

The city of Portland, Oregon, in the northwestern United States is winning a reputation as one of North America's greenest cities, thanks to its green power utility programmes, sustainable architecture and responsible population. **Lisa Cohn** writes this report.

Green ethic takes root

How a US city is changing its ways

On a corner in Portland, on a strip of grass between the sidewalk and the street, is a simple kiosk built of cob and masonry. It features an 'ecorooft' - or bed of plants - topped by a photovoltaic panel that illuminates a community bulletin board crowded with invitations, announcements and calls-to-action. Funded by neighbours through garage sales and community dinners, this solar-powered gathering place is a symbol of the nearly 30 years of community effort that have helped make Portland what it is today - a clean, livable, people-centered city that boasts a number of firsts in green energy and environmental sustainability.

This, and other 'green gathering places', are typically Portland, says Mark Lakeman, co-founder of City Repair, a non-profit group that organized this project and aims to

homeless illuminated by a wind turbine and top-ranking green power purchase rates (See article by Elisa Wood page 76, REW July-Aug 2005).

Utility customers who pay a little extra for green power have propelled Portland General Electric's (PGE) green sales to the second highest in the nation. The city boasts a whopping 29,626 residential customers (of both PGE and PacifiCorp) who buy green power; representing an 8.6% penetration rate, according to Diane Zipper, director of green power programmes for the Portland-based Renewable Northwest Project (RNP), which promotes the development of renewable energy.

Developers, too, are on the green bandwagon. Portland ranks number one in the USA in terms of the number of projects registered with the US Green Building Council (USGBC) as LEED (Leadership in Energy and Environmental Design) buildings, and also ranks first in terms of square footage of certified and registered LEED projects, said Taryn Holowka, communications manager for USGBC. The council certifies buildings as environmentally responsible if they meet its 'LEED' criteria.

As for city officials, they're intent on improving Portland with a large-scale purchase of clean energy, with plans for the city to get 100% of the electricity it uses to power municipal facilities from renewable energy sources by 2010. In addition, the city already has several small-scale renewable projects, generating about 3 million kWh from micro-renewables. This total is split more or less evenly between fuel cells powered by waste methane, a micro hydroelectric facility located in the drinking water system, and a series of microturbines powered by waste methane.

Consumers, corporations, environmental groups and politicians are all part of Portland's creative greening process

'mend' the city with sustainable building practices. 'These projects engage lots of people - from the grassroots level through to politicians - in creative projects,' he says.

Indeed, consumers, corporations, environmental groups and politicians are all part of Portland's creative greening process, and together they have fashioned a city with parking metres powered by solar energy, a village for the



The solar array on Oregon's State Capitol building in Salem is used to light its Pioneer statue OREGON DEPARTMENT OF ENERGY



INCENTIVES FUEL GROWTH OF SOLAR ENERGY IN OREGON

Founded in 2002, the Energy Trust of Oregon has provided various incentives for the use of solar power in Oregon, increasing photovoltaic generation by 1 MW since 2003 in what is a surprisingly sunny state.

'The solar programme has grown by leaps and bounds due to the Energy Trust programme – over 400% the first year,' says Jon Miller, executive director of the Oregon Solar Energy Industries Association, based in Portland. 'Oregon is by far the largest solar market in the Northwest.'

'I think that a lot of Oregonians had the desire to do solar,' says Doug Boleyn, president of the Solar Energy Association of Oregon. 'When the Energy Trust incentives came about, people said, "Now is the time". This was the final incentive that put them over the top.'

Furthermore, in spite of Oregon's reputation as a rainy place, the state comes fifth in the US for its solar thermal generation, says Miller. Oregon's long, sunny summers provide ample resources for solar hot water heating.

Perhaps counter-intuitively a solar water heater in Portland will deliver more energy savings than a solar water heater in Florida, which is known for its solar resources, says Christopher Diamond, senior energy analyst for the Oregon Department of Energy.

'That's because the water is colder here and we have longer, sunnier summers,' he explains. Oregon's fifth-place solar thermal ranking and recent boost in PV installations have been largely due to the efforts of the Energy Trust, which is a nonprofit organization dedicated to changing how Oregonians use energy. The trust's goal is to fulfil a state mandate to invest 'public purposes funding' into energy efficiency, conservation and renewable energy resources in Oregon. The mandate is the result of 1999 energy restructuring legislation that called for a 3% 'public purposes' charge for customers of Portland General Electric Co. (PGE) and PacifiCorp.

In Portland alone, the Energy Trust has helped fund six commercial and 21 residential solar systems. In addition, it contributed to the cost of 32 solar water heating installations, says Jan Schaeffer, spokeswoman for the Energy Trust.

'Oregon has installed more solar electric systems in the last two and half years than it did over the last 20 years combined,' said a recent Trust press release.

The Energy Trust offers incentives of up to US\$10,000 to homeowners and up to \$35,000 for businesses interested in solar photovoltaic systems. In addition, the state provides tax credits for solar electric systems, says Miller. Together, the incentives and credits pay for roughly half the cost of a system, says Schaeffer.

For example, the owners of Pepsi Cola of Klamath Falls received \$210,000 in financial incentives from the Energy Trust and \$444,412 in business energy tax credits from the Oregon Department of Energy. John Bocchi, one of the company's owners, said he installed the system because of the financial incentives and because he liked the idea of eliminating electric bills. He estimates that Pepsi will send about 50,000 kWh of electricity to PacifiCorp's grid after meeting its own internal needs.

Like Pepsi Cola's installation, nearly all the new solar electric

installations take advantage of net metering, says Diamond. Oregonians first gained the right to use net metering systems in 2000, he says.

Among Oregon's new solar users are four Portland-area schools that acquired PV systems using funds from utility PGE, the Energy Trust and the Bonneville Environmental Foundation (BEF), through the Solar 4R Schools programme. Each participating school receives a web-based curriculum package providing real-time data on the panels' electrical output. In addition, the city of Hillsboro – which gets 100% of its power from either solar or PGE's green power programme – also received a 3.15 kW PV array, donated by PGE and BEF. Another company, Kettle Foods in Salem owns a 114 kW system.

Contributing to the boost of solar use in Oregon is BEF, which has helped fund about 500 kW of solar power in the Northwest, says Angus Duncan, president and CEO of BEF. The nonprofit organization finds creative ways to fund projects, selling green tags and using the money to help pay for installations or provide loans. BEF also takes part in a solar tags buying cooperative, under which it purchases green tags from new solar installations, working with the Northwest Solar Cooperative, says Duncan.

BEF's first project, a 30 kW system for the city of Ashland in 1999, was a 'community' project, with the city owning the primary PV units. The Oregon Shakespeare Festival and a local university hosted PV arrays on their facilities, Duncan says.

'When we first did the Ashland project, it was 30 kW, and the biggest project in the region. Now we're seeing people not blinking when they talk about 100 kW systems and up,' he says.

However, in some areas of Oregon – especially Portland – it's been hard to sell solar energy, in part because of the city's reputation as a cloudy city, says Miller. 'People have the perception that solar won't work in Portland. It's not true.'

In fact, western Oregon is blessed with just as much solar radiation as most of the eastern seaboard, east of the Mississippi, says Boleyn.

'What throws people here in the Northwest are the murky terrible winters for three months. That is counter-balanced by sunny summers. On an annual basis, we receive about 4 to 4.5 peak sun hours per day on average. That's in the same range as most of the US, except for Rocky Mountain states and the desert southwest.'

A proposal pending in the Oregon Legislature would give solar an additional boost, providing \$6000 in tax credits for solar electric systems, instead of the \$1500 now available, says Miller. In addition, just to the south, a California initiative calls for \$2 billion in investments in solar over the next 10 years, he says.

'Manufacturers here in Oregon will prosper if California goes big,' he says.

In fact, Oregon ranks 9th in the US for states expected to benefit from the growth in the PV market, according to a report by the Renewable Energy Policy Project, based in Washington, D.C.

While California and Oregon are pursuing new tax credits and incentives, Diamond hopes to see more installers trained in Oregon. 'Our biggest failure right now is qualified, trained installers. They aren't easily available and aren't knocking on your door, asking "Would you like to buy a solar water heater?"'



Solar panels mounted on the Brewery Block buildings in Portland GERDING/EDLEN

These efforts have helped Portland cut its greenhouse gas emissions to 1990 levels, despite the fact that the city's population has increased since then. According to the city's Office of Sustainable Development, the city's emissions per capita have dropped by 13%, at a time when most American cities have experienced increases in greenhouse gas production.

'The drive to make Portland a green city is happening on multiple levels and multiple fronts,' says Stephanie Swanson, a spokeswoman for the Portland Office of Sustainable Development. 'Local governments, the business community, homeowners and community and environmental advocates - all of these interest groups have arrived at the conclusion that



it makes sense from a health, environment and business perspective to put Portland at the forefront in renewable energy and green building.'

FROM GRIM TO GREEN

However, Portland has not always been a sustainable city, says Jan Schaeffer, a spokeswoman for the Energy Trust of Oregon, Inc., which funds renewable energy and efficiency projects. 'Thirty years ago, when I moved here, it was a squat city dominated by cars.'

All that began to change in the 1970s, when the state adopted groundbreaking land use rules. They required municipalities to plan more and to include citizens in the process, says Mike O'Brien, a green building specialist for the Office of Sustainable Development.

The public jumped at the opportunity to be involved, and called for measures to improve environmental sustainability, says Angus Duncan, president and CEO of the Bonneville Environmental Foundation, another organization which helps fund renewable energy projects.

'Oregonians are very chauvinistic, and not a little parochial. Those terms can have negative connotations, but I mean this in a positive way. We are proud of being different and living in a different kind of state. That pushes us to accentuate the things we are good at and the values we cherish the most, and look for ways to express that.'

In the late 1960s and 1970s - under Governor Tom McCall - Oregon passed the Open Beach Bill and the Oregon Bottle Bill and began to clean up the Willamette River. It also formed the Oregon Department of Environmental Quality. Around the same time, the city created its first municipal energy plan. In 1974, Portland adopted a downtown plan that led to land use policies which promoted walking and discouraged driving.

However, the event that most embodies Portland's culture was the decision by Mayor Neil Goldschmidt in the 1970s to scrap a freeway and funnel federal money earmarked for the highway into public transportation funds and other public projects.

In addition, the city dug up a highway on the west bank of the river downtown and replaced it with a park.

'At the time, other cities were digging up parks to put in freeways,' says Duncan.

The city that dug up a freeway to plant a park sees green energy as the next frontier in its drive toward environmental sustainability, says City Commissioner Eric Sten, a major player in the drive to create a sustainable Portland.

'If you go back a while, Portland has tried for a couple decades to have a more livable city,' he says. 'Green energy is the next level up.'

FIRST TO GO FOR 100% GREEN POWER

Sten and his associates have launched an ambitious effort to get to the next level. City officials already purchase 13% of the municipality's 16 MW load (which costs US\$13 million a year) from clean sources, and now say they want to go 100% green by 2010, purchasing renewable energy to supply all city facilities.

'I don't know of any other cities that have a goal to be 100% renewable,' says David Tooze, senior energy specialist for the Office of Sustainable Development.



LEFT Portland has the second highest number of renewable energy consumers in the US PORTLAND GENERAL ELECTRIC **FACING PAGE** A solar array on the roof of the Pepsi building in Portland **ET0**

When officials recently issued a request for proposals regarding Oregon-based projects to provide clean power for the city facilities, all the developers who responded proposed wind farms that would be sited in the Columbia River Gorge or the eastern part of Oregon, Tooze says.

'We're looking to directly own a big chunk of a wind operation in Oregon,' says Sten. We want to use our buying power to create real development, permanent change.'

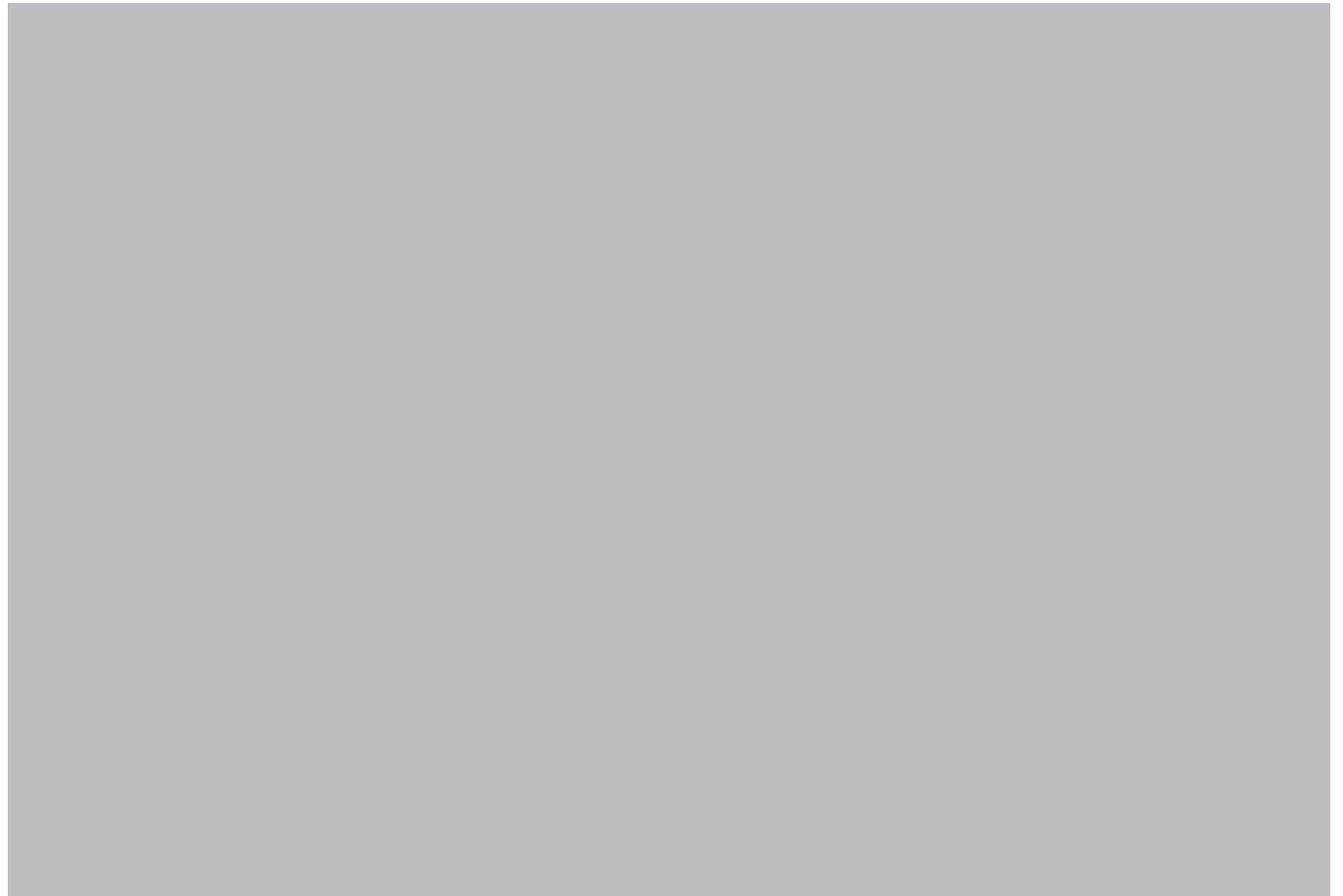
In addition to the green energy purchases, the city has invested in permanent change that Portlanders can see and feel everyday. Residents drop coins into solar-powered parking meters; firemen from two precincts speed out of stations equipped with photovoltaic panels. In some areas of town, children check solar-powered crossing signals before walking across the street. When municipal workers repair parking meters or inspect sewer pipes, they use mobile solar-charged units to power their equipment.

City officials are also putting the green ethic to work a few storeys above street level. The City Council recently passed a resolution calling for all city owned buildings to meet the USGBC's 'Leed' standards, says Sten. That's a few steps above earlier policies that mandated 'green features,' he says.

'Because of the early work we did on green buildings, we are starting to see Portland architects and developers get business out of town.'

The Canadian city of Vancouver, for example, is looking to borrow green building expert Rob Bennett from the Office of Sustainable Development, in order to help Vancouver 'green up' before the Winter Olympics in 2010.

The environmental policies are also proving good for business as new firms are moving into town to supply green





services. Conservation Services Group, based in Westborough, Massachusetts, recently established an office in Portland to provide energy conservation.

Exporting and sharing Portland's expertise means the city is importing money, says Sten. 'This underscores the fact that making progress has not cost us money, but makes us money,' he says.

GREEN BUILDING BOOM

Indeed, developers who specialize in green buildings say that their investments in natural lighting, solar energy and recycled materials pay off. A leader in this area is Gerding/Edlen Development Co., who developed the Brewery Blocks project in the Pearl District of the city. Among the building's features are translucent shelves suspended above employees' heads - the shelves bounce natural light from windows onto desks and bookshelves. Recyclable carpet covers the floors while outside, solar panels generate 7% of the electricity used in the building's common areas.

These features have helped sell office space in this and other 'sustainable' buildings in the project, says Dennis Wilde, project manager for the firm.

Gerding/Edlen also plans to install a larger photovoltaic array in a new sustainable building planned for Portland's waterfront. In addition to their solar arrays, some of these buildings use ground-source heat pumps.

'If you look at the number of Leed buildings per person, we are number one - we're a small city with all these buildings,' says O'Brien.



While some developers have gone green because they believe it's the right thing to do, many are also being enticed by financial incentives.

The city and the state offer incentives to builders that range from a state green-building tax credit - which amounted to more than \$350,000 in just one Brewery Blocks building - and city incentives allowing for denser development if the project features environmentally sound features. In addition, Oregon recently sweetened its rules pertaining to its 35% business energy tax credit for solar installations. Now, if owners can't claim the tax credit - because they don't have a tax liability - they can re-sell the credit. 'US Bank is a willing buyer of these credits,' O'Brien says. 'That made it possible for us to do our two solar fire stations.'



UTILITY CUSTOMERS SHOW RESPONSIBILITY IN THEIR POWER PURCHASING

Like the developers, utilities in Portland understand the citizens' focus on sustainability. The utilities' green power programmes, first launched in the late 1990s, have consistently been ranked among the top ten in the country in recent years. PGE ranks second in the national green power sales, while PacifiCorp comes second in total number of customers purchasing renewable power, according to the US Department of Energy's National Renewable Energy Laboratory's rankings.

'It took a few years to educate people, but once they realized they had a choice, they began buying green power,' says Thor Hinckley, manager of PGE's renewable power programmes.

Partially fuelling green power sales is a law restructuring the state's electrical industry which went into effect in 2002. Oregon regulators required PGE and PacifiCorp to begin offering choices, including green power. The utilities joined forces with experienced clean power brokers - Green Mountain Energy of Austin, Texas, and Three Phases Energy from San Francisco, and began to market their ideas.

PGE customer Sunshine Dairy Foods purchases biogas power, generated from the manure produced at an Oregon dairy farm. It also partnered with PGE to advertise the utility's green energy programme on its milk cartons, says Doug Warrick, Sunshine Dairy's sales manager.

In spite of Portland utilities' high green power rankings, some worry that the potential sale of both PGE and PacifiCorp may change how the utilities offer and market clean power and invest in renewable energy. The city's attempt to purchase PGE and create an even greener utility was recently thwarted by PGE owner Enron. Meanwhile, MidAmerican Energy Holdings has proposed purchasing PacifiCorp.

'If you are an optimist, you look at these transactions as a way to have companies clarify their commitment and perhaps do more green energy,' says Rachel Shimshak, director of RNP. 'If you are a pessimist, you might think they are only out to rape and pillage.'

ENVIRONMENTAL, NON-PROFIT AND GOVERNMENT ORGANIZATIONS PLAY KEY ROLE

In addition to its bevy of citizen activists, the city is home to a number of environmental, government and nonprofit organizations that provide support, funding and education for sustainable projects.

Portland's Office of Sustainable Development, created in 2000, was one of the first offices of its kind in the country, and led the charge to cut greenhouse gas emissions.

'In 2000, Commissioner Dan Saltzman took a very small energy office and merged it with a solid waste and recycling group,' says Swanson. 'That gave us the resources and revenue potential to have a green building programme and to focus on reducing emissions from global warming.'

Also helping green Portland is RNP, which has been headed by Shimshak since it was founded in 1994. RNP actively lobbies for utilities to increase their commitment to renewable energy and encourages consumers and businesses to invest in clean power. Right now, for example, RNP wants Portland's utilities to offer a renewable energy product that



Solar on the roof of a fire station in Portland

provides customers with a stable rate over a long time period, even if it's more expensive.

While RNP lobbies for more action, Portland-based Bonneville Energy Foundation (BEF) makes it happen with creative ideas. The foundation sells 'green tags' and uses the proceeds to fund renewable energy projects. BEF recently established a solar tags buying cooperative. The Northwest Solar Cooperative buys green tags from new solar installations in Oregon and Washington, then sells them to BEF, which sells them to its customers.

'To pull more renewable energy into existence and make it more visible, we can be a little more flexible,' says Duncan.

Creative ideas also flow from the nonprofit City Repair, 'We

put our ear to the ground and try to understand what Portland wants to do,' says Lakeman.

For example, City Repair helped the residents of Dignity Village - a village for the homeless in North Portland - find the resources to build a sustainable community. The villagers raised funds to buy a small wind turbine that provides lighting, and the professional community donated labor to teach residents how to install and maintain the wind turbines.

So far all of these efforts have grown out of the original environmental movement of the 1960s, says Duncan.

'The environmental movement may have gotten tired in other places, but it just re-invents itself here in Portland and all over Oregon,' he says.

And, as Portlanders re-invent the process of going green, they reap benefits, both environmental and economic, adds Sten. 'Here in Portland, we're refuting the national thesis that you can't do anything about global warming. We've shown real progress in a short amount of time.'

'Our city is growing quickly because it's a cool place to live and we have policies that make it livable,' says Sten.

And that's one of the reasons outsiders are attracted to the city recently dubbed 'a livable shade of green' by the *New York Times*.

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