, which would be about 50 percent more efficient than most conventional, electrically heated homes.

Is the \$45 per-square-foot price worth it for this 1,800 square-foot contemporary, yet highly sophisticated home? For Mike Nuess, a confessed "energy nut," the answer is simple.

"I'm going to learn a lot from this house. I'm going to learn what I did right, but also some things I did wrong. That will be very valuable information." ■

Factory-Built Efficiency

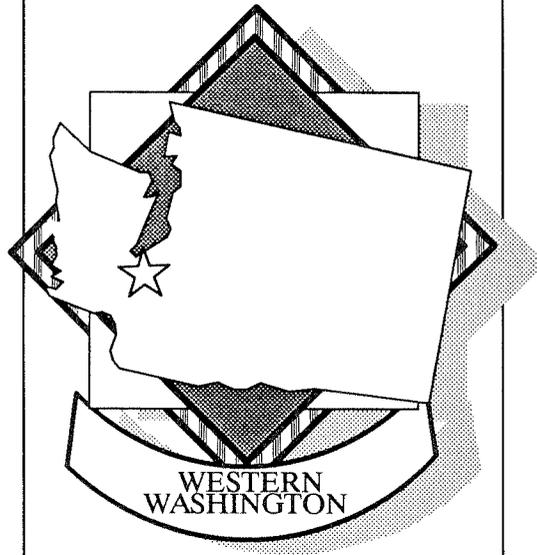
Every year, a third of the homes built in the Northwest — about 10,000 houses in all — are manufactured in factories. While construction practice for these homes has evolved over the years, energy-efficiency improvements were limited. This year, urged on by the Northwest Power Planning Council, the Bonneville Power Administration developed a technical and marketing assistance Super Good Cents program for manufactured homes, and 150 demonstration models were constructed. There are demonstration homes in all four Northwest states — Idaho, Montana, Oregon and Washington.

The manufactured housing industry has been particularly cooperative. Changing a manufacturing process is always a difficult task. Yet, during the research project, eight of 17 manufacturers in the Northwest voluntarily modified their procedures.

The significant changes manufacturers made included: upgrading their standard windows, adding manual controls to the ventilation system, and doubling or tripling insulation levels throughout the homes. Home dealers, who assume responsibility for siting the homes, concentrated on reducing moisture in the crawl space and sealing air leaks in the homes during their set-ups.

Meters installed in the test homes will measure how much electricity is used for space and water heating. The Council has estimated that if all electrically heated manufactured homes are built to the model conservation standards, the region could save as much as 115 average megawatts of electricity over the next 20 years (the average electricity use of a city the size of Missoula, Montana). The homes are predicted to use 50 to 70 percent less energy than current-practice manufactured homes. Data collected by monitoring the metered homes will determine the accuracy of such computer-calculated energy savings estimates.

This study marks the first time manufactured homes have been included in Bonneville's Super Good Cents effort to encourage the design, construction and marketing of energy-efficient homes. The outstanding efficiency expected from these modern incarnations of what used to be called "mobile homes" should go a long way toward creating a positive image for the industry. — Jim Erickson



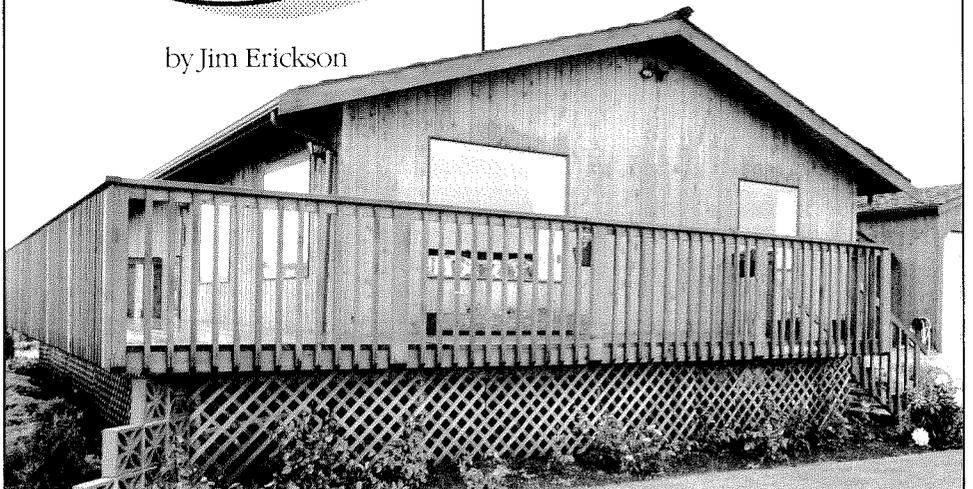
by Jim Erickson

On a gray, stormy day, while the wind howls off the Pacific Ocean, Ed and Alice Haynes sit inside their Ocean Shores, Washington, home oblivious to the weather. Unless they happen to look out a window.

The couple's energy-efficient dwelling, included in a Northwest research effort called the Residential Construction Demonstration Project (RCDP), is incredibly quiet. Outside noises infiltrate the Haynes' home about as easily as heat leaks out. Which means noises stay out and heat stays in.

On weekends, there is a bit more traffic than usual on Ocean Shores Boulevard, a major arterial. Oh, it's nothing like the big cities' experience, but it is considerable for this community of 2,000. Gazing out at the intersection of the boulevard and Taurus Street, near where their home is located, Alice remarks, "Friends ask us if the traffic bothers us. To tell you the truth, we don't even notice. The house is very quiet." Credit the triple-pane windows for helping provide sound-proofing.

If silence is golden, then comfort is platinum. And comfort is a big plus in the Haynes' home. "I really love our comfortable home," Alice says. "I particularly notice it with the floors, which are warm. When I go to other people's homes, I notice how much colder those are than ours."



The Haynes' home is one of the many success stories of the demonstration project. Their residence was one of 165 built in the project's first phase (called Cycle I). Cycle II is just wrapping up, with 182 site-built and 150 manufactured homes constructed throughout the region.

Extensive insulation and an air-to-air heat exchanger have made the Haynes' home especially toasty. During a one-year monitoring period (1987-88) for the Bonneville Power Administration-sponsored project, the Haynes' 1,352-square-foot home used 2.52 kilowatt-hours per square foot, an amount that was less than the average of 3.09 kilowatt-hours per square foot for all homes in the project.

The computerized "beige box" that recorded energy performance data has been removed from the home. And the Haynes, for the first time since moving into the house

three years ago, were able this past winter to use their wood stove. To give accurate readings on the home's performance, use of the wood stove was prohibited during the test period. The Haynes religiously took weekly readings for the 1986-87 and 1987-88 heating seasons and sent the data to the Washington State Energy Office, which manages the demonstration project for the region.

"We were glad to do it," says Ed, "because it helped us learn how the house really works." Not that the Haynes were surprised. "We realized it when our heating bills were so low," recounts Ed. "That was a good indicator that things were working well." Alice recalls that Larry Locke, the contractor who built the house, had joked that the home was so energy-efficient one could "light a match or turn on a single light bulb and heat the house."

Photograph by Jim Erickson

It's a bit of an exaggeration, of course, but she notes that during the coldest period of last winter, when the temperature dipped down to 7 degrees in Ocean Shores, their biggest utility bill was just \$90 for two months.

During the 1987-88 monitoring period, the total electricity use in the Haynes' home was 10,323 kilowatt-hours: 3,410 kilowatt-hours for space heating; 2,323 kilowatt-hours for hot water; and 4,590 kilowatt-hours for appliances and lighting. At approximately 4 cents per kilowatt-hour, that calculates to just over \$400 a year in utility costs.

Although the Haynes are anything but energy technocrats, they still are no strangers to energy-efficient homes. Haynes built an electrically heated Port Orchard home with lots of insulation and double-pane windows, when the pair was employed at the Puget Sound Naval Shipyard in Bremerton. She worked as an engineering draftsman and he as a machinist and shop foreman until retiring in 1969 and 1973, respectively.

Alice drew up the plans for what they now call "the perfect retirement home," but neither of them did any work on the actual construction of the house. However, Ed did build a deck after the house was finished.

In retirement, she keeps busy quilting and he makes use of spare moments building miniature houses — it takes up to five months to finish one. And, occasionally, they get interrupted answering the door, greeting passersby who want to take pictures of the home or just tell the Haynes how much they like the house. Those kinds of visits make the couple's day and reinforce the choice they made regarding the home and community in which to live.

"We like living here," Alice muses. Then she smiles and adds: "If my [house] plants could talk, they'd say they like it, too. I've never had plants do so well in a home before." That the plants are healthy says it all. This pleasant, comfortable, energy-efficient home simply grows on you. ■

WHERE TO TURN

FOR MORE INFORMATION

IDAHO

Idaho Department of Water Resources
Division of Energy Resources
Statehouse Mail
Boise, ID 83720
208-334-7900

Association of Idaho Cities

3314 Grace
Boise, ID 83703
208-344-8594 or
toll free in Idaho 1-800-334-SAVE

MONTANA

**Department of Natural Resources
and Conservation**
1520 E. Sixth Avenue
Helena, MT 59620
406-444-6697

Montana Local Government Energy Office

101 E. Broadway
Suite 513
Missoula, MT 59802
406-721-7294

OREGON

Resource Technologies Program
Oregon Department of Energy
625 Marion Street, N.E.
Salem, OR 97310
503-378-7809

League of Oregon Cities

P.O. Box 928
Salem, OR 97308
503-588-6550

Bonneville Power Administration

Super Good Cents: Pat Zimmer
1-800-452-8429
Early Adopter Program:
Peggy Crossman
503-230-7516

WASHINGTON

Washington State Energy Office
809 Legion Way, S.E.
Olympia, WA 98504
206-586-5013

**Association of Washington Cities/
Washington Association of Counties**
1076 S. Franklin
Olympia, WA 98502
206-753-4137

GLOSSARY

Compiled by Judy Gibson

air-vapor barrier — An air-vapor barrier reduces the amount of air and the diffusion of water passing between the interior and exterior of the house. Its primary purpose is to reduce air-change heat losses to a practicable minimum by sealing the house as tightly as possible against uncontrolled air change.

air-to-air heat exchanger — A device that extracts heat from one air stream exhausting from the house and delivers it to another air stream that is entering the house. An air-to-air heat exchanger is a specific type of heat-recovery ventilator.

average annual megawatt or average megawatt — A unit of energy output over a year, equivalent to the energy produced by the continuous operation of one megawatt of capacity over a period of time. (Equivalent to 8,760 megawatt-hours.)

avoided cost — An investment guideline describing the value of conservation and generation resource investments in terms of the cost of more expensive resources that would otherwise have to be acquired.

Btu (British thermal unit) — The amount of heat energy necessary to raise the temperature of one pound of water one degree Fahrenheit (3,413 Btus are equal to one kilowatt-hour).

climate zone — As part of its model conservation standards, the Council has established climate zones for the region based on the number of heating degree days, as follows: Zone 1: 4,000-6,000 heating degree days (the mild maritime climate west of the Cascades and other temperate areas); Zone 2: 6,000-8,000 heating degree days (the somewhat harsher eastern parts of the region); and Zone 3: over 8,000 heating degree days (western Montana and the severe higher elevations throughout the region).

conservation — According to the Northwest Power Act, any reduction in electric power consumption as a result of increases in the efficiency of energy use, production or distribution.

cost-effective — According to the Northwest Power Act, a cost-effective measure or resource must be forecast to be reliable and available within the time it is needed and to meet or reduce electrical power demand of consumers at an estimated incremental cost no greater than that of the least-costly, similarly reliable and available alternative or combination of alternatives.

elasticity of demand — The degree to which consumer demand for a product responds to changes in price, income or other factors.

energy — Average power production over a stated interval of time, expressed in kilowatt-hours, megawatt-hours, average kilowatts or average megawatts.

full requirements customers — Utilities that generate no power, relying instead on purchasing all of the power needed to meet their total load requirements.

heating degree days — The average degrees per year it takes to bring the daily temperature to 65 degrees. This is calculated by taking the average of the high and the low temperatures subtracted from 65. For example, if the high was 60°F and the low was 30°F, there were 20 degree-days. Heating degree days are determined by the National Weather Service.

infiltration — The amount of air entering a building through cracks around doors, windows and poorly sealed vent dampers.

infiltration control — Conservation measures, such as caulking and weatherstripping, that are taken to reduce the amount of cold air entering or warm air escaping from a building through cracks around doors, windows and poorly sealed vent dampers.

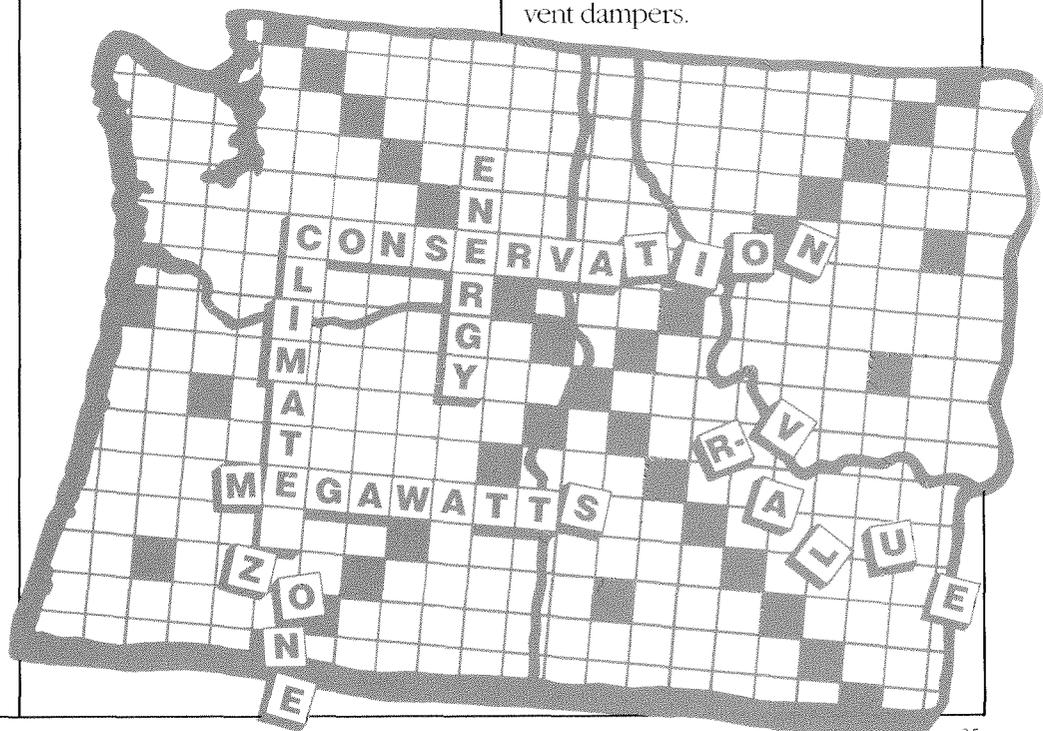
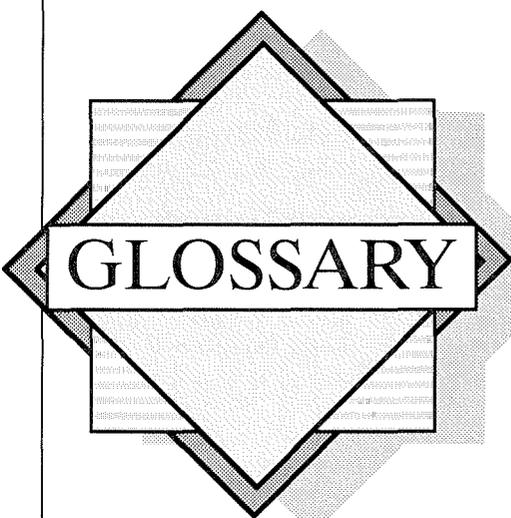


Illustration by Lis DeMarco



GLOSSARY

inverted rates — A rate structure that prices successive blocks of power use at increasingly higher per-unit prices.

kilowatt (kW) — The electrical unit of power that equals one thousand watts.

kilowatt-hour (kWh) — A basic unit of electrical energy that equals one kilowatt of power applied for one hour.

levelized life-cycle cost — The present value of a resource's cost (including capital, financing and operating costs) converted into a stream of equal annual payments. For example, if no down payment is paid on a house, and the entire amount needed to buy it is borrowed from a bank, that amount is the present value of buying a house. The mortgage payment including interest on a house is the levelized cost of that house.

lost-opportunity resources — Resources that may lose their cost-effectiveness unless actions are taken now to develop or secure them for future use. Efficiency improvements timed with necessary major repairs or during construction are prime examples of resource opportunities that could be lost if not developed when most practical.

low-e windows — Windows treated with a reflective coating on either the inner or outer side. The coating transmits short-wave radiation (light) but selectively blocks long-wave radiation (heat). Placed on the inside, low-e coatings reduce heat loss. On the outer layer, the coating keeps heat out.

manufactured home — A factory-built structure that is transportable in one or more sections.

marginal costs or marginal resources — As applied in the utility industry, these are the most expensive resources or costs used when determining least-costly resource choices. The Northwest Power Planning Council has used the cost of new coal plants as the marginal cost. Resources that cost less than coal plants can be considered for acquisition. More expensive resources would have a lower priority.

megawatt (MW) — The electrical unit of power that equals one-million watts or 1,000 kilowatts.

megawatt-hour (MWh) — A basic unit of electrical energy that equals one megawatt of power applied for one hour.

model conservation standards — Energy-efficient building standards (developed by the Council) for new electrically heated homes and all new commercial structures.

penetration rate — The annual share of a potential market for conservation that is realized, as in "7 percent of the region's homes have been weatherized this year."

present value — The worth of future returns or costs in terms of their value now. To obtain a present value, an interest rate is used to discount these future returns and costs.

R-value — A measure of the ability of a material or a combination of materials to retard the flow of heat. The higher the R-value, the greater the insulating value. All materials having the same R-value, regardless of thickness, weight or appearance, have the same insulating value.

resource — Under the Northwest Power Act, electric power, including actual or planned generating facilities, or actual or planned load reduction resulting from direct application of a renewable resource by a consumer, or from a conservation measure.

retrofit — To weatherize an existing structure. Also, the process of modifying an electric generating plant subsequent to its construction for the purpose of improving its performance.

sectors — The economy is divided into four sectors for energy planning. These are the residential, commercial (e.g., retail stores, office and institutional buildings), industrial and agricultural sectors.

simple payback — The time period required before the savings from a particular investment offset its cost. For example, an investment costing \$100 and resulting in a savings of \$25 the first year would be said to have a simple payback of four years. Simple paybacks do not account for future cost escalation, nor other investment opportunities.

space conditioning — Controlling the conditions inside a building in order to maintain comfort through heating, cooling, humidification, dehumidification and/or air-quality modifications.

thermal envelope — The perimeter of a building (composed of floors, walls, ceilings, windows and doors) through which heat is lost to the outside.

U-value — A measure of heat lost through a given material if one side faces warmth (i.e., the inside of a house) and the other side faces cold. It is defined as the Btus lost per difference in temperature (°F) per square foot of material (Btu/°F-sq. ft.). It is the inverse of an R-value. ■

Sources:

1. *Public Power Essentials*, by Public Power Council, 1987
2. *1986 Northwest Conservation and Electric Power Plan — Volume One*, Northwest Power Planning Council, 1986
3. *Insulation Manual — Homes Apartments*, by NAHB Research Foundation, Inc., 1979

ELLENSBURG



REBOUNDS

by Carlotta Collette

Model project aims at economic vitality through energy efficiency.

The freeway drive to Ellensburg, Washington, from Yakima to the south is an ear-popping climb for nearly 40 miles. Mount Adams is seemingly forever in the rear-view mirror, and exits to other towns are minimal. Except for settlements strung along Interstate 90, Ellensburg's surroundings are breathtakingly empty. The arid ranges of the Saddle Mountains, the Yakima Ridge, the Cascade Foothills and the Wenatchee Mountains make a deep, dry bowl that turns from faded green to blond as the seasons progress. In the middle sits Ellensburg, in the economically "distressed" county — by Washington state's standards — of Kittitas.

Kittitas County's status is not unique in Washington; 21 of the state's 39 counties are considered to

be distressed, with unemployment 20 percent or more above the state's average. "The Puget Sound area is carrying a lot of the state economically," explains Michael Grady, an energy specialist with the Washington State Energy Office. "King County's unemployment is only 4.6 percent; the state average is 6.8 percent and Kittitas County is nearly double that at 12.6 percent."

Grady is so versed in state employment figures, because he helped develop a statewide profile of small and mid-sized cities as a first step toward selecting one for an experiment linking energy efficiency and economic development. The theory behind the experiment surfaced a few years ago, when Bill Head, acting assistant director at the energy office, met with experts from

several cities to plan a community project that would focus on the economic development implications of the efficient use of energy.

With a small grant to kick off the project, oil overcharge money from the state of Washington, additional program money from the Bonneville Power Administration and the likelihood of assistance from several economic development support areas of the state, the first soon-to-be-sustainable city in the United States was selected. To narrow the field of willing towns, Grady worked with data from several Washington departments, including the departments of Trade and Economic Development, Revenue, and Employment and Security.

Kittitas County was not the most impoverished in the state, nor was Ellensburg the most economically afflicted city. In fact, a contributing factor in Ellensburg's selection was the town's ability and willingness to contribute to the pilot project. The city-run utility provided \$322,000 for no-interest loans and cash grants to help commercial enterprises trim their energy use. Business owners and community leaders were also excited about the possibility of testing in Ellensburg the role energy efficiency plays in helping smaller cities expand their economic base.

"Ellensburg has been very aggressive in retrofitting existing dwellings," says City Manager Doug Williams. "About 85 percent of our residences have been insulated, and there's not a lot of new construction. With this project, we can look at the broader commercial and industrial sectors. The less these businesses spend on energy, the more they can spend on other things. Plus, our utility provides both electricity and gas. This will be the first program where we can look at conservation for gas users," he adds.

Ellensburg, population 11,700, seems, on the surface, to be an almost thriving community. The presence of Central Washington University adds a liveliness not often seen in smaller, remote towns. Were it not for the university, the city would surely be considerably more dusty. Central Washington accounts for 30 to 40 percent of the city's power use and nearly half its population.

The town does have three substantial industries. The surrounding ranch and farm lands provide the resource for Twin City Foods, a national frozen food company; Superior Packing, a lamb processing operation; and Washington Beef, a similar business that specializes in beef products. Sweet corn and timothy hay are also major crops from the valley, which are shipped to markets in Japan.

At the Westco Wool Company, business could be hot if the building that houses it were a little warmer.

Interstate 90 also brings tourists to the historic and beautiful area for year-round recreational opportunities. But the city's only boom was a rise in student population a decade ago. "The word for Ellensburg now is 'stable,'" says Williams, "but stable isn't quite good enough. We need to see some growth."

The overall goals of the model project, called Rebound, are simple enough: improve energy efficiency within a community to enhance its economy; study the way energy-efficiency improvements affect communities; and document the program so it can serve as a model for other cities. But Rebound's success will depend on a complex network of local, state and federal agencies offering technical and financial assistance through a veritable litany of existing projects.

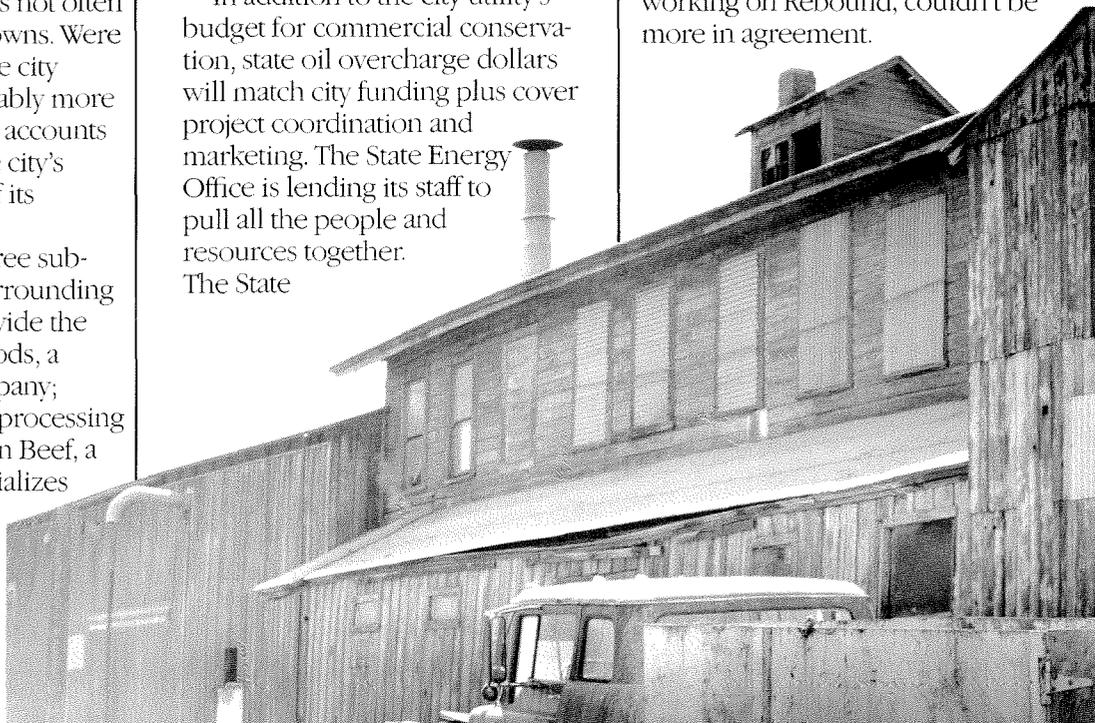
In addition to the city utility's budget for commercial conservation, state oil overcharge dollars will match city funding plus cover project coordination and marketing. The State Energy Office is lending its staff to pull all the people and resources together. The State

Department of Agriculture is making a low-interest revolving loan fund available for the food processing industries. The Department of Community Development has offered its many commercial, industrial and public works technical and financial assistance programs. The list goes on, with tax deferrals and job retraining among other offerings.

Even the Oregon Department of Energy and Oregon State University are on board, carrying out industrial energy-use audits and training Washington energy office staff in industrial applications of conservation technologies.

At the federal level, the Bonneville Power Administration, which had previously audited several local businesses and monitored their energy use, is anxious to get back into the city. "Ellensburg may be the model for a new Bonneville commercial conservation retrofit program," suggests Tom Hannon, Bonneville's assistant power manager for conservation in the upper Columbia area.

Hannon is hoping Ellensburg can help Bonneville design administratively simple programs. "This thing shouldn't have to get complicated just to get money from Bonneville," he says. Richard Wickwire, the city utility's engineer and coordinator working on Rebound, couldn't be more in agreement.



"This is complicated enough for Ellensburg," he reasons.

Grady, from the State Energy Office, feels likewise. "One whole purpose of this project is to streamline programs so local utility staff who don't have a lot of expertise can gain access to all these other programs. We want to see what the city wants, not just what Bonneville or the State Energy Office wants. As a result, we're helping to train a utility commercial auditor and set up a city-run grant and loan program that will allow the city to identify and finance its own conservation projects."

One way of determining what the city wants is with a community advisory team. Ellensburg's is an enthusiastic band of 12, who represent every aspect of life in the city. There are restaurateurs and meat packers, public school and university representatives, bankers, doctors and participants from the local cable television station. The local government is present along with the chamber of commerce.

Already, 23 businesses have been audited and are ready to go with recommended conservation measures. Several more are lining up to see where efficiency might take them.

The range of enterprises seems to span centuries as well as technologies. A precarious wood structure from the 1890s houses one business that has few counterparts in the world. It is the Westco Wool Company, a "wool pullery," and subsidiary of Superior Packing. At Westco, in mild weather, 13 employees treat sheepskins (by-products from the packing company slaughterhouse) with a depilatory that loosens the wool from the hide. The wool is then "pulled" free, washed, dried and wrapped into bales that stand nearly as tall as a person.

The Ellensburg pullery is one of only two such establishments in the country. And business could be hot if the building that houses it were a little warmer. Westco can only operate for about nine months of the year. In winter, water freezes on the

floor, making it too uncomfortable and too dangerous to work there.

Don Reilly, Westco's plant manager, explains that there's more than enough market for the pullery's wool. "About 99 percent of what stays in the United States," he says, "goes to the Pendleton factory down in Washougal. Our buyers are after us to expand."

Through Rebound, the pullery's processes as well as its building will be studied. Any effort that will take less than one year or more than 10 to pay for itself in cost savings won't get funded through the program. Business owners can generally cover the quick-payback measures. But making the pullery a more cost-effective enterprise with possibly even an improved product should require many changes that take only about five years to pay back. That puts it right in range for Rebound support.

At the other end of the spectrum, is the possible future home of five of the world's most interesting chimpanzees, subjects of a 23-year study of the apes' use of American Sign Language. Most famous of the chimps is Washoe, who first began signing in the 1960s. Under the tutelage of Dr. Roger Fouts and his wife Debbi, Washoe has learned more than 240 signs, which she then taught to her "adopted" son and the other chimpanzees in the study.

The Fouts and Washoe have been a sort of family now for more than 20 years, coming to Central Washington University's psychology department in 1980, because, as Roger puts it, "This was the best place for the chimps."

But chimpanzees are neither the cleanest nor the quietest of beasts, and the suite of classrooms connected by elevated passages that houses them is on the third floor of the psychology building. "Their rooms have to be hosed down regularly," explains Fouts, "and the floors leak. They repair the floor, but it leaks again. Besides, chimps are noisy [shrieks from the next room have made this statement somewhat obvious], and the students below don't really appreciate it."

The city is reaching beyond its hills to tap into resources that often never make it to smaller communities.

So how do a handful of articulate chimpanzees fit into Ellensburg's revitalization? There is a move to build a new home for them, one that could give them more room, while providing a little distance from other university students. A Chimpanzee Communication Educational Research Center could not only improve the coexistence of students and chimpanzees, it could also become a tourist attraction and special study facility that would draw people from around the world, argues Fouts.

Central Washington is willing to help build a ground-level structure to house the long-term study, and the Fouts have appealed to the state legislature for funding. Rebound could make certain that the new facility uses energy as effectively as possible. The Fouts dream that the new home might feature a solar greenhouse to supply some heat for the overall structure, while serving as a kind of "chimp-pick" nursery for fresh food and a jungle gym.

These are the visions of a unique town, and Rebound — a unique project — suits it. The surrounding hills of rangeland and fertile bottomland shaped, but also limited, Ellensburg's early economy. Now the city is reaching beyond its hills to tap into resources that often never make it to smaller communities. The lessons learned in Ellensburg are likely to ripple out to other towns across both the Northwest and the nation as a whole. The town's recovery may well trigger not only the more efficient use of energy, but also the more effective use of government. It's a model to watch. ■

Energy Efficiency Good (Business)

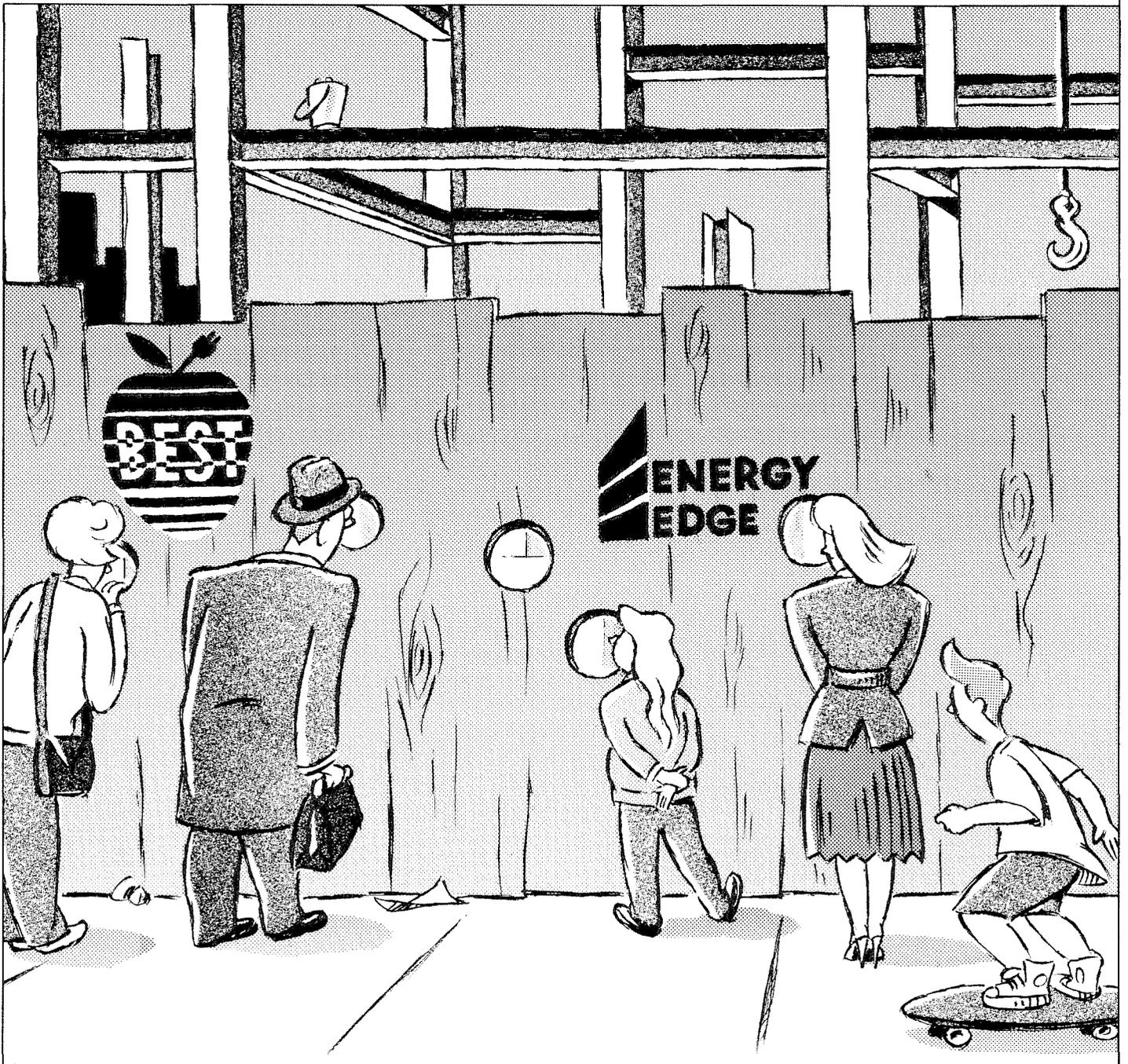


Illustration by Reed Darmon

Makes Sense

by Diane Walton
Oregon Office
Northwest Power Planning Council



"The marketplace is demanding that businesses get better and better at what they're doing, because the competition is getting tougher. So if you can get any kind of competitive edge by cutting costs, you have a better chance of not only surviving, but succeeding."

— Connie Bloom, Manager
Springfield [Oregon]
Downtown Association

Pacific Northwest attention is turning to the commercial sector's ability to save energy. This diverse group of customers presents energy service providers with different opportunities for efficiency improvements in each new building going up. Whether these opportunities are seized continues to be driven by economics and experience, and those factors are beginning to allow more and more energy-efficiency measures to be taken.

From mom-and-pop grocery stores to waste-water treatment plants, the region's commercial sector used about 22 percent of the Northwest's total firm (guaranteed by contracts) energy in 1987. Those 3,479 average megawatts are equal to the consumption of five cities the size of Portland, Oregon. Space heating and cooling, and lighting dominated the use. Office buildings and retail stores accounted for almost half the electricity used in this sector.

No one knows precisely how much energy the region could save through efficiency improvements in the commercial sector. All estimates show it as a major resource for the Pacific Northwest. If the energy-efficiency improvements recommended in the Northwest Power Planning Council's power plan are all made, there is an estimated 13-percent savings (990 average megawatts) by the year 2010. That is

a savings equal to energy use in the city of Seattle.

Publicly and privately owned utilities are working to refine their estimates of the potential savings, and they are finding different ways to go after them. Federal, state and local governments are helping utilities and their commercial customers. Programs such as the Bonneville Power Administration's Energy Edge and Oregon's Business Energy Tax Credit (BETC or "Betsy"), and facilities such as the Seattle Lighting Design Center and Portland General Electric's Energy Resource Center are leading to tangible energy savings and helping the region better understand this vital resource.

Bonneville's Energy Edge challenged regional architects, engineers, developers and building owners to design and build commercial structures capable of achieving 30-percent higher energy efficiency than current commercial model conservation standards call for. The commercial model conservation standards, developed by the Council, call for efficiency measures in all new commercial construction. These standards are currently being re-examined with the intent of bringing them closer to new state and federal standards that are more stringent.

Energy Edge was operated by Portland Energy Conservation, Inc., the Oregon Department of Energy,

Pacific Power & Light and the Washington State Energy Office. Payments totalling \$3.4 million to cover the cost of efficiency measures installed came from Bonneville. The two years of extensive monitoring, which is being done now, is also funded by Bonneville.

"Hands-on experience moves market practice. The Energy Edge program let us make a brief foray into the vast potential for savings in the Northwest's commercial sector" says Nancy Benner, Portland Energy Conservation, Inc.'s director of commercial programs. "The development of regional expertise in implementing conservation will be invaluable as the region's current power surplus becomes a power shortfall."

Twenty-eight buildings were completed in the Energy Edge program. The challenge of beating the model conservation standards by 30 percent was met, with early estimates showing a yearly savings of 13,000 megawatt-hours above and beyond the standards. This equals the energy services for about 1,000 homes. Such impressive savings in the commercial sector were made possible by a combination of technological advances, financial incentives, and the one-on-one project assistance from the four sponsors and Bonneville.

Saving money and cutting costs have been the keys to survival for many small businesses in the Pacific Northwest. Bonneville's Local Gov-

ernment Financial Assistance Program has funded several commercial energy management projects. This program created such opportunities as Springfield, Oregon's work with its Downtown Association on energy audits, energy record keeping, project implementation, operation and maintenance, and financing.

Connie Bloom, manager of the Springfield Downtown Association, describes energy management as "another phase of good business management." She says, "When you get a report that shows you how many dollars you're going to save and where you are wasting money, if you are a good business person, you're going to pay attention to that."



The commercial sector includes both privately and publicly owned buildings. The Eugene, Oregon, school district's engineer, Bill Clumpner, says his team of heating and air-conditioning specialists has saved their taxpayers about \$1.5 million in the past three years, just by cutting energy use in school buildings. Measures taken range from adding insulation during reroofing jobs, installing thermostatic timers for school heating systems, and meticulous attention to garnering maximum efficiencies within current systems.

Not every school district in the region is fortunate enough to have its own Bill Clumpner-led team. But, in late March, Pacific Power and Light Company unveiled its Better Energy in Schools Today (BEST) program, offering schools in its service territory (which includes parts of Oregon, Washington, Idaho and Montana) free, tailor-made heating and cooling system engineering designs. The program encompasses new construction and existing structures, and will help to achieve the kind of savings Eugene's schools are seeing. A Pacific Power staff consultant will work directly with a school's design team to identify the most appropriate and least-costly energy-efficient systems.

When a school decides to make the energy-efficiency investment, Pacific Power will help find financing and process paperwork. According to Pete Pendleton, Pacific's education segment manager, the company has learned a great deal about energy use in educational facilities. "Over the years, we have worked closely with schools. We're familiar with available programs, such as Oregon's Small Scale Energy Loan Program. Financing is also available through Pacific Capital, a PacifiCorp [Pacific Power and Light's parent company] subsidiary that works exclusively with tax-exempt entities."

As part of this program, Pacific has a special interest in schools considering new technologies. If these technologies are unique to the company's service area and could be used by other customers, Pacific will look at forming a partnership with the school to research and develop energy saving systems.

The Small Scale Energy Loan Program to which Pendleton refers is one of the Oregon Department of Energy's independent energy programs. The loan program, the Business Energy Tax Credit, the Public Energy Program and department staff are helping Oregon businesses save energy and use renewable resources.

For example, when fire destroyed the Praegitzer Industries' circuit board plant in Dallas, Oregon, Department of Energy engineers called on the company. The company intended, in effect, to recreate the old plant. Offering a tax credit and a loan, department of energy staff convinced the company to design conservation into the new plant.

The company used a \$1.7-million loan through the Small Scale Energy Loan Program. The loan paid for the energy aspects of the \$14-million new plant. Project costs were cut further with a \$127,000 Business Energy Tax Credit. Energy costs in the new plant are expected to be about \$40,000 a year less than in the old facility.

Small Scale Energy Loan Program

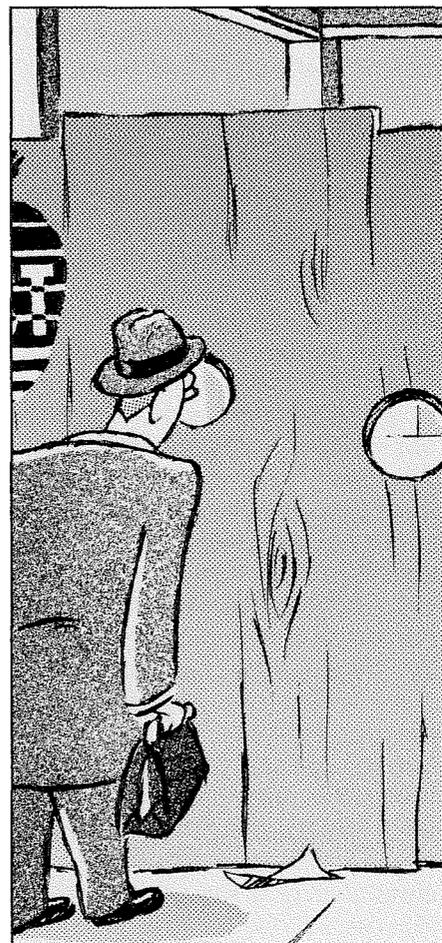
Since 1981, Oregon's Small Scale Energy Loan Program has put nearly \$156 million to work in Oregon's economy. These low-interest, long-term loans to businesses, homeowners, non-profit organizations, local governments and state agencies help save or produce energy worth about \$29 million a year. And the program pays for itself. General obligation bonds are sold to raise loan funds. Borrowers pay program costs. Many borrowers cover loan payments with energy savings. Here are some examples of commercial conservation projects financed by Oregon's Small Scale Energy Loan Program:

- Centennial School District in Multnomah County has returned four times to finance conservation projects. The projects save the district more than \$58,000 every year.
- A \$1.2 million loan to the Wheat Marketing Center and Norcrest China will pay for the energy measures in Portland's old Albers Mill. The mill, built in 1910, will be transformed into a six-story office building. Energy measures include water-source heat pumps that draw from the Willamette River. The measures are expected to save about \$20,000 a year in energy costs.

- A \$280,000 loan to Klamath County will pay for a geothermal heat system in the new jail. The system should save about \$34,000 a year.
- Springbrook Institute, Inc. will open a drug and alcohol treatment center next year in Newberg, Oregon. A \$423,000 loan paid for energy saving features in four buildings. The project's costs will be cut with a \$78,000 Business Energy Tax Credit. Total energy savings should be about \$26,000 a year.

Public Energy Package

A key tool for saving energy in the public sector is Oregon's award-winning Public Energy Package. It helps public agencies pay for a study of their energy use. If the study finds



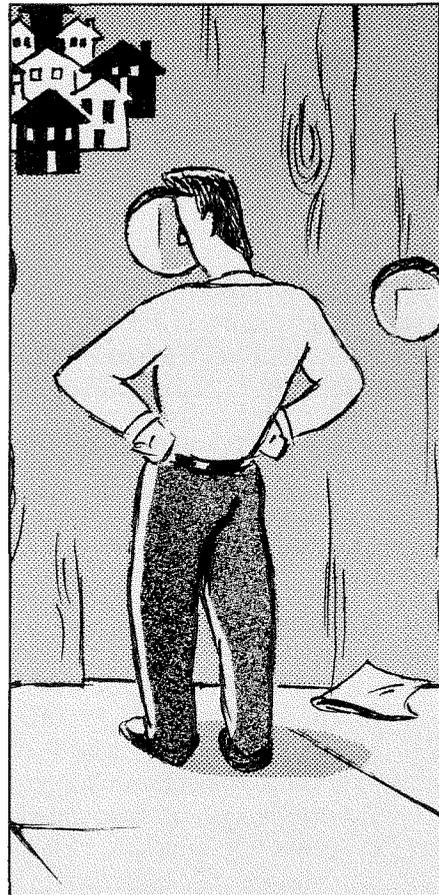
a good project, a loan can pay for the study and project. If a good project is not found, the study is paid for through the Public Energy Package. In short, the client can't lose.

Current projects are expected to cut the annual operating costs of schools and governments in Oregon by about \$1.2 million. One of the studies led to a \$750,000 loan for energy improvements at the State Capitol that should save about \$100,000 a year.

More than 1,600 Oregon businesses have used the Business Energy Tax Credit. It has helped stimulate more than \$140 million in project investments. Energy savings from the credit program are worth more than \$50 million each year. The tax credit covers 35 percent of the project costs. It is taken over five years.

All types of businesses are eligible to use this tax credit. Here are some examples:

- Large retailers in Oregon are cutting their cost of energy. More than \$10 million has been invested in retail outlet conservation projects. That already has helped save almost \$3 million in energy costs, and the savings will continue to mount. The May Company upgraded energy systems in several Oregon stores. The company's Meier and Frank store in downtown Portland cut energy costs about \$46,000 a year with an energy-management control system. The Department of Energy is also working with the Nordstrom department store chain to build conservation measures into its new and remodeled stores.
- Grocers can cut operating costs 12 to 15 percent with energy controls on lighting, heating, cooling and ventilation systems. Plastic strip curtains, glass doors on refrigeration cases and heat recovery sys-



tems can save even more. Safeway Stores, Inc., has invested about \$2.8 million in 170 conservation projects in Oregon stores. The investments cut energy costs by about \$1.3 million a year. The projects also led to almost \$980,000 in tax credits. Since 1982, Fred Meyer stores have invested more than \$5.5 million in energy projects. The investment paid off with more than \$1.5 million in energy savings each year. Tax credits for the projects total more than \$1.9 million.

- Oregon restaurants have invested more than \$800,000 in conservation projects. They save more than \$230,000 a year in energy costs.

Commercial conservation is being achieved throughout the Pacific Northwest. In some states, legislation has been enacted to support conservation in the commercial sector. Plans, programs and projects have been put in place to encourage it. They provide the thought, word, deed and financing.

The Council is now reviewing its commercial model conservation standards with an eye toward mak-

ing them even more efficient. As Jim Goller, Idaho member and vice chair of the Council, explains "The Council's present [commercial] standards don't capture all regionally cost-effective savings as required by the Northwest Power Act. Consequently, we are losing a lot of energy savings."

Builders, designers and architects are taking new steps to get the most energy out of their dollar. Utilities are stepping up conservation support to their commercial customers. Bonneville and the states are considering new programs to make the best use of our low-cost electricity, and they are continuing some successful old ones. Together, the region is making a difference. ■

For more information about comparable programs:

WASHINGTON

Washington State Energy Office, Patrick Keegan, assistant director for institutional, commercial and industrial divisions, 206-586-5044

IDAHO

Idaho office, Northwest Power Planning Council, Phil Welker or Karen Nelson, 206-334-2956

MONTANA

Montana Department of Natural Resources and Conservation, Louise Moore or Jeanne Doney, energy division, 406-444-6697

OREGON

Oregon Department of Energy, Larry Gray, administrator, conservation section, 800-221-8035 in Oregon or 503-378-8607

SHORTS

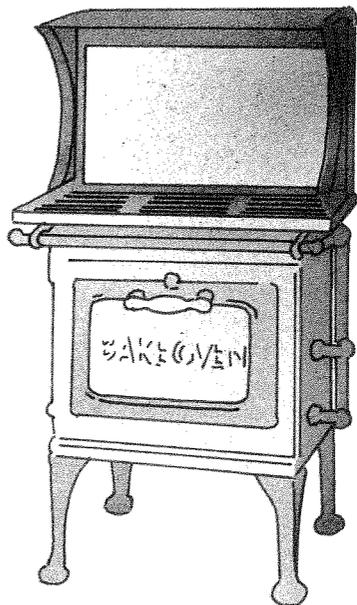
Corvallis, Oregon, and Pullman, Washington, lead a list of 30 small municipalities in the United States with the highest average education levels. Eight other Northwest cities also made the ranking.

The populations of Corvallis and Pullman over age 25 average 14.2 years of education, according to a recent report published in *American Demographics*. That put them at the top of a list of the country's 30 most highly educated "micropolitans," small cities outside large municipal areas.

The other Northwest cities on the list were: Bozeman, Montana (13.6 years of education); Idaho Falls, Idaho (12.9); Missoula, Montana (12.9); Helena, Montana (12.8); Pocatello, Idaho (12.8); Bend, Oregon (12.7); Coeur d'Alene, Idaho (12.7); and Walla Walla, Washington (12.7).

Demographers speculate that in the 21st century businesses and industries increasingly may be attracted to smaller, well-educated cities outside of major urban areas.

"This information is important because it shows patterns in economic development, which often indicate trends in energy demand," says Debbie Kitchin, a demand forecasting economist at the Council. (Source: *American Demographics*, 5/89.)

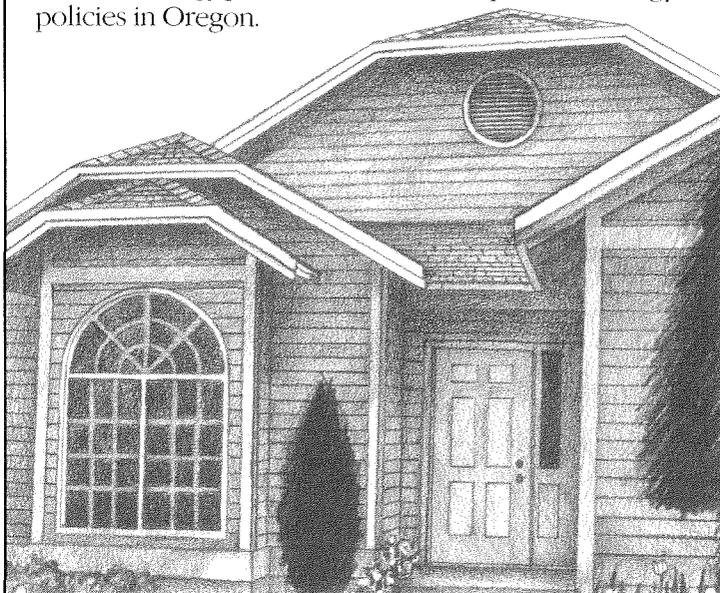


Wood stoves are responsible for a substantial amount of winter air pollution in Washington, according to a recent study by that state's Department of Ecology.

Each year, wood stoves, inserts and fireplaces produce 73,000 tons of harmful particulates, 152,000 tons of volatile organic compounds and 453,000 tons of carbon monoxide statewide. (Source: *Seattle [Washington] Weekly*, 5/17/89.)

Oregon will have a strategy to reduce its emissions of greenhouse gases at least by 20 percent by 2005 under a bill passed by the Oregon Legislature in late May. The bill, which at press time awaited Governor Neil Goldschmidt's signature, calls on the state Department of Energy to develop a specific plan to reduce Oregon's contribution to global warming, thought by scientists to be caused by such man-made pollutants as carbon dioxide and methane.

If, as expected, Goldschmidt signs the measure, the Department of Energy will draft greenhouse strategies with the help of an interdepartmental task force that includes the Northwest Power Planning Council. Those strategies will be included in the department's next biennial energy plan, which is the blueprint for energy policies in Oregon.



A nationwide effort to plant trees around houses and paint their walls and roofs white could save 16,700 megawatts a year in the United States.

That power savings — equal to the amount of electricity sold each year by the Bonneville Power Administration and all other utilities in the Pacific Northwest — would also reduce the nation's annual output of carbon dioxide by almost 20 million tons, according to estimates by the Lawrence Berkeley Laboratory in Berkeley, California.

The energy research laboratory estimated that the energy saved by national planting and painting steps would cost less than 1 cent a kilowatt-hour. That's half the cost of energy savings derived from more efficient electrical appliances and one-fifth to one-tenth the cost of new sources of power. (Source: *Energy Conservation Digest*, 4/17/89.)

SHORTS

By the year 2005, power plants fueled by garbage will consume 294,000 tons of refuse a day in the United States, a major market research firm predicts.

That's more than a six-fold jump from the 39,100 tons of refuse energy plants in the United States dispose of today, says New York-based Frost & Sullivan, Inc. (phone number: 212-233-1080), whose 277-page study sells for \$1,975. (Source: *Conservation Digest*, 3/20/89.)

Emerald People's Utility District (EPUD) has been listed as one of 101 companies that give the best service in the United States.

The municipal utility that serves 14,000 customers in rural areas north and south of Eugene, Oregon, was one of three public agencies cited in "The Service Edge: 101 Companies that Profit from Customer Care," a recently published book by Ron Zemke and Dick Schaaf.

The book lays out principles for successful customer relations and recognizes a broad range of businesses — from the American Automobile Association to United Parcel Service and the Wall Street Journal — for providing superior service.

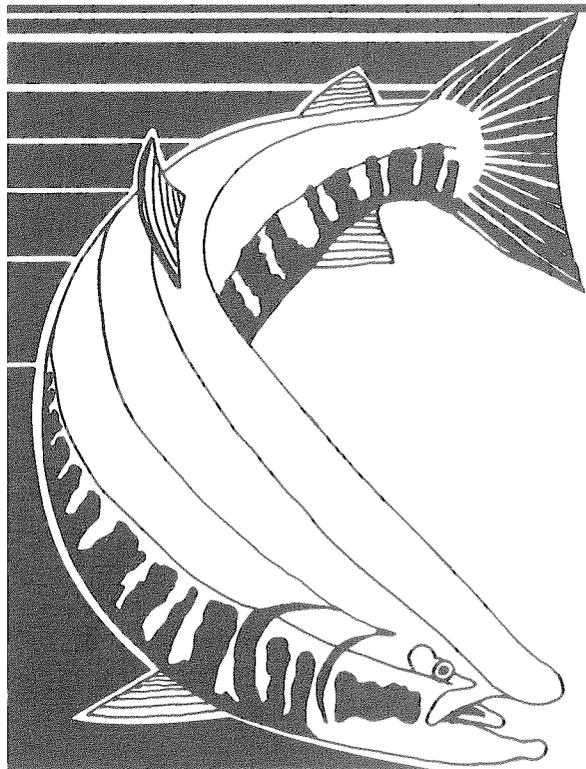
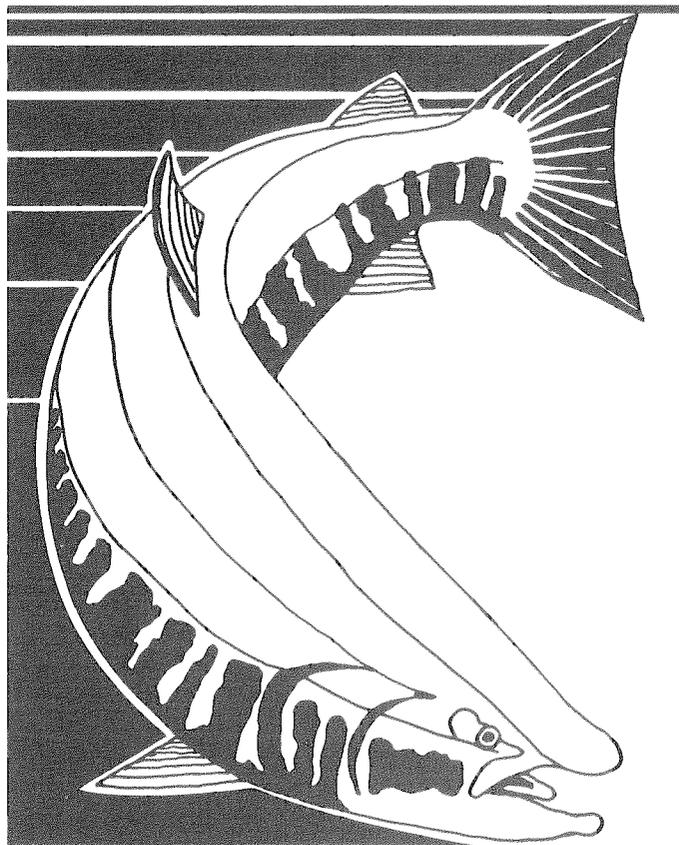
"The difference in large part involves putting the customer, not profit-minded investors, first," the book says of EPUD. "It starts when a customer starts receiving service: Since 1987, no security deposit has been held hostage against the prospect of a bill not being paid on time." (Source: The [Eugene, Oregon] *Register-Guard*, 4/13/89.)

Fall returns of chinook salmon to spawning grounds in the Columbia River Basin in 1989 could be 40 percent smaller than heavy runs of the past two years.

According to preliminary estimates by the Washington Department of Fisheries, some 446,000 chinook will swim up the Columbia in August, September and October.

That would be down from 759,000 in 1988 and 867,000 in 1987. Washington Fisheries Department officials suspect that this year's lower returns are a result of high catch limits authorities allowed commercial fishermen off Alaska and British Columbia during the past two years. With poor chinook runs to streams in British Columbia during the past several years, those high commercial limits meant that Columbia River chinook represented a greater portion of the commercial harvest last year than earlier. (Source: *Vancouver* [Washington] *Columbian*, 4/6/89.)

Compiled by Gordon Lee



CALENDAR

August 9-10 — Northwest Power Planning Council meeting at the Council's central office in Portland, Oregon.

August 23-25 — "Waterpower 89: an International Conference and Exposition on Hydropower" at the Niagara Convention Center, Niagara Falls, New York. Sponsored by the U.S. Department of Energy, the U.S. Army Corps of Engineers and others. For more information: American Society of Civil Engineers, 345 E. 47th Street, New York City, New York 10017.

September 13-14 — Northwest Power Planning Council meeting in Idaho.

September 18-19 — "Wild Trout IV" held in Yellowstone National Park, Mammoth, Wyoming. For more information: Frank R. Richardson, 404-331-3588 or Gardner Grant 914-428-5553.

September 24-27 — "Windpower 89: the American Wind Energy Association's Annual Meeting at the San Francisco Hotel in San Francisco, California. Sponsored by the American Wind Energy Association and the U.S. Department of Energy. For more information: Denise Pado or Diane Eppelen, American Wind Energy Association, 703-276-8334.

A more detailed calendar of Council committee meetings and consultations is carried each month in Update! See order form on back cover.

Compiled by Ruth L. Clarris

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NORTHWEST ENERGY NEWS

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The Northwest Power Planning Council is required to develop a program to restore the Columbia fisheries and a regional electric energy plan, to be carried out by the Bonneville Power Administration, emphasizing cost-effective conservation and renewable resources.

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COUNCIL PUBLICATIONS ORDER FORM

Please send me a copy of the following publications of the Northwest Power Planning Council. (Note: not all publications are available immediately, but they will be sent to you as soon as possible.)

Publications

- (89-1) 1989 Supplement to the 1986 Northwest Power Plan
- (89-1A) 1989 Supplement to the 1986 Northwest Power Plan — Appendices
- (89-18) 1989 Supplement to the 1986 Northwest Power Plan — Response to Comments
- (89-12) Draft Northwest Power Planning Council Fiscal Year 1991 Budget and Fiscal Year 1990 Revisions
- (89-13) Draft 1989 Northwest Power Planning Council Annual Report (available in early July)
- (89-15) Briefing Paper: Adequacy of the Northwest's Electricity Supply
- (89-19) Technical Corrections to the Protected Areas Data Base and Response to Comments
- (89-21) Issue Paper: Financial and Economic Assumptions
- (89-22) Issue Paper: Ocean Energy Resources
- Directory of Organizations
- 1986 Northwest Power Plan
- 1987 Columbia River Basin Fish and Wildlife Program

Mailing Lists

Please add my name to the mailing lists for the following newsletters. (Note: do not check if you already are receiving them.)

- Northwest Energy News* (this bimonthly magazine)
- Update!* (monthly public involvement newsletter that contains the Council meeting agenda, deadlines for public comment and a more detailed publications list)

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(Or call Judi Hertz at the Council's central office, 503-222-5161, toll free 1-800-222-5555 in Idaho, Montana and Washington, or 1-800-452-2324 in Oregon.)

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