OPPORTUNITY. 機匯

Apr 2025

INNOVATION DRIVING SUSTAINABLE ENERGY SOLUTIONS

Summer 2025 / Big Picture
Business Unit: HUTCHISON PORTS

Ports and terminals around the world are increasingly utilising electric power for equipment and shoreside vessel power generated from sustainable green energy sources. This shift has led to a growing demand for electricity supply in recent years, as the shipping industry strives to achieve net-zero greenhouse gas (GHG) emissions as proposed by the International Maritime Organisation (IMO).

In April 2025, the IMO has approved draft amendments introducing an updated net-zero framework to cut international shipping emissions to net-zero by 2050. The IMO Net-Zero Framework is the first to mandate both emissions limits and GHG pricing across an entire industry. Set for formal adoption in October 2025 and enforcement in 2027, the rules will apply to ocean-going ships over 5,000 gross tonnes, responsible for 85 percent of international shipping' s CO^2 emissions. Under the updated net-zero framework, ships must annually reduce fuel GHG intensity based on tiered targets, using the 2008 baseline.

- The upper tier (base target) calls for a 4 percent cut by 2028, rising to 30 percent by 2035.
- The lower tier (compliance target) requires a 17 percent cut by 2028, increasing to 43 percent by 2035.

As part of the energy transition strategies to reduce reliance on fossil fuels, terminal operators and ports are exploring a range of sustainable power options, including solar, tidal, hydrogen, and hydroelectric power. Competition for limited clean and renewable energy from both industry and consumers means that ports are investing in emission-free energy to power their facilities and equipment.

Many innovative eco-friendly projects are focused on harnessing natural resources such as wind, solar, and hydropower, as well as a variety of low-carbon fuels including hydrogen, ammonia, and methane. For more insights, read about 'FUELS FOR THE FUTURE' in the Summer 2024 edition.

SHORE POWER ON TAP AT HUTCHISON PORTS

Hutchison Ports continues to deliver sustainable, innovative solutions throughout its global network, employing a range of renewable green energy sources and smart technology to enhance operational efficiency. This includes the deployment of electric-powered equipment, automated vehicles, and shore power where applicable.

Today, our terminals in China, including Shanghai, Ningbo, Xiamen, and Yantian provides shore power connectivity at their berths, allowing vessels to shut down their engines while docked. This initiative significantly reduces emissions in the port area and benefits local communities by lowering air, noise and marine pollution.

In Europe, Hutchison Ports BEST terminal in Spain has launched the first shore power supply system in the Port of Barcelona, supplying vessels with 100 percent renewable electricity while at berth. Hutchison Ports ECT in the Netherlands is collaborating with the Port of Rotterdam to provide shore power to 90 percent of ships by 2030. Meanwhile in Asia, Hutchison Ports Gwangyang in Korea has completed its shore power supply, expected to be fully operational by summer 2025.

SOLAR LIGHTING THE WAY FORWARD

Generating renewable power on-site at ports has become a widely adopted practice to reduce pollution in port communities. Solar power can supplement energy supply at terminals and decrease reliance on grid power. Many terminals globally are utilising rooftop spaces on buildings, cranes, and even parking facilities to install photovoltaic solar panels. Hutchison Ports HIT in Hong Kong has solar panels installed on quayside cranes machinery houses, 52 metres above the ground which will generate a total of 42,000 kilowatt-hours of electricity per year. For more details, read about 'SOLAR PANELS REACH NEW HEIGHTS AT HIT' in the Winter 2024 edition.

The expansion of solar photovoltaic power has been driven by a remarkable 90 percent reduction in the cost of solar panel equipment over the past decade.

OVERVIEW OF RENEWABLE POWER SOURCE AT HUTCHISON PORTS NETWORK (2024)

OLD AND NEW INNOVATIONS POWERING PORTS

Innovation that leverages both new and traditional technologies is central to many energy projects worldwide. On the River Mersey in North West England, research is underway to harness tidal power technology. This tidal power plant stores water during the incoming tide and releases it during the ebb tide, providing clean marine energy to the port industry and city residents.

HYDROGEN: A PROMISING ALTERNATIVE TO FOSSIL FUELS

Harnessing energy from hydrogen, the most abundant element in the universe, has led to the development of various technologies to capture and utilise it. Ports are exploring different methods of producing hydrogen for multiple applications, creating a source of green energy for onshore activities in road, rail and port operations.

Hutchison Ports and ScottishPower are advancing plans for a 100MW large-scale green hydrogen hub at the Port of Felixstowe. The energy source for producing green hydrogen at the port will come from nearby wind farms operated by Scottish Power. Located within Freeport East, the facility is well-served by road, rail, and sea infrastructure, and it offers opportunities to decarbonise the operations of surrounding industries, fulfilling local demand for hydrogen liquefaction and ammonia production. ScottishPower has described the hydrogen hub as ‘strategically important’ for clean fuel.

HYDROGEN SHORE POWER PROJECT ON THE RISE

A consortium of innovative energy companies in Scotland is developing green hydrogen by processing wastewater to power tugs while berthed at the port. The project integrates a green hydrogen shore-power solution for marine use, incorporating water reuse. The process uses purified water for electrolysis to manufacture hydrogen, which is then fed into an internal combustion engine generator to produce carbon-free, pollution-free shore power for tugs.

Similar projects are also underway at the Port of Rotterdam, where a hub is being developed to produce and export hydrogen to global markets.

DOCK POWERED BY 2000-YEAR-OLD TECHNOLOGY

In the UK, Peel Ports is utilising hydropower at its ‘Queen Elizabeth II’ dock at Eastham Dock on the

Wirral, employing a state-of-the-art Archimedean Screw generator located at a lock at the site. The generator is connected to the dock’ s electricity network and is expected to generate up to 1.5 million kilowatt-hours (kWh) per year, enough to power the dock and nearly 190,000 homes for a day.

CHANGE DRIVING INNOVATION

The pressure to reduce greenhouse gas emissions is sparking a new era of innovation in the shipping and ports sector, benefiting port staff, communities, and customers for generations to come. According to ‘Ports and Energy Transition by 2040’ published by Port Economics, Management, and Policy, approximately 60 percent of all new power generation capacity is expected to come from renewables, with much of this renewable-based power generation becoming competitive without relying on subsidies.

With additional power from nature like solar and wind, energy powered systems can be more flexible, securing extra power during peak demand. The declining cost of batteries also means that energy can be stored for use during temporary fluctuations in supply and demand. As ports transition to using more electric-powered equipment and machinery to reduce fossil fuel reliance, they will require power from the grid and supplementary sources from renewable energy to meet increasing demand.

HUTCHISONPORTS

A member of CK Hutchison Holdings