

Greening giants

With the number of tall buildings on the rise, the eco-credentials of such structures are in the spotlight.  ROGER HUNT reports on how substantial can still be sustainable.

The wind turbines at the 43-storey Strata building have led to the developers being accused of environmental tokenism



In the days after the terrible events of 9/11 there was some speculation that tall buildings were consigned to history. Such thoughts did not last long. Indeed the Council on Tall Buildings and Urban Habitat predicts that within this decade we are likely to witness not only the world's first kilometre-tall building, but also the completion of a significant number of buildings over 600m, or around 2,000ft.

To put this in perspective, The Shard, which is rising inexorably above the London skyline to be the tallest building in western Europe, will be a mere 310m. In the words of the website, it will be a "vertical city of high-quality offices, world-renowned restaurants, the five-star Shangri-La hotel, exclusive

residential apartments and the capital's highest viewing gallery offering 360° views".

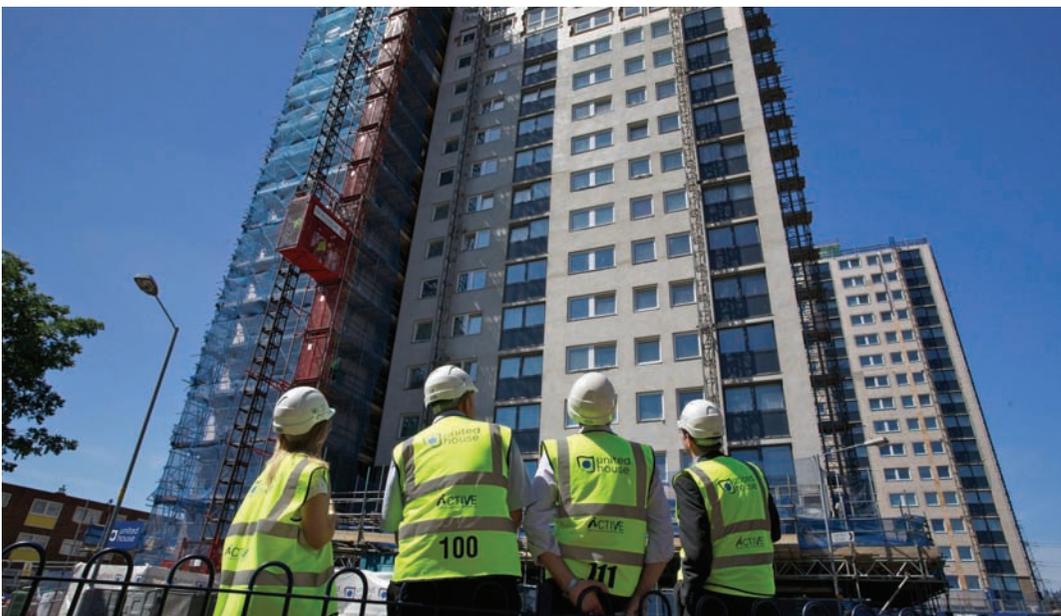
As tall buildings rise higher, it raises the question of whether sustainable practices are keeping pace. According to William Murray, a director of Wordsearch, a company specialising in creating marketing campaigns for tall buildings, their potential sustainability relies on them being built for the right reasons and in the right way. "The only really good reason to build a tall building is because you've run out of space. For residential towers it's often about view, it's about the saleability of them, it's about the people who like to live high," says Murray.

"Creating a truly sustainable development involves both the local and wider communities, ensuring

facilities for the existing and new residents are part of the scheme and support the local economy, as well as limiting negative environmental impact.

"Until recently, many tall buildings were created in isolation without addressing that wider story. Developers didn't have either the facilities or obligation to consider the wider social impact, or chose to go tall for reasons of vanity rather than necessity, therefore limiting how sustainable they can be," adds Murray.

The impact – both good and bad – of tall buildings is potentially enormous. They may form an iconic landmark, bring vibrancy, homes and people to an area, or may overshadow in all senses of the word. Manchester's 47-storey Beetham Tower was recently



Due to the nature of their design, the more commonplace ideas of sustainability are less easily applied to towers



CLOCKWISE FROM LEFT

St George development The Tower, One St George's Wharf, in Vauxhall, features a wind turbine that will generate an estimated 20,000kWh | Erno Goldfinger-designed, Grade II listed Balfron Tower in Tower Hamlets is one of a number of high-rises being retrofitted by PRP Architects | The Shard, near London Bridge, will be the tallest building in western Europe | Strata, in Elephant & Castle, features a glazing system that reduces solar gain and heat loss | the Colne & Mersea tower blocks have been retrofitted with triple glazing and PV panels



accused of humming due to the wind, disturbing local residents' sleep.

At Barratt London, Gary Patrick, regional sales director, believes it is important to look at the wider sustainable benefits of constructing tall residential buildings. "With more and more people choosing to live and work in the capital, building vertically can be seen as a solution to increasing the housing stock without sprawling onto land outside the city."

Bill Price, director of property and development at WSP, a global design, engineering and management consultancy specialising in property, transport and infrastructure, adds: "You strengthen your argument for tall buildings if you are near a major transport interchange; buildings like The Shard and the Strata tower tick that box very substantially."

Price has been involved in both projects. Strata is a 43-storey, 148m-tall reinforced concrete residential tower leading the sustainable regeneration of London's Elephant and Castle area. With its pixilated appearance and three, 9m-diameter wind turbines, the tower has been much derided, with the developers accused of environmental tokenism.

In truth, a number of options were considered to enable Strata to achieve the London mayor's 10% renewable energy target, but it was concluded that wind turbines represented the best solution, given the size and shape of the building. They should produce about 8% of the building's total energy demand, although Price highlights two fundamental issues: firstly, because the blades are fixed, they do not always pick up optimal wind and, secondly, on a very windy day, the turbines have to be locked because otherwise they would vibrate and be too noisy for residents.

However, they are not the only green features. Less obviously, the building includes a high-performance glazing system that reduces solar gain and heat

losses, a heat recovery system within the whole house ventilation system, and air permeability less than half of that required by current UK building regulations. Provision has also been made for connection into the proposed local community combined heat and power system. It is anticipated that, together, these measures will result in a 73.5% reduction in carbon dioxide emissions compared with 2006 building regulations.

Elsewhere in London, The Tower, One St George Wharf, a St George development at Vauxhall, also intends to harness the power of the wind. The 50-storey building incorporates a vertical axis wind turbine that will generate an estimated 20,000kWh annually. In addition, boreholes have been drilled down 160m to reach the London aquifer where groundwater remains at a constant temperature year round. Water is pumped from this and heat is extracted for space heating and hot water within the building. Water is also used for cooling.

The apartments are triple glazed and the glazing system incorporates a ventilated façade which allows excess solar gain to be ventilated, while maintaining cold weather performance. Within the glazing system, blinds further reduce overheating and are perforated to allow a view from the apartments even when closed, making them more likely to be used by residents.

Barratt's Gary Patrick says that due to the nature of their design, the more commonplace ideas of sustainability are less easily applied to towers. "This means that solutions usually have to be more innovative which, of course, comes at a premium." Barratt London's 27-storey Ontario Point building at the Maple Quays development in Canada Water will exceed the requirements of Level 4 of the Code for Sustainable Homes. A combined heat and power plant fueled by biomass helps meet energy needs. ▶

THIS IMAGE Ferrier Point near the Olympic Village now includes more than 400m² of PV panels
RIGHT & BELOW RIGHT Before and during Sprunt and United House's £11m retrofit of the Colne & Mersea residential tower blocks in Barking, east London



Clearly, height need not be a barrier to the inclusion of sustainable features, but, says Price, the unique demands of high rises force engineers to be cleverer with materials. He cites concrete as an example. "We're using stronger and stronger concrete to make the columns as small as possible by using super high-strength concrete. If you have a super robust building it's going to last a long time so it won't need demolishing and replacing. In sustainability terms, despite the use of cement, that avoidance of demolition is a strong card."

But what about the sustainability of tall buildings already in existence? Retrofitting is becoming increasingly common, and, in New York, the Empire State Building has been used as a model to help understand and promote environmentally sound practices. Upon completion of the programme, the building's total energy usage will be reduced by more than 38%, energy costs by \$4.4m (£2.9m) annually and carbon emissions by 105,000 tonnes over the next 15 years. Although an office building, the background to the retrofit provided on the website is fascinating, especially when one considers the scale of the undertaking, which included the refurbishment of some 6,500 windows.

In the UK, PRP architects is currently upgrading a variety of high-rise residential buildings. One example is Balfour Tower, a Grade II listed, 27-storey, 1960s

Erno Goldfinger creation on the Brownfield Estate in the London borough of Tower Hamlets.

"We have demonstrated 80% CO₂ savings after retrofitting; primarily through thermal upgrades and installing new windows," says Chris Wilford, associate director at PRP. "Interestingly, for new high-rise residential buildings, the emerging definition of zero carbon and the Fabric Energy Efficiency Standards do not yet apply to anything over four storeys."

Ken Hughes, a director at Sprunt architects, acknowledges that tall buildings have not always had a good press but adds: "When you go and see some of these buildings they are nice-size flats with great views and people love them. It's often the common parts, the maintenance of the lift and the environment around the tower block where they fail because there isn't a budget to maintain them."

In Barking, east London, Sprunt has been working with contractors United House on the £11m retrofit of two 1970s 17-storey residential tower blocks – Colne and Mersea – on the Harts Lane Estate. Triple-glazed windows have been fitted along with integrated blinds to provide solar shading on the south and west elevations. On the roof, photovoltaic panels have been added to create a minimum of 10% on-site renewable energy.

Photovoltaic panels are also a key element at another east London refurbishment, that of the

23-storey Ferrier Point, which is being undertaken by construction firm Rydon. The tallest building in the borough of Newham, Ferrier Point stands on the edge of the Olympic Village. Nearly 400m² of photovoltaics have been incorporated into the facade on the south-facing elevation and will supply electricity to communal facilities such as lifts, hallway lighting and reception facilities. The rest of the tower will be clad with coloured aluminium panels that are resistant to airborne grime, keeping it cleaner for longer – a key consideration with any tall building. [Sh](#)

CONTACTS

Council on Tall Buildings and Urban Habitat

www.ctbuh.org

Empire State Building www.esbsustainability.com

PRP www.prparchitects.co.uk

Rydon www.rydon.co.uk

Sprunt www.sprunt.net

United House www.unitedhouse.net

Wordsearch www.wordsearch.co.uk

WSP www.wspgroup.com

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