

NET-ZERO ENERGY BUILDINGS

A COMPELLING CASE FOR ENERGY EFFICIENT BUILDINGS

Our cities consume enormous quantities of energy, with the heating and cooling of buildings accounting for more than 41% of total demand in Europe alone. This means buildings have a dramatic negative global environmental impact, which is unsustainable, given the world's predominant reliance on fossil fuels and their rapidly increasing costs.

It is clear that making buildings more energy efficient is essential, especially given ever more stringent energy efficiency codes and building regulations, but it is also a sound business investment that benefits both owners and occupiers. Fortunately thanks to advances in building technology, energy efficient building design is now more available and affordable than ever. The implementation of optimal cost energy saving building methods can provide building solutions with a reduction in capital cost or minimum capital cost uplift based on specific buildings. Energy efficient buildings are cheaper to run as well as they offer an attractive return on investment (ROI) for property owners, investors and tenants. Additional economic benefits for the property sector include higher rental income, maximisation of tenancy occupancy levels and future proofing property asset values. They can also enhance BREEAM, LEED, Greenstar, Estidama and other environmental assessments.

This makes a compelling case for energy efficient buildings, especially when it does not impinge on their aesthetics, their functionality or the comfort level of those inside. Creating striking looking buildings that are Net-Zero Energy at the same time is the golden bullet solution for everyone concerned with modern cities.

THE ROUTE TO NET-ZERO

With this in mind, Kingspan, the global leader in insulation and building envelope's products and solutions, introduced a three step process towards Net-Zero Energy Buildings (NZEBs), called the Route To Net-Zero (RTNZ).

A Net-Zero Energy Building is a building where, as a result of its very high level of energy efficiency, provision of on-site renewable energy

systems and additional off-site measures, its overall annual primary energy consumption is equalled or exceeded by energy production related to renewable energy sources.

Beyond the obvious environmental benefits of NZEBs, they also offer reduced energy bills, increased building value, controlled costs and even energy security, with less reliance on variable, insecure sources.

The superior energy efficient products and sustainable systems that Kingspan offers are all designed to create stunning looking buildings with cost optimal solutions, meaning increased ease and speed of build, low energy and operating costs (towards Net-Zero Energy).

To achieve affordable NZEBs, a whole building life cycle cost assessment needs to be carried out. This will take into account the construction's capital cost, the costs of energy, maintenance and plant replacement throughout the building's life, and the income from energy generated by on-site low or zero carbon technologies.

Kingspan approaches the RTNZ using a clearly defined route, divided into three steps.



The first step, called 'envelopefirst™' and 'Optimised Services', is to optimise the insulation and air tightness performance of the building envelope for its intended life, to at least comply with building codes, while also ensuring the building's services are geared to energy efficient operation. It is of the utmost importance that the building envelope is appropriate before embarking on other energy efficient measures. The envelope must offer thermal performance suitable to the local climate.

But it is not just the building envelope that must be considered at this stage, it is important to take a holistic approach to energy efficiency. Important elements such as a building's day-lighting design must always be carefully considered, taking location and climate into account. Kingspan's daylight systems can be incorporated into building



New offices' building in Peterborough, UK, which has taken full advantage of Kingspan Insulated Panels' wide range of building envelope & PV systems, and safety solutions, becoming the first commercial property to be certified to BREEAM 'Excellent' under the new building assessment method.

designs to further reduce energy consumption, by reducing the need for electric lighting. Energy efficient internal building services with intelligent controls must also be included at this stage.

Kingspan Insulated Panels' building envelope products and solutions provide enhanced thermal conductivity with low air permeability to ensure thermal performance robustness throughout the building's lifecycle. The wide range of Kingspan roof, wall and façade insulated panel systems, including day-lighting, come in various colours and finishes to suit any design requirements. All products and solutions ensure low energy consumption as well as initial capital outlays for heating and cooling plant systems.

With the building envelope correctly specified and optimal building services incorporated into the design, the second step is called 'Insulate & Generate'. At this stage, additional enhancements to the building fabric are introduced and renewable energy systems are added to further reduce its overall energy footprint. Low or zero carbon technologies such as Kingspan PV (PhotoVoltaic) Roof Mounted Systems are perfectly suited to help reduce energy bills for buildings with large roof space. Likewise, Kingspan Sol-Air, a thermal air heating system that channels passive solar heat gain into the heating system, is perfectly suited for buildings with fresh air requirements. Other buildings may require different solutions, including solar thermal, wind and even heat pump technologies, all of which are available from one of the divisions of Kingspan.

'Insulate & Generate' further reduces the building's overall energy consumption. The energy saving solutions selected at this stage depend on a number of variables, including building type, internal demands, orientation, geographical location and climate.



In 2011, Kingspan Insulated Panels celebrated the completion of the next phase of its RTNZ with the installation of 2,900m² of Kingspan PV Roof Mounted System on the roof of its manufacturing facility at Holywell, UK.

The final step in the RTNZ is called 'Net-Zero Energy Buildings'. The purpose of this stage is to ensure that the overall annual performance of the building balances out. This usually involves enhancing the renewable energy producing technologies incorporated in the building, and may require investment in off-site energy saving schemes.

With the promise of increased energy security, higher lease and rental returns, green building accreditation, a reduced environmental impact, low lifetime running costs, enhanced marketability, increased productivity and a future-proof asset, the benefits to constructing, owning, operating or working in a Net-Zero Energy building are clear. Kingspan believes that the RTNZ is a path that everybody needs to follow, and one that savvy and cost-centric architects, specifiers, planners and developers are already embarking on.

With this in mind Kingspan is making sure its product range covers the full spectrum of requirements to meet these needs; from thermal efficient roof, wall and façade systems, through to PV solutions from the Insulated Panels division, to wind and solar thermal technologies from the Environmental division.

As the global leader in high performance building solutions, Kingspan is widely recognised in the industry for the high quality and performance of its products as well as its commitment to providing optimal cost energy saving solutions. And as a Group, Kingspan has embarked on its own RTNZ, committed to ensuring that all of its facilities worldwide are Net-Zero Energy by the year 2020. ■

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