Sustainable initiatives, and accommodate a library and a visitor’s centre will host permanent exhibitions of all the west wind and are expected to generate power for use in the building. In addition, the three horizontal-axis wind turbines at a diameter of 29m each and 6,000 photovoltaic panels integrated into the façade will generate most of the energy needs of the building.

Many other design provisions will contribute to substantial savings with regard to water and materials consumption. In the context of the United Arab Emirates, where emerging wealth – mainly propelled by oil revenues – is rapidly changing the built environment, high-rise buildings will continue to dominate the skylines of the cities. Accepting this fact, the Lighthouse Tower will become a benchmark in this region with regard to energy efficiency and renewable energy sources.

Comment of the Holcim Awards jury Africa Middle East

The jury commended this project because it demonstrates in a convincing manner that high-rise buildings also have significant potential to be designed and constructed in compliance with the globally-accepted standards for sustainable construction. The high-tech structure is a 400m-tall, 53-storey twin tower mainly for ‘class A’ offices. Optimization of passive strategies for both energy and water and building integration with renewable energy systems including three large scale photovoltaic panels integrated into the façade will generate most of the energy needs of the buildings.

The Lighthouse Tower is located on a prominent plot within the central district of the Dubai International Financial Centre (DIFC). DIFC is a 120-acre (48ha) free-zone envisaged to be the world’s newest international financial centre serving the vast region between Western Europe and East Asia. The client’s design brief requires the creation of a physical and metaphorical “lighthouse” for the financial centre which accommodates high-end class ‘A’ offices. This unique building is set to become a prototype for low-carbon towers within the region and a model for more sustainable developments in the future.

The architectural vision for the Lighthouse Tower has evolved from the client’s aspirations for creating a beacon for the DIFC. This tower reflects the energy and kinetics of an international financial centre which is fast becoming a global leader and was inspired by the rectilinear context and simple minimalist lines of the existing DIFC precinct. In setting a new benchmark for Dubai, the design aspires to be a low-carbon commercial building which will aim to reduce its total energy consumption by up to 55% and water consumption by up to 36% compared to the current Dubai standard practices. This will be achieved through the use of many design provisions which include passive solar architecture, many low-energy, low-water engineering solutions, recovery strategies for both energy and water and building integrated renewable energy systems including three large scale wind turbines and over 6,000 photovoltaic panels within the façade.

Quantum change and transferability

This building will incorporate three 29m diameter wind turbines at its top, the highest ever installation of turbines above ground, while 6,000 photovoltaic units will form the spanned panels. It demonstrates how renewable energy systems can be married with architecture and will inspire others to follow suit. It will mark a quantum change in construction that will see buildings becoming power plants of the future.

Ethical standards and social equity

The development will have a long-term impact on the commercial fabric by its presence as a beacon of sustainability and as a benchmark for future sustainable developments in the region. The visitor’s center will host permanent exhibitions on various sustainable initiatives thereby contributing to public awareness on sustainable and environmentally responsive design. An integral part of the DIFC Lighthouse will be its outdoor environment. People will be encouraged to use the landscaped concourse which will slope down to street level as a park. High levels of outdoor comfort, engineered considering surface temperatures, shading, breeze and evaporative cooling, will create a vibrant, social space that forms the heart of the DIFC precinct throughout the year.

Ecological quality and energy conservation

This building exceeds any other skyscraper in reducing energy consumption. Our first step was to limit building loads passively. A high performance façade reduces heat transfer but allows ample light. Pressure testing will ensure low infiltration gains. Breaking escape stairs and installing air locks at high level will reduce stack effects. Efficient day-light-controlled lights, pumps, motors and fans reduce both primary energy loads and resultant cooling loads. Heat recovery wheels reduce outside air loads, low weight, double-decked elevators, occupancy control for ventilation and in-dractions fans and occupancy/pollution sensing in the car parks all reduce energy use. Overall, energy will be reduced by 35% and water by 36% compared to our business as usual benchmark.

Economic performance and compatibility

Extensive financial analysis was undertaken for this building and economically it proves a sound investment. The total extra cost for all sustainable initiatives, including integrated photovoltaic panels and wind turbines, is USD 27 million. This would pay back in 7.4 years. However, allowing for 10% increased rent due to the building’s green image, this drops to just 2.4 years.

Contextual and aesthetic impact

The tall, slender geometry of the tower sculpted by sunlight and wind reflects the energy and kinetics of DIFC. The LED-lit façade inspired by the traditional ‘Masrabadya’ and the client’s logo transforms the tower into a ‘Lighthouse’. Metaphorically, the super-green development is envisaged to become a beacon for all future low-carbon, sustainable developments within the region.