

# Hills are alive with the sound of ecology

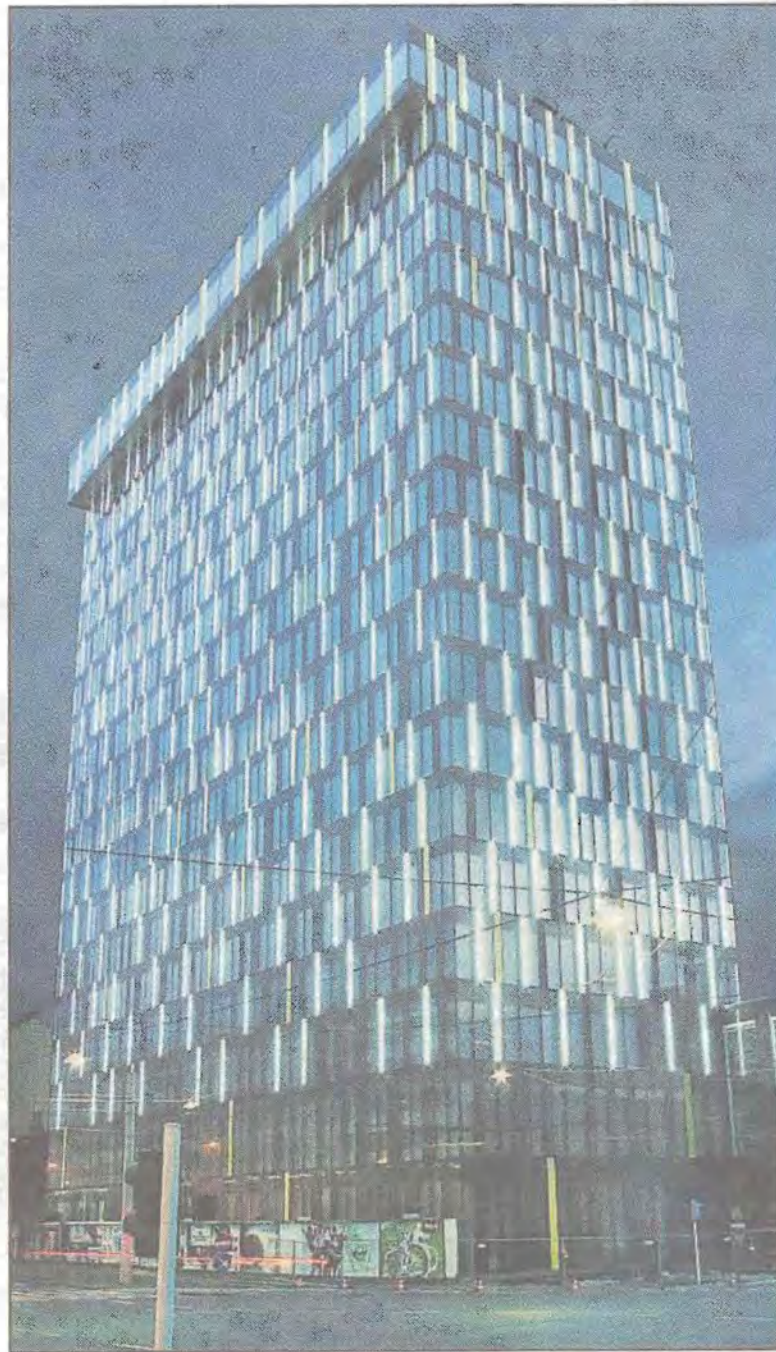
**T**HE recession has engendered much debate within the building industry. We are continually discussing how we can return to growth, but a consensus is emerging that however we achieve it, growth must be environmentally as well as economically sustainable.

We can learn a great deal from Austria, where 'passive' buildings constructed from sustainable materials, using low amounts of energy (and even generating their own), are fast becoming the norm. The passive house is the ultimate low-energy building. Any building, in any sector, can be constructed or retro-fitted to passive house standards.

With a group of other professionals, I visited Austria recently and the buildings we saw combine clever design with environmental technologies, such as solar panels, photovoltaic cells, heat pumps and air filters. They are a pleasure to live and work in



Architect **Frances Power** says despite improvements in building regulations, we still lag behind leading edge countries like



**LEFT:** The Power Tower in Linz is the first high-rise office building built with passive-house characteristics. The building draws energy for heating and cooling from the ground and a solar power station on the south-west façade generates electricity.

**BELOW:** The Passivhaus Kindergarten in Innsbruck has a sedum roof (designed to grow grass, etc), surrounded by glazing. Filters expel stale air and introduce air that is even cleaner than the alpine air outside.

within the Power Tower is consistently excellent. Filters continually exchange stale air for fresh air with high oxygen content. This, in turn, stimulates the people working within the building, improving their concentration and productivity. Three factors — radiant temperature, the rate of air change and ambient temperature — contribute to thermal comfort. The Power Tower successfully integrates all three.

At night it is at its most impressive, with the 700 LEDs on its façade producing breathtaking lighting effects and enlivening the Linz skyline. The lighting technology involved is highly energy-efficient, consuming less electricity than a commercial vacuum-cleaner.

The Austrians set great store by their pleasant, well-oxygenated air within their passive buildings. "Come into the fresh air!" is a common greeting to visitors.

When we arrived at a factory, one of the workers beckoned us to come inside quickly; he didn't want



discussing how to return to growth, but a consensus is emerging that however we achieve it, growth must be environmentally as well as economically sustainable.

We can learn a great deal from Austria, where 'passive' buildings constructed from sustainable materials, using low amounts of energy (and even generating their own), are fast becoming the norm. The passive house is the ultimate low-energy building. Any building, in any sector, can be constructed or retro-fitted to passive house standards.

With a group of other professionals, I visited Austria recently and the buildings we saw combine clever design with environmental technologies, such as solar panels, photovoltaic cells, heat pumps and air filters. They are a pleasure to live and work in and do not pollute, or contribute to climate change.

The cost of eco-friendly building technologies varies depending on building type, but is an approximate 10%-15% differential, which would be paid back in running costs over 10 to 13 years. In the case of Christophorus haus, a multifunctional office and cultural centre, they were six years into a 13-year period of equalisation. The energy standard chosen influenced operating costs, so it makes sense to look at building costs relating to energy payback. This is relevant to schools and municipal buildings, where the government pays construction and running costs.

The Passivhaus kindergarten, in Innsbruck, is one of the most joyful buildings I have visited. Its designers set out to amuse and fascinate children, who can run their hands along the soft, tactile timbers — white oak, spruce and silver fir — on the walls and floors. Everything in the nursery, even the door handles and coat hangers, are on a child's scale.

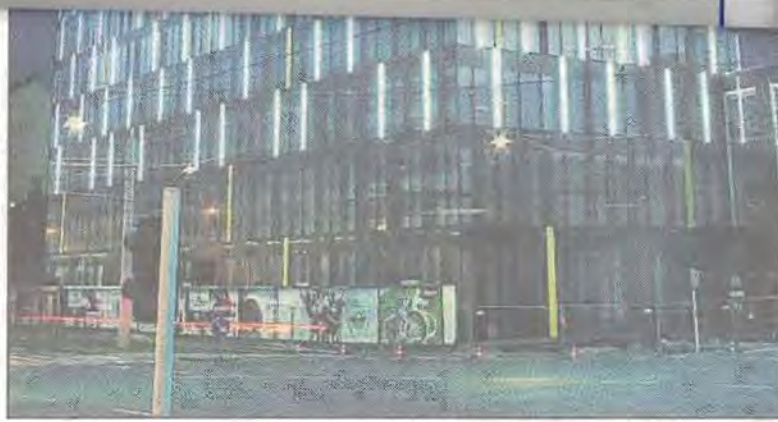
The building was constructed off-site, then assembled on a



**Architect Frances Power** says despite improvements in building regulations, we still lag behind leading edge countries like Austria

concrete slab over nine weeks. It is a free-standing, timber-framed building, filled with light with a sedum roof (designed to grow grass, etc), surrounded by glazing. Filters expel stale air and introduce air that is even cleaner than the alpine air outside. It is a building that promotes a sense of well-being.

The contractor who made its component parts off-site, then assembled them on the concrete slab, told me how much he enjoyed the experience. As he sketched out the details of the roof lights, I marvelled at this most successful of buildings — a rare blend of inspired design, excellent craftsmanship, energy-efficiency, and child-friendliness.



The Power Tower, in nearby Linz, is the first high-rise office building built with passive-house characteristics. The new corporate headquarters for Energie AG Oberösterreich, an infrastructural group operating throughout Europe, it places great emphasis on efficient and sustainable use of energy.

The building draws energy for heating and cooling from the ground. A solar power station on the south-west façade generates electricity. With a surface area of 600 square metres and a capacity to produce 42,000 kWh per year, it is one of Austria's largest power plants integrated into the façade of a building. The Power Tower does not require connection to a district heating system, nor does

it use fossil fuels in its heating and cooling systems. The amount of CO<sub>2</sub> it emits is hundreds of tonnes less than is produced by a conventional high-rise office building. With glass covering two-thirds of the surface of the multi-functional façade and a highly-insulating material the rest, the building heats and cools itself. Innovative, slatted sunshades reduce solar radiation by up to 90%, and make conventional air-conditioning unnecessary. The atmosphere inside is pleasant and comfortable. The heating system consists of a series of copper tubes inside the heating and cooling panels, suspended from the ceiling. These emit the radiant heat with which people are most comfortable. Air quality

improving their concentration and productivity. Three factors — radiant temperature, the rate of air change and ambient temperature — contribute to thermal comfort. The Power Tower successfully integrates all three.

At night it is at its most impressive, with the 700 LEDs on its façade producing breathtaking lighting effects and enlivening the Linz skyline. The lighting technology involved is highly energy-efficient, consuming less electricity than a commercial vacuum-cleaner.

The Austrians set great store by their pleasant, well-oxygenated air within their passive buildings. "Come into the fresh air!" is a common greeting to visitors.

When we arrived at a factory, one of the workers beckoned us to come inside quickly: he didn't want a draught of cold, alpine air disturbing his colleagues as they worked on creating beautiful, wooden doors and windows for Europe's passive buildings.

The last project we visited was a community centre in Ludesch, constructed around a central courtyard and sheltered from the summer sun by a central screen of photovoltaic modules in laminated safety glass.

The building, a timber-framed construction, uses local sheep's wool for insulation. Like the kindergarten, the interior is soft and tactile. As is usually the case in sustainable projects, the community building received grant aid from central government, but it also pays for itself by selling the electricity it generates to the national grid.

Everywhere we went we were struck by the Austrian ability to marry sustainable construction with concern for the people who use buildings.

Frances Power is MD of FPA Architects.  
Website: [www.fpa.ie](http://www.fpa.ie).

She travelled to Austria on the invitation of the commercial section of the Austrian embassy. [www.advantageaustria.org/ie](http://www.advantageaustria.org/ie).