



Powering UK Ports

A Policy Framework for Electrification & Shore Power

September 2026

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The British Ports Association is the national trade body for UK ports and harbours. Our members handle 86% of the UK's seaborne trade and support other important maritime activity from offshore energy to fishing and marine tourism and leisure.

Version	Date	Author	Status/Comments
0.1	26/8/26	M. Simmonds	First draft, body and recommendations.
0.2	27/8/26	M. Simmonds	Added and updated some recommendations
0.3	8/9/26	M. Simmonds	Recommendation 9 and related section replaced. Executive summary added and combined with recommendations section.
1.0	18/9/26	M. Simmonds	Final version approved by BPA Council

Executive Summary & Recommendations

The energy transition will significantly increase the importance of electricity to UK ports. Ports themselves are electrifying equipment and operations, while vessels, tenants, logistics businesses and industrial users will increasingly require access to low-carbon power. Shore power, vessel charging and the production and handling of alternative fuels could create substantial new demand, often with very high peaks. Investment in electricity infrastructure at ports can also unlock industrial investment and decarbonisation well beyond the port boundary.

The UK starts from a difficult position. Electricity prices for British businesses are high by international standards and ports do not generally benefit from the relief available to some other strategically important industries. Network charging also creates particular problems for infrastructure that needs substantial capacity but may use it intermittently. This matters for shore power and vessel charging, where ports can face significant fixed costs for maintaining capacity before sufficient customer demand has developed. The charging framework should recognise the difference between a conventional end-user and an infrastructure provider maintaining electrical capacity so that other businesses can electrify.

Availability of power is equally important. Major grid connections can take years to deliver, while network planning based principally on current or firmly contracted demand risks understating future requirements at ports. Demand may increase suddenly as a new vessel service, industrial user or piece of infrastructure is electrified. Regional and strategic network planning therefore needs to take account of credible future maritime and industrial demand, with a pathway for capacity to increase as that demand becomes firmer. Local generation, storage and flexible connections can help make better use of the network, but they are not a substitute for sufficient grid capacity.

The UK ports sector is independently financed and should remain so. It is at the heart of the UK's thriving and competitive ports industry. Ports routinely invest substantial sums where there is a viable commercial case. Electrification nevertheless creates risks that conventional port investment does not always face: infrastructure can be required years before customer demand is certain, while much of the economic and environmental value it creates may accrue to shipping lines, tenants, neighbouring industries and the wider economy rather than the investor. Policy should not remove normal commercial risk or subsidise projects that would proceed anyway, but it should recognise where government objectives require enabling infrastructure to be delivered ahead of the market. Aggregating suitable projects and working with the National Wealth Fund and private investors could also help attract long-term infrastructure capital.

Government should remain technology neutral on maritime decarbonisation, with international shipping emissions principally addressed through the IMO. That does not mean waiting for a single technology to emerge before planning infrastructure. Shore power, batteries, hybrid systems and alternative fuels are all likely to play a role, and most credible pathways will substantially increase the requirement for

electricity and electrical infrastructure at ports. Maritime, energy and network policy should reflect that common requirement now.

The expansion of the UK ETS to maritime can help create demand for lower-carbon infrastructure, but carbon pricing is effective only where operators have practical and competitive alternatives. Maritime ETS revenues should help fund the infrastructure and technologies that allow operators to decarbonise. BPA supports UK–EU ETS linkage in principle, but any agreement should preserve a safeguard against future measures that create material risks of carbon leakage, loss of port competitiveness or freight shifting from sea to more carbon-intensive modes.

Shore power is the clearest test of whether this policy framework works. The technology is mature and can substantially reduce emissions and local air pollution at berth, but investment is held back by high electricity prices, fixed network charges, connection costs and uncertain utilisation. Government should remove the Climate Change Levy penalty on shore power, address the structural price differential with onboard generation and provide a dedicated multi-year route for supporting deployment where there is a demonstrable viability gap. This should sit alongside, rather than replace, continued support for maritime innovation.

In the long term this should help create a commercially sustainable market in which ports and their customers can invest with confidence, electricity infrastructure is available when it is needed and the policy framework does not make electrification unnecessarily expensive. Getting these fundamentals right would support maritime decarbonisation while strengthening the competitiveness of UK ports and the wider industries that depend on them.

Headline Recommendations

Recommendation 1: Government should provide ports with access to electricity-cost relief comparable to that available to other strategically important industries, with eligibility based on exposure to high electricity costs and the role of the activity in supporting competitiveness and decarbonisation, rather than restricting support to manufacturing alone.

Recommendation 2: Reform residual network charging for high-capacity, low-utilisation infrastructure that enables third-party electrification, including consideration of a distinct charging treatment for qualifying port infrastructure rather than treating it in the same way as conventional end-users.

Recommendation 3: For qualifying infrastructure delivered ahead of demand, Ofgem should introduce a time-limited, tapered approach to residual network charges so that fixed DUoS and TNUoS costs build as utilisation develops rather than applying in full from the outset.

Recommendation 4: Ofgem and network companies should restore meaningful commercial incentives for businesses to reduce peak network demand, including through behind-the-meter storage, flexible demand and local generation. This should include appropriate network-charge signals and improved access to flexibility and system-service revenues where these investments demonstrably reduce network requirements.

Recommendation 5: Government should expand the Connections Accelerator Service, publish clearer eligibility and prioritisation criteria, and ensure that port and other enabling infrastructure is assessed on the wider investment, decarbonisation and economic activity that a connection can unlock, rather than direct capital investment and jobs alone.

Recommendation 6: Government, Ofgem, NESO and network operators should ensure that strategic and regional network planning for ports takes account of credible future maritime and industrial demand, with staged pathways to additional capacity as demand develops.

Recommendation 7: Ofgem and network operators should explore greater use of flexible connection arrangements and innovation in demand management.

Recommendation 8: Government should work with the National Wealth Fund, ports and private investors to explore financing models that can aggregate port-electrification and shore power projects and attract long-term infrastructure capital.

Recommendation 9: Government should maintain a technology-neutral approach to maritime decarbonisation, while recognising in maritime, energy and network policy that most credible decarbonisation pathways will substantially increase the need for electricity and electrical infrastructure at ports.

Recommendation 10: Government should recycle a meaningful proportion of maritime UK ETS revenues into port and vessel decarbonisation, including shore power, vessel electrification and the infrastructure needed to support alternative fuels.

Recommendation 11: Any UK–EU ETS linking agreement should preserve a clear safeguard allowing the UK to review and, where necessary, adjust the application of future maritime measures that create material risks to UK port competitiveness, carbon leakage or reverse modal shift. This should include the ability to suspend alignment with specific future measures where those impacts cannot otherwise be addressed.

Recommendation 12: Extend the Climate Change Levy exemption on certain vessels to cover electricity supplied as shore power to all commercial ships at berth.

Recommendation 13: Government should develop a targeted unit-price support mechanism for shore power, drawing on the approach used for energy-intensive industries and international schemes, to reduce the structural cost differential with onboard generation while the market develops.

Recommendation 14: Government should establish a multi-year deployment funding mechanism for deploying shore power, vessel charging and associated port-electrification infrastructure, separate from innovation funding and targeted at projects where public support can close a demonstrable viability gap. Monitoring, knowledge-sharing and commercial-disclosure requirements should be proportionate to mature infrastructure projects and protect legitimate commercial confidentiality.

The Opportunity

Ports at the centre of a changing energy system

The energy transition will change both how ports use energy and the role their infrastructure plays in enabling others to decarbonise. Electricity demand will rise across port estates as equipment and operations electrify, but increasingly it will also come from vessels, tenants, logistics businesses and industrial users.

In many locations, the implications will extend well beyond the port boundary. Investment in port infrastructure can enable or attract further activity across the surrounding industrial and transport system, creating additional electricity demand beyond that associated with the port operator or the initial project.

Electrification of vessels and cargo handling may be followed by new logistics facilities, warehousing, manufacturing, processing, energy infrastructure or other businesses seeking access to the port and its supply chains. The resulting demand may arise on neighbouring land, along transport corridors or across a wider industrial cluster.

The future electricity requirement associated with a port should therefore not be understood just by looking at the loads that exist within its boundary today. A relatively modest initial connection request may be the first stage of a much larger pattern of demand as investment, electrification and industrial activity develop around it.

Electrification will transform demand at ports

Ports are already electrifying a growing range of activities. Cargo-handling equipment, cranes, vehicles, buildings and other operational loads can increasingly be powered by electricity rather than fossil fuels. Battery-electric and hybrid technologies are also developing for harbour craft and other vessels operating close to port.

The benefits are straightforward. Electrification can reduce greenhouse-gas emissions, improve local air quality and noise, and reduce exposure to fossil-fuel prices. For equipment with regular and predictable duty cycles it can also create relatively stable electricity demand around which wider investment can be planned.

Vessels will add a much larger source of demand with a different profile. Shore power allows ships to switch off their auxiliary engines while alongside and draw electricity from the shore, substantially reducing emissions of nitrogen oxides, sulphur oxides and particulate matter in and around ports as well as greenhouse-gas emissions. These local benefits can be particularly valuable because many ports are close to communities and urban areas.

Battery-electric and hybrid ferries, workboats and harbour craft will require charging infrastructure, while larger vessels may increasingly combine batteries with other propulsion technologies. Alternative fuels will remain essential to the decarbonisation of deep-sea shipping, meaning ports will need to support a mix

of technologies rather than a single pathway. Because many alternative fuels are less energy-dense than conventional marine fuels, they may also need to be produced and supplied from a wider range of locations, potentially creating new opportunities for UK ports even though the UK is not currently a major global bunkering hub. Electricity will be important to all of these pathways.

The result will not just be higher annual electricity consumption. Some new uses, particularly shore power and vessel charging and the synthesis of new fuels, can require several megawatts at particular times while using comparatively little energy across the year. Port electrification will therefore change both the scale and shape of electricity demand.

Port investment can unlock wider industrial decarbonisation

Ports are also important locations for industrial decarbonisation. Many host clusters of manufacturing, chemicals, logistics, food processing and energy businesses, while others support offshore energy supply chains. These sectors will require increasing access to electricity and other low-carbon forms of energy if they are to decarbonise and remain internationally competitive.

Investment in energy infrastructure at ports can therefore enable much more than the port operator's own activities. Additional network capacity may support vessels, cargo-handling equipment and port operations while also unlocking investment by existing tenants and businesses that choose to locate nearby.

This matters for competitiveness as well as decarbonisation. Energy cost and availability are increasingly important factors in industrial investment decisions. Port areas with reliable access to competitively priced electricity can become more attractive locations for new investment, while constrained or expensive energy can push activity elsewhere.

There are also opportunities to make energy infrastructure work harder. Businesses located close together may be able to share network capacity, generation, storage and other infrastructure, while larger and more diverse loads can improve asset utilisation and support private-wire or local-energy arrangements. The wider economic benefit of investment in port energy infrastructure can therefore be considerably greater than the value captured by the organisation making the initial investment. This reinforces the role of ports as a foundational industry: their infrastructure supports the competitiveness and decarbonisation of sectors across the economy, including many that government has identified as strategically important.

It also has an important implication for policy. Strategic energy and network planning should recognise the longer-term development potential of ports and their surrounding economies, rather than responding only to current consumption or individual connection requests as they arise

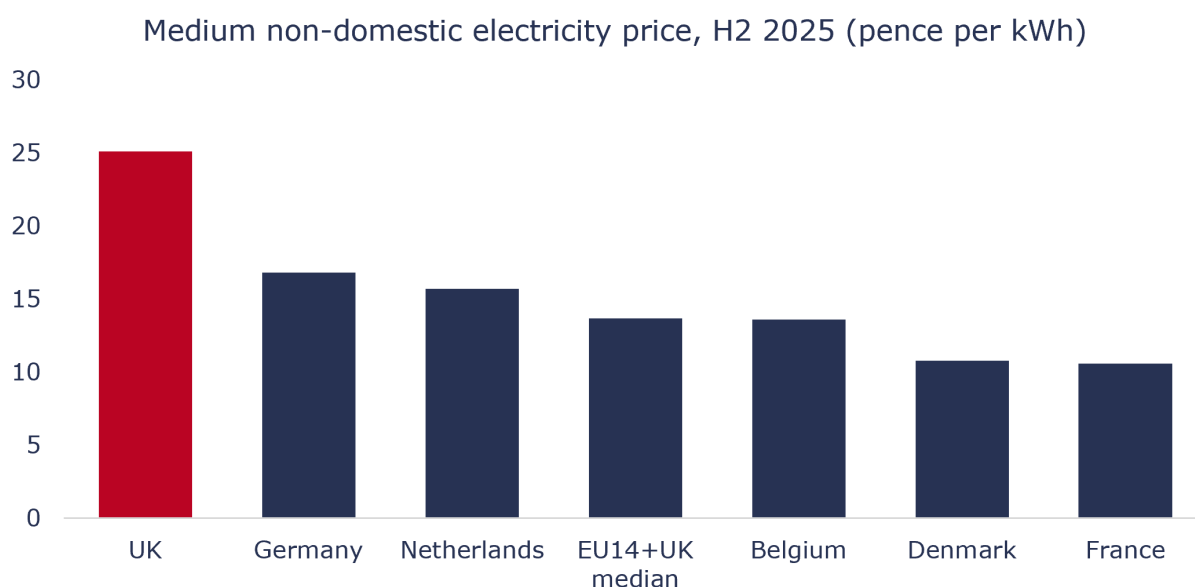
Make Power Affordable

UK electricity prices are internationally uncompetitive

High electricity prices remain a significant barrier to port electrification. The problem is widely recognised by government: its own Industrial Strategy measures are explicitly intended to bring electricity costs for selected British industries closer to those faced by international competitors.

Energy prices increasingly matter to port competitiveness as electricity becomes a larger input to day-to-day port operations and to the infrastructure and services ports provide to customers and tenants. High prices can weaken the business case for electrifying equipment or supplying shore power. Over time, they will also influence where shipping lines, industrial tenants and new energy-intensive activities choose to invest. Ports compete internationally not only for cargo and vessel calls, but for the industries and supply chains that cluster around them. As electrification grows, a persistent gap between UK and competitor electricity prices will become a more important factor in those decisions.

DESNZ figures published in June 2026 illustrate the scale of the disadvantage. In the second half of 2025, medium non-domestic electricity consumers¹ in the UK faced prices including taxes and levies of around 25.1p/kWh, compared with 16.8p/kWh in Germany, 15.7p/kWh in the Netherlands, 13.6p/kWh in Belgium, 10.8p/kWh in Denmark and 10.6p/kWh in France. The UK price was around 83% above the EU14+UK median.



Source: DESNZ Quarterly Energy Prices, June 2026, table 5.4.1.

¹ Medium non-domestic consumers are defined by DESNZ as those consuming between 2 and 20 GWh of electricity a year, which would include a large number of UK ports

Government's analysis for the British Industrial Competitiveness Scheme (BICS) provides further insight into the causes of this gap. For a very large industrial electricity consumer, policy costs were estimated at around £61/MWh in the UK in 2024, equivalent to approximately 27% of the total bill.² The comparable figures were around £10/MWh in Germany and £2/MWh in France. Government attributes much of the difference to the UK's approach of recovering the cost of renewable-energy support through electricity bills rather than through general taxation or other mechanisms.

A significant part of the UK's electricity-cost disadvantage is shaped by policy rather than international markets. Government has recognised the effect on industrial competitiveness and intervened accordingly. BICS will exempt qualifying manufacturing businesses from the indirect costs of the Renewables Obligation, Feed-in Tariffs and the Capacity Market, which government estimates will reduce their electricity costs by £35–40/MWh.

Support for the most electricity-intensive industries goes further. The British Industry Supercharger provides relief from renewable and capacity-market costs and compensation for up to 90% of eligible network charges. Government estimates the combined benefit at around £65–87/MWh.³

Ports do not receive equivalent treatment. BICS is restricted to businesses operating in eligible sectors which also manufacture eligible products, while the Supercharger is targeted at qualifying energy-intensive industries. This sits uneasily with government's recognition of ports as foundational infrastructure and strategic enablers of industrial growth. BPA raised this inconsistency during the BICS consultation, arguing that excluding ports weakens both port competitiveness and the industrial value chains they support.

The issue will become more important as ports electrify. Electricity is increasingly an input not only to a port's own operations but to services provided to other

**Internationally
uncompetitive
electricity prices**

83%

**UK port electricity
price premium**

£61/MWh
**Policy costs for
very large users**

**Electricity cost
support for other
sectors**

~£40/MWh
BICS support

~£87/MWh
**British Industry
Supercharger support**

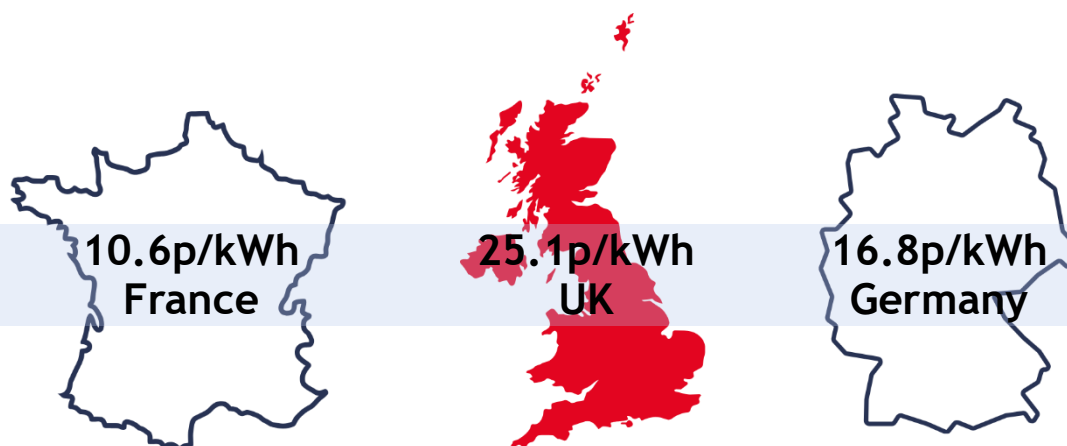
² Data from DBT, British Industrial Competitiveness Scheme: consultation on scheme eligibility and approach <https://www.gov.uk/government/consultations/british-industrial-competitiveness-scheme-consultation-on-scheme-eligibility-and-approach/british-industrial-competitiveness-scheme-consultation-on-scheme-eligibility-and-approach>

³ Data from DBT, British Industrial Competitiveness Scheme: guidance for applicants: <https://www.gov.uk/government/publications/british-industrial-competitiveness-scheme-business-guidance/british-industrial-competitiveness-scheme-guidance-for-applicants>

businesses. Ports may supply shore power to vessels, charging to harbour craft and electricity and energy infrastructure to tenants and wider industrial clusters. High electricity costs can therefore affect both whether the port invests and whether customers choose to use the infrastructure once it is built.

Shore power demonstrates the problem particularly clearly because electricity competes directly with onboard generation. A difference of £10/MWh equates to £100,000 a year for every 10 GWh of electricity supplied. Differences of the scale identified in government's industrial support schemes can therefore materially affect the economics of a well-used shore-power installation. Where utilisation is initially lower, high electricity costs compound the fixed-cost and investment risks considered elsewhere in this paper.

Competitive electricity prices are therefore not just a question of reducing port operating costs. They affect investment in port electrification, demand for low-carbon infrastructure and the competitiveness of the maritime and industrial activity that ports support. The impact of these costs is particularly acute for electrification projects where electricity competes directly with an alternative energy source. Shore power is the clearest example: vessels can continue to generate electricity onboard using marine fuel that does not bear the same policy costs as grid electricity. Later in this report we recommend that Government explore a targeted unit-price support mechanism for shore power, drawing on international approaches and the principle already established through schemes such as BICS that high electricity policy costs can justify intervention where they undermine competitiveness and investment.



**Germany also has a generous tariff discount scheme for shore power*

The case for intervention therefore extends beyond shore power. As electricity becomes a larger input to port operations and to the services ports provide to shipping and industry, excluding ports from electricity cost support available to other strategic sectors risks weakening both port competitiveness and the wider industrial activity they enable.

Recommendation 1: Government should provide ports with access to electricity-cost relief comparable to that available to other strategically important industries, with eligibility based on exposure to high electricity costs and the role of the activity in supporting competitiveness and decarbonisation, rather than restricting support to manufacturing alone.

Fixed network costs penalise infrastructure operators

For larger electricity users, a significant part of the network bill is no longer directly linked to the volume of electricity consumed. Fixed distribution and transmission charges sit alongside charges for maintaining agreed network capacity. These charges vary from port to port but they share a common risk: substantial costs for having electricity available, whether or not they or their customers or tenants use it.

This has become more significant following Ofgem's Targeted Charging Review (TCR). The TCR changed the way the residual costs of the electricity networks are recovered, replacing charges based on consumption or peak use with fixed charges for households and businesses. Ofgem has subsequently estimated that around £5 billion a year of network costs were moved from unit rates or peak-use charges into standing charges. Distribution reforms took effect in 2022 and transmission reforms followed in 2023.⁴

Ofgem expected most domestic consumers to benefit, with a typical household saving just £5 a year, on average, while non-domestic consumers were expected to pay more. The reforms have particular consequences for businesses that provide infrastructure for other users, including some ports. Ports are increasingly being expected to secure and maintain substantial electricity capacity to serve vessels, tenants or other customers, while having limited control over how quickly that demand develops.

This policy change has shifted additional risk onto ports and other infrastructure operators. Under the previous system lower utilisation reduces both revenue and many of the associated electricity costs. As a greater proportion of costs become fixed, the network recovers a greater proportion of its costs irrespective of utilisation while the infrastructure provider carries more of the demand risk.

The impact on individual infrastructure users can be substantial. Ports have reported very large increases, between 300% and 900% at some ports⁵, in fixed network charges following the reforms. The precise impact varies according to connection characteristics and charging arrangements, but these examples illustrate the scale of the change for businesses maintaining significant electricity capacity. A port can therefore face a major increase in annual network costs without any corresponding increase in electricity consumed, supplied to customers or revenue earned.

Some port loads, particularly shore power and vessel charging, but also some heavy lifting and cargo operations, are inherently intermittent with high peak loads. A charging regime designed principally around conventional electricity consumers and households is penalising infrastructure operators. Ports should pay

⁴ The rationale for reform was that Ofgem were becoming concerned that some users could reduce their contribution to the fixed costs of the network through on-site generation or by managing consumption at particular times, despite continuing to rely on the network when required. Fixed residual charges were intended to distribute these costs more evenly between users.

⁵ Evidence shared with the BPA in confidence by port operators

a fair share of network costs, but the allocation of those costs should not make strategically useful enabling infrastructure commercially unviable simply because its utilisation profile differs from that of a conventional industrial user.

Shore power illustrates the problem particularly clearly. A connection must be capable of meeting a vessel's peak power requirement when it is alongside, even if that capacity is unused for much of the day or year. High fixed costs must then be recovered across a relatively small number of megawatt hours during the early years of a project. This increases the price charged for each unit of shore power, which can reduce demand and make it still harder to recover the fixed costs.

The result can be a circular problem: low utilisation increases the effective cost of electricity; higher prices discourage vessels from connecting; and lower demand further weakens the investment case.

The reforms have also changed the incentives for businesses to manage when they use electricity. Before TCR, a greater share of some network charges could be reduced by avoiding periods of peak demand, most notably through the Triad mechanism for transmission charges. TCR removed this behaviour from the calculation of residual charges. Forward-looking and time-of-use signals remain elsewhere in the charging system, but they now represent a smaller part of the overall network cost faced by many large users.

This can weaken the commercial incentive for flexible demand. It can also affect the economics of behind-the-meter generation and storage. Solar, wind and batteries may reduce the amount of electricity purchased from the grid or help a port manage peaks, but they cannot avoid fixed residual charges simply by reducing consumption at particular times. Storage installed behind the meter therefore has less scope to generate value through avoided network costs than under the previous arrangements.

Ports and other infrastructure operators can potentially shift demand, combine different loads, use storage and invest in local generation. This could deliver benefits but is being disincentivised. The charging framework should retain meaningful incentives to use existing network capacity efficiently where doing so can reduce wider system costs.

The issue will become more important as investment in the electricity network increases. Network costs must ultimately be recovered, but the method of recovery affects investment behaviour. A system that places an increasing share of those costs on fixed charges can make investment particularly difficult for infrastructure built ahead of uncertain third-party demand.

Our view is that reforms have shifted additional risk onto ports whilst disincentivising behaviour that could help deliver emissions reduction and investment in low-carbon generation and energy storage.

Energy regulation should distinguish between a business consuming electricity primarily for its own purposes and an infrastructure operator maintaining capacity so that other businesses can electrify and decarbonise. The current framework can place a disproportionate share of utilisation risk on the latter.

Recommendation 2: Reform residual network charging for high-capacity, low-utilisation infrastructure that enables third-party electrification, including consideration of a distinct charging treatment for qualifying port infrastructure rather than treating it in the same way as conventional end-users.

Recommendation 3: For qualifying infrastructure delivered ahead of demand, Ofgem should introduce a time-limited, tapered approach to residual network charges so that fixed DUoS and TNUoS costs build as utilisation develops rather than applying in full from the outset.

Recommendation 4: Ofgem and network companies should restore meaningful commercial incentives for businesses to reduce peak network demand, including through behind-the-meter storage, flexible demand and local generation. This should include appropriate network-charge signals and improved access to flexibility and system-service revenues where these investments demonstrably reduce network requirements.

Make Power Available

Ports cannot electrify without sufficient network capacity

For many ports, the first constraint on electrification is whether sufficient power can be secured from the network at the right time and at an affordable cost. Major connections can take years to deliver and require substantial reinforcement. This is particularly challenging for ports, where demand can increase sharply as vessels, cargo-handling equipment or industrial users electrify.

Government has recognised the economic consequences of connection delays. The Connections Accelerator Service (CAS) is a welcome response, bringing together government, Ofgem, NESO and network companies to identify earlier or more flexible connection options for strategically important projects. However, the service is deliberately focused on a relatively small number of projects, and access depends on government or mayoral sponsorship and assessment against economic and social criteria.

As the service develops, it should be scaled up and its selection criteria made more transparent. The assessment of enabling infrastructure such as ports should also look beyond the direct capital investment and employment associated with the initial connection. A port connection may unlock investment by shipping companies, tenants and industries across a much wider area, as well as enabling substantial emissions reductions. These benefits should count towards the strategic case for accelerating a connection.

A port connection can unlock much more than the port operator's own electricity demand. Additional capacity may support shore power, vessel charging, cargo-handling equipment, industrial tenants and wider activity around the port. This ripple effect means the economic and environmental value of a connection can be substantially greater than that visible in the initial application.

Timing is also an issue. Customers may be unwilling to commit to electrification until capacity is available, while ports can struggle to demonstrate firm demand without those commitments.

Recommendation 5: Government should expand the Connections Accelerator Service, publish clearer eligibility and prioritisation criteria, and ensure that port and other enabling infrastructure is assessed on the wider investment, decarbonisation and economic activity that a connection can unlock, rather than direct capital investment and jobs alone.

Network planning can understate future port demand

Electricity networks are necessarily planned around evidence of demand. For ports, however, relying too heavily on current consumption or firmly contracted loads risks systematically understating what will be required and forecasting demands on a number of factors that involve a lot of uncertainty.

Port electrification is unlikely to develop in a smooth or predictable way. A new shore-power connection, electrified assets or a major industrial tenant can add several megawatts of demand at once, while further growth may then take years to materialise. Some individual shore-power connections can be larger than a port's entire existing electricity requirement.

This creates a timing problem. Network reinforcement and major connections can take years to develop, but customers may be unwilling to commit to electrification until sufficient capacity is available. Ports can therefore struggle to demonstrate firm demand for connections before that demand emerges.

The problem extends beyond the port boundary. Ports can enable additional demand from logistics, manufacturing, processing, energy infrastructure and other businesses across surrounding industrial clusters. Assessing a port only on its own present or contracted consumption can therefore miss a much larger future requirement. Planning does not need to treat every potential load as certain but it should distinguish credible future demand from purely speculative demand and provide a route for capacity to be developed in stages as that demand becomes firmer. This could allow ports to secure an appropriate initial connection while preserving a credible pathway to substantially greater capacity as vessels, tenants and surrounding industries electrify.

Government's proposals to reserve future capacity, reallocate capacity released elsewhere in the queue and prioritise strategic demand could help address this. As the system develops, assessment should recognise credible future and aggregated demand, wider investment enabled by a connection, decarbonisation benefits and the strategic importance of the activity supported. This should ensure that strategically important enabling infrastructure is not disadvantaged because its benefits are spread across several users or emerge over time.

A more strategic approach would also help avoid repeated piecemeal reinforcement, reduce the risk that electricity networks become a constraint on industrial growth and give ports and their customers greater confidence to make long-term investment decisions.

BPA is encouraging ports to engage actively with the development of Regional Energy Strategic Plans (RESs) so that future maritime, industrial and port-related demand is properly understood and reflected in regional network planning.

Recommendation 6: Government, Ofgem, NESO and network operators should ensure that strategic and regional network planning for ports takes account of credible future maritime and industrial demand, with staged pathways to additional capacity as demand develops.

The system does not reward efficient use of network capacity

Ports have opportunities to reduce some of these pressures through on-site generation, energy storage and more flexible use of networks. Solar, wind and other generation can provide electricity close to demand. Battery storage can absorb locally generated or lower-cost electricity and release it during peaks. Private-wire arrangements and local energy systems can allow generation and demand to be coordinated across a port or industrial cluster.

These options are increasingly important, particularly where network capacity is constrained. They may also allow ports to manage some of the difference between high peak power demand and lower average energy consumption.

They are not, however, a complete substitute for network investment. Renewable generation is variable, storage adds cost and very large electrical loads can exceed what can reasonably be supplied locally. A vessel may require several megawatts of reliable power at a specific time regardless of whether the sun is shining or the wind is blowing.

Behind-the-meter storage can also help ports make better use of constrained connections by absorbing electricity when demand is lower and releasing it during peaks. This can reduce the amount of network capacity needed at any one time, particularly for intermittent loads such as shore power. However, the commercial case for these investments is not always aligned with their value to the wider system: some network charging arrangements and market structures can weaken the incentive to invest in flexibility even where it could reduce peak demand and defer reinforcement. These issues are considered in more detail above.

Port electrification will therefore require a combination of stronger grid connections, local generation, storage and flexible demand, but each will need to be deployed where it is most efficient, rather than forcing ports to compensate for inadequate network capacity through more expensive local solutions.

Recommendation 7: Ofgem and network operators should explore greater use of flexible connection arrangements and innovation in demand management.

Make Investment Viable

Many of the measures proposed elsewhere in this report, such as reducing electricity costs, improving access to network capacity and creating stronger and more predictable demand, are ultimately measures to improve the commercial case for investment. This section focuses on the remaining financing challenges where projects are fundamentally viable but difficult to fund efficiently at individual project scale.

Electrification requires investment before demand is certain

The principal barrier to port electrification is not just high capital costs. Ports routinely invest significant sums in long-term infrastructure where there is a sufficiently strong commercial case.

The UK ports sector is independently financed and operated. That model has been fundamental to its success: ports invest around £1 billion a year in infrastructure⁶ while contributing £1.8 billion annually to the Exchequer⁷. Maintaining a commercially driven and independent ports sector should remain a central principle of government policy.

Electrification creates a particular challenge because substantial investment may be required before demand is firmly established. Grid connections, substations, cabling, charging infrastructure and berth equipment can take years to deliver, while customers may be unwilling to commit until they know the infrastructure will be available.

Ports cannot control how quickly that demand develops. A port may install shore power or vessel-charging infrastructure, but it cannot determine when compatible vessels enter service, whether shipping services continue to call or when industrial tenants electrify. Demand may also arrive unevenly: a single new vessel service or industrial user can add several megawatts, while further demand may then take years to materialise.

This creates both investment and utilisation risk. Fixed network, maintenance and financing costs begin once infrastructure is available, but revenues depend on how quickly customers use it. An asset may therefore be viable over its lifetime while producing inadequate returns during its early years.

Ports should continue to carry normal commercial risk. But where public policy depends on infrastructure being available before the market alone would deliver it, policy needs to recognise the additional risk created by requiring investment ahead of established demand.

⁶ BPA Infrastructure Tracker: <https://www.britishports.org.uk/investments/>

⁷ Maritime UK, 2022:

https://www.maritimeuk.org/documents/1138/2022_CEBR_Report_Ports_industry.pdf

Much of the value created cannot be captured by the investor

The commercial return from port electrification does not necessarily reflect its wider economic and environmental value. Ports may fund infrastructure that enables vessels, tenants or other businesses to decarbonise, while many of the resulting benefits accrue elsewhere. Carbon reductions, cleaner air, additional network capacity and investment unlocked by other businesses may create substantial public and economic value without generating an equivalent return for the organisation funding the initial asset.

A recent UK shore-power business case illustrates this gap. The project was expected to generate a positive commercial return over 20 years, but its monetised carbon and air-quality benefits were several times greater than the private value captured by the investor. It subsequently proceeded with 50% capital co-funding through ZEVI.

The same issue applies more broadly to enabling infrastructure. Additional electrical capacity at a port may initially support one project but subsequently enable vessel charging, cargo-handling equipment, industrial tenants or new investment elsewhere in the surrounding cluster. The wider value of the infrastructure can therefore be considerably greater than that visible in the initial business case.

This does not mean that public funding should replace private investment. Where projects are commercially viable, they should continue to be financed principally by the businesses that benefit from them. But appraisal and funding decisions need to recognise the wider benefits of infrastructure that cannot readily be captured by the investor.

A fragmented project pipeline increases financing costs

Not every port-electrification project will require public support. Some will have viable underlying business cases but may still struggle to attract finance on suitable terms.

Port electrification is likely to comprise a large number of investments of different types and sizes, including grid connections, substations, shore power, vessel charging, storage and local generation. Individually, some projects may be relatively small for infrastructure investors while still requiring significant development work, due diligence and bespoke commercial arrangements.

This fragmentation can increase transaction costs and make otherwise viable projects less attractive to long-term infrastructure capital. Combining projects across different ports, customers or phases could create greater scale, spread utilisation risk and reduce the costs associated with financing each investment separately.

This could be particularly relevant to the National Wealth Fund, alongside commercial lenders and institutional investors. There is already precedent for financing portfolios of investment across the ports sector rather than treating every individual asset as a standalone transaction.

Aggregation will not make an uneconomic project economic. Where the underlying commercial return is insufficient, other interventions may still be required. But where projects are fundamentally viable, access to patient capital, portfolio finance and more standardised financing structures could lower financing costs and accelerate deployment.

A clearer national pipeline of port-electrification projects could also give investors greater confidence that this is a developing infrastructure market rather than a series of isolated projects.

Recommendation 8: Government should work with the National Wealth Fund, ports and private investors to explore financing models that can aggregate port-electrification and shore power projects and attract long-term infrastructure capital.

Create Certainty & Demand

Technology neutrality still requires infrastructure certainty

Ports make investment decisions over decades, but the policy and technology environment in which those investments will operate remains uncertain. Internationally, the maritime sector still lacks complete certainty over the timing and implementation of the IMO's Net-Zero Framework, while the future strength and scope of carbon pricing, requirements at berth and support for different technologies will all influence when customers choose to electrify.

The technologies used to decarbonise shipping will vary between vessel types, routes and markets. Shore power, batteries, hybrid systems and zero- and near-zero-carbon fuels are all likely to play a role, and government should avoid prescribing a single technological pathway. For international shipping in particular, global action through the IMO should remain the primary means of driving decarbonisation and avoiding fragmented national requirements.

Government should remain technology neutral and allow operators to choose the solutions best suited to individual routes and markets. However, uncertainty over the eventual technology mix should not obscure an important common requirement. Most credible decarbonisation pathways are likely to increase substantially the need for electricity and electrical infrastructure at ports. Shore power and vessel charging create direct electricity demand, while the production, storage and handling of alternative fuels can also depend on significant electrical capacity and supporting infrastructure.

The Government's Maritime Decarbonisation Strategy, the expansion of the UK ETS to maritime and developing IMO measures already provide much of the overall direction for reducing shipping emissions. The priority should now be to translate that direction into sufficiently clear expectations for infrastructure planning and investment. Ports and network operators will often need to provide capacity years before the precise technology choices or customer demand are certain. Maritime and energy policy should therefore recognise growing electricity requirements as a common enabling need across different decarbonisation pathways, rather than waiting for individual technologies to become dominant before infrastructure is planned.

Recommendation 9: Government should maintain a technology-neutral approach to maritime decarbonisation, while recognising in maritime, energy and network policy that most credible decarbonisation pathways will substantially increase the need for electricity and electrical infrastructure at ports.

ETS expansion risks undermining competitiveness

Carbon pricing can help create demand for port electrification. By increasing the cost of emissions, the UK Emissions Trading Scheme can strengthen the incentive for vessel operators to use shore power and invest in lower-carbon vessels and technologies. The BPA has for a decade argued that a lack of consistent demand is one of the principal barriers to investment, particularly for shore power connections. Ports can install shore power, but they cannot determine how frequently vessels will use it. A sufficiently strong and predictable carbon price can improve the relative economics of plugging in and give ports greater confidence that demand will develop.

Carbon pricing only changes behaviour effectively where a practical and competitive alternative exists. If shore power is unavailable, grid capacity cannot be secured or electricity remains substantially more expensive than onboard generation, the ETS simply increases the cost of shipping.

This creates a wider competitiveness risk. Shipping is a global and highly mobile industry. Vessel calls, routes, cargo and associated investment can move between ports and jurisdictions in response to relatively small changes in cost. The UK ETS must therefore drive emissions reductions without making UK ports and shipping less competitive internationally.

Carbon pricing must also avoid encouraging reverse modal shift. Overall, shipping is by far the most carbon-efficient means of moving freight. For conventional sea freight, emissions per tonne-kilometre can be an order of magnitude lower than road freight, although the precise comparison varies by vessel type, loading and route. If the ETS raises the cost of short-sea or coastal shipping without providing viable routes to decarbonise, moving freight from sea to road could increase overall transport emissions rather than reduce them.

Table 1: Indicative GHG intensity, selected transport modes⁸

Freight Mode	Indicative GHG Intensity
Large bulk carrier, 100,000+ dwt	c. 3.5–4.1 g CO ₂ e/tonne-km
Bulk carrier, 35,000 - 60,000 dwt	c. 7.0–7.4 g CO ₂ e/tonne-km
General cargo vessel, 20,000+ dwt	c. 11.0–11.6 g CO ₂ e/tonne-km
Rail freight, EU average	18.5 g CO ₂ e/tonne-km
HGV, over 20 tonnes	125 g CO ₂ e/tonne-km

The purpose of carbon pricing should therefore be to accelerate investment and fuel switching, rather than raising revenue from activity for which a viable alternative does not yet exist. Recycling revenues raised from maritime back into

⁸ Smart Freight Centre 2024, and IMO Fourth GHG Study

maritime decarbonisation would help close that loop, supporting the infrastructure and technologies that allow operators to respond to the carbon price.

Linking the UK and EU Emissions Trading Schemes could bring significant benefits for maritime. Greater alignment would reduce administrative complexity, limit distortions between neighbouring markets and provide greater certainty for operators trading between the UK and Europe. BPA therefore supports linkage in principle.

However, alignment should not become an open-ended commitment for the UK automatically to reproduce every future change to the EU ETS regardless of its consequences for UK shipping and ports. The UK and EU have different trading patterns, geography and exposure to international competition, and future changes designed principally around EU circumstances may not always produce appropriate outcomes for the UK.

This is particularly important for maritime because relatively small differences in cost can influence routes and port calls. Future changes to geographical scope, emissions coverage, carbon costs or the treatment of particular trades could create carbon leakage, distort competition or encourage freight to shift from sea to road.

The objective should therefore be alignment where it reduces friction and competitive distortion, without surrendering the ability to respond where future EU policy produces demonstrably harmful consequences for the UK maritime sector. Any linking agreement should include a clear safeguard mechanism allowing significant future changes to be reviewed and, where necessary, addressed.

The UK should also monitor the domestic operation of the maritime ETS itself. A scheme that shifts vessel calls, cargo or emissions elsewhere rather than reducing them would not be achieving its purpose. Competitiveness, carbon leakage and modal shift should therefore form part of the ongoing assessment of the scheme as it develops.

Recommendation 10: Government should recycle a meaningful proportion of maritime UK ETS revenues into port and vessel decarbonisation, including shore power, vessel electrification and the infrastructure needed to support alternative fuels.

Recommendation 11: Any UK–EU ETS linking agreement should preserve a clear safeguard allowing the UK to review and, where necessary, adjust the application of future maritime measures that create material risks to UK port competitiveness, carbon leakage or reverse modal shift. This should include the ability to suspend alignment with specific future measures where those impacts cannot otherwise be addressed.

Shore power: The Test Case

Shore power provides the clearest test of whether the UK can create a workable policy framework for port electrification. The technology is established and its benefits are well understood. It can allow vessels to switch off auxiliary engines while alongside, reducing greenhouse gas emissions as well as nitrogen oxides, sulphur oxides, particulate matter and noise in and around ports. Yet the commercial case for investment remains difficult.

Shore power brings together many of the challenges considered elsewhere in this paper. Installations can require substantial investment in grid connections, substations, cabling and berth equipment. They can create very high peak electricity requirements despite relatively modest annual consumption. Ports may incur significant fixed network costs before demand is established, while utilisation depends on investment decisions made by shipping lines over which the port itself has limited control.

There is also an inherent coordination problem. A port is unlikely to invest in infrastructure that customers cannot use, or where there are too few customers to justify the investment. Even once a port has invested and a vessel has installed the necessary equipment, utilisation will depend heavily on whether shore electricity is competitive with generating electricity onboard.

The result is that infrastructure can be technically viable and socially desirable without initially producing the return required to justify commercial investment. This is particularly likely during early deployment, when relatively few compatible vessels may call and substantial fixed costs must be recovered across a limited volume of electricity. It can also be an issue for ports that welcome cruise ships but do not have sufficient volume, or have seasonal volume, and so may struggle to utilise connections all-year round despite paying charges for the power availability.

That does not mean that every shore-power project requires endless subsidy or that ports should install infrastructure regardless of likely demand. Port investment should continue to be led principally by customer requirements and a credible commercial case. Policy should instead address the specific barriers that prevent otherwise worthwhile projects from proceeding.

Government therefore needs to consider shore power as a system rather than equipment installed at an individual berth. Electricity prices, network charging, grid connections, carbon pricing, vessel requirements and capital support all affect the same investment decision. Addressing one while ignoring the others risks leaving the underlying commercial problem unresolved.

The longer-term objective should be a commercially sustainable market rather than permanent subsidy. Public intervention should be targeted at overcoming identifiable barriers while the market develops and should reduce as utilisation and the commercial case strengthen.

The tax system penalises shore power

Several European countries reduce electricity taxation for shore power so that cleaner electricity can compete more fairly with marine fuel. Germany, Denmark, Sweden, the Netherlands, France, Italy and Spain have all introduced preferential tax treatment, with Belgium following in 2027.

The UK already has the foundations of a similar policy. Climate Change Levy rules provide exemptions for electricity used in certain passenger vessels and ships undertaking international journeys. However, these provisions were not designed as a shore-power incentive, are poorly understood and do not provide a clear exemption for electricity supplied to all commercial vessels at berth.

The fiscal cost of changing this would initially be very small. At the current CCL rate of £8.01/MWh, around 624 GWh of otherwise taxable shore-power consumption would be required before annual foregone revenue reached £5 million. Previous BPA modelling estimated that all vessels at UK berths consumed around 641 GWh of energy in 2019, falling to around 502 GWh when calls of less than two hours were excluded. Actual shore-power consumption today represents only a small fraction of that potential market.

CCL relief would not by itself make shore power competitive. At £8.01/MWh it represents less than 1p/kWh, while the underlying differential between shore electricity and onboard generation can be substantially greater. It would nevertheless remove an unnecessary tax penalty and bring the UK closer to the treatment available in competing European ports.

Recommendation 12: Extend the Climate Change Levy exemption on certain vessels to cover electricity supplied as shore power to all commercial ships at berth.

Shore power cannot compete on price with onboard generation

Installing shore-power infrastructure will not deliver emissions reductions unless vessels use it. Operators will compare the cost of taking electricity from the shore with the cost of continuing to generate electricity onboard, and a persistent price differential can undermine utilisation even where the infrastructure is available. For sectors that are already willing to plug in, the price of electricity will also increasingly affect the competitiveness of individual ports.

This is partly a consequence of the way the two energy sources are treated. Grid electricity bears network charges, policy costs and taxation that do not apply in the same way to marine fuel used for onboard generation. Marine fuel can be supplied free of fuel duty for commercial marine voyages, while fuel for international commercial voyages is also zero-rated for VAT. This creates a structural disadvantage for one of the principal technologies available to eliminate emissions from vessels at berth.

Removing Climate Change Levy would address only a small part of this differential. Wider electricity policy and network costs can be considerably more significant.

Government already recognises that high UK electricity costs can undermine strategically important investment. Through the British Industrial Competitiveness Scheme and the British Industry Supercharger, eligible energy-intensive industries receive substantial relief from electricity costs in order to protect competitiveness. Ports are themselves recognised as a foundational industry in the Government's Industrial Strategy, yet the decision to restrict BICS to manufacturing leaves ports as one of only two of the Strategy's eight foundational industries outside the scheme.

The circumstances are not identical, but the principle is relevant. Where the structure of electricity costs frustrates wider economic or decarbonisation objectives, Government has accepted that targeted intervention can be justified.

There is also direct international precedent for applying this principle to shore power. Italy has introduced a €570 million scheme, running to 2033, which can remove up to 100% of the general system charges applied to shore-side electricity. The benefit must be passed through to vessels and the scheme is explicitly designed to reduce the cost differential between shore power and onboard generation. Germany has separately reduced electricity taxation and adapted network charging to reflect shore power's distinctive high-peak, low-utilisation demand profile.

Table 2: European Support for Shore Power Electricity Costs

Country	Support for Shore Power	Effect
Italy	€570 million scheme providing up to a 100% reduction in general system charges on shore-power electricity, running to 2033. Italy is also authorised to apply the EU minimum rate of electricity taxation to shore power. ⁹	Directly reduces the unit price paid for shore power, with the explicit aim of making it competitive with onboard generation.
Germany	Electricity tax reduced from €20.50/MWh to €0.50/MWh until the end of 2029. Network operators may also offer qualifying shore-power connections daily capacity charges instead of annual or monthly capacity charging. ¹⁰	Reduces both electricity taxation and the penalty created by high, intermittent peak demand.
Netherlands	Reduced electricity tax of €0.50/MWh for qualifying shore-power installations, authorised until June 2027. ¹¹	Reduces the tax component of the shore-power unit price.
Spain	Shore power receives a reduced electricity tax of €0.50/MWh, with the current authorisation running to the end of 2028. ¹²	Reduces the tax disadvantage of using electricity rather than onboard generation.
Sweden	Reduced shore-power electricity taxation of SEK 6/MWh (around €0.55/MWh when the current measure was proposed), authorised until the end of 2027. ¹³	Reduces the operating cost of shore power through preferential electricity taxation.
Belgium	Authorised to apply a reduced electricity tax to shore power at the EU minimum rate from January 2027 to the end of 2032. ¹⁴	Adds another European example of preferential tax treatment specifically for shore power.

The UK should explore an equivalent intervention focused on the unit price actually faced by vessels. This need not mean guaranteeing that shore power will always be cheaper than marine fuel or providing permanent subsidy. Support could instead target identifiable policy costs and be reviewed periodically as utilisation increases, carbon pricing strengthens the incentive to connect and relative energy prices change.

⁹ Italy: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ%3AL%3A2021%3A422%3AFULL>

¹⁰ Germany: <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=177729310628&uri=CELEX%3A52026PC0244>

¹¹ Netherlands: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0209>

¹² Spain: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32025D0210>

¹³ Sweden: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52024PC0018>

¹⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32026D1776>

There is a particular case for intervention while the market is developing. High electricity prices suppress utilisation; low utilisation increases the cost that must be recovered from every unit sold; and higher prices further discourage vessels from connecting. Targeted unit-price support could help break that cycle and ensure that investment in shore-power infrastructure translates into actual emissions reductions.

Recommendation 13: Government should develop a targeted unit-price support mechanism for shore power, drawing on the approach used for energy-intensive industries and international schemes, to reduce the structural cost differential with onboard generation while the market develops.

Funding mechanisms are designed around innovation

The UK has provided substantial public support for clean maritime technology through the Department for Transport's UK SHORE programme. The Clean Maritime Demonstration Competition has supported feasibility studies, trials and demonstrations, while the Zero Emission Vessels and Infrastructure competitions have provided match funding for higher-TRL technologies and commercial demonstration, including shore power and vessel charging.

These programmes have played an important role in bringing technologies towards market. However, the policy challenge is increasingly moving from innovation to deployment. Conventional shore-power technology is mature and already being deployed at scale internationally. The principal barriers to many UK projects are no longer whether the technology works but the cost of infrastructure and grid connections, high electricity prices and uncertainty over utilisation and customer demand.

The UK's main maritime funding mechanisms nevertheless remain structured primarily as innovation programmes. Shore-power projects can therefore find themselves in the awkward position of having to demonstrate technological novelty in order to access public support for deploying technology that Government already wants to see rolled out.

There should remain strong support for genuinely innovative maritime technologies. But mature port-electrification infrastructure should not have to be repackaged as innovation to qualify for support. Where Government wants established technology deployed ahead of the point at which the market can support it unaided, there should be a route to assess projects on their economic, environmental and strategic merits.

International experience demonstrates that this would not be unusual. Governments across Europe and North America have co-funded shore-power deployment directly. The Netherlands has introduced a dedicated national scheme offering up to 45% of eligible investment costs for some projects. Germany, Spain and France have combined national, regional and European funding for major installations, while Canada and the United States have provided substantial funding for shore power within wider port-decarbonisation programmes. Norway used more than NOK 1 billion of state support to help establish its shore-power

market before closing its dedicated programme once the market was considered sufficiently mature.

Any future UK mechanism should remain competitive, targeted and additional. Its purpose should not be to subsidise projects that would proceed commercially without support, but to overcome a demonstrable viability gap or accelerate strategically important infrastructure where wider benefits justify intervention. Requirements for monitoring, disclosure and risk-sharing should also reflect the commercial realities of mature infrastructure projects rather than those of early-stage research and demonstration.

Capital support cannot solve the shore-power problem on its own. A grant will not make an installation successful if electricity subsequently remains prohibitively expensive or customers do not use it. But a dedicated deployment route would remove one important barrier and allow public support to be directed more precisely at the stage of market development the UK has now reached.

Recommendation 14: Government should establish a multi-year deployment funding mechanism for deploying shore power, vessel charging and associated port-electrification infrastructure, separate from innovation funding and targeted at projects where public support can close a demonstrable viability gap. Monitoring, knowledge-sharing and commercial-disclosure requirements should be proportionate to mature infrastructure projects and protect legitimate commercial confidentiality.

Public funding remains the international norm for shore power

Table 3: Support for Shore Power Capital Costs, Selected Countries

Selected examples of recent electrification and shore power funding and programmes. This is non-exhaustive and there are further examples within the countries below.

The Netherlands	The Netherlands introduced a dedicated national shore-power programme in 2024, offering funding of up to 45% of eligible costs for installations contributing to AFIR requirements and up to 30% for other qualifying projects. Individual projects have also received national and provincial support, including the DFDS installation at Vlaardingen.
Germany	Germany continues to combine federal and state funding. Kiel's latest shore-power expansion, completed in 2025, was supported by the federal government and Schleswig-Holstein alongside European funding.
Spain	Spain is supporting deployment of shore power connections. Barcelona's first container-terminal OPS installation opened in 2024 after receiving public funding through Spain's Recovery, Transformation and Resilience Plan, while the wider Nexigen programme is receiving substantial further public support.
France	France has used a combination of national, regional and local government funding to expand shore power at Marseille, including major electrical-network reinforcement and new high-power connections for ferries and cruise vessels.
Canada	Canada's Clean Ports stream is providing C\$127 million for port decarbonisation infrastructure, with shore-power awards running into tens of millions of Canadian dollars at individual ports. In the United States, the EPA's Clean Ports programme has similarly provided substantial federal funding for shore-power and wider port-electrification schemes.
Norway	Norway used the state-backed Enova programme extensively to establish its shore-power market. From 2016, Enova committed more than NOK 1 billion to shore-power infrastructure. Its final dedicated funding round awarded NOK 143 million to 17 projects before the programme was closed in 2024 after Enova concluded that the market had matured sufficiently. Public support continues for related maritime charging infrastructure.
Denmark	Denmark has combined municipal, national and European support. Copenhagen's major cruise shore-power system, opened in 2025, has received EU co-funding and public financing from Copenhagen municipality; Aarhus has also received DKK 39.8 million of EU support for container-ship shore power, while Fredericia has received support through both Denmark's port fund and the EU.
Belgium	Continuing to subsidise large new installations. A 5MW shore power project at Antwerp Euroterminal, representing an investment of around €25–30 million, received a €4 million Flemish subsidy. At Zeebrugge cruise terminal, European and Flemish support totals just under €4 million, including €830,000 from the Flemish Government.
United States	Federal and state programmes have provided substantial support for shore power and wider port electrification. The Clean Ports Program has awarded nearly \$3 billion for zero-emission port equipment and infrastructure, including shore-power systems, grid upgrades, charging and energy storage. California alone secured just over \$1 billion across seven ports under the programme, reflecting the state's longstanding use of regulation alongside public investment to reduce emissions from ports.

Glossary

AFIR	Alternative Fuels Infrastructure Regulation. EU legislation setting requirements for the deployment of alternative-fuels infrastructure, including shore-side electricity at certain ports.
BICS	British Industrial Competitiveness Scheme. Government support intended to reduce electricity costs for eligible manufacturing industries exposed to high UK power prices. The scheme is due to provide relief from specified electricity policy costs.
BPA	British Ports Association. The national trade association representing UK ports and harbours.
CAS	Connections Accelerator Service. A government-led service intended to help strategically important electricity-demand projects identify opportunities for faster or more flexible grid connections.
CCL	Climate Change Levy. A tax charged on electricity, gas and certain other fuels supplied to businesses and the public sector.
CMDC	Clean Maritime Demonstration Competition. A UK SHORE funding programme supporting the development and demonstration of clean maritime technologies.
DESNZ	Department for Energy Security and Net Zero. The UK Government department responsible for energy policy, electricity markets and the transition to net zero.
DfT	Department for Transport. The UK Government department responsible for transport policy, including maritime policy.
DNO	Distribution Network Operator. A company responsible for operating and maintaining a regional electricity distribution network.
DUoS	Distribution Use of System charges. Charges associated with using and maintaining the local electricity distribution network.
ETS	Emissions Trading Scheme/System. A carbon-pricing system that places a cap on emissions and requires covered operators to surrender allowances for the emissions they produce.
IMO	International Maritime Organization. The United Nations agency responsible for global rules governing international shipping, including measures to reduce greenhouse-gas emissions.
NESO	National Energy System Operator. The body responsible for strategic planning and operation of Great Britain's electricity and gas energy systems.
NWF	National Wealth Fund. The UK Government-backed investment institution providing finance for infrastructure and other projects intended to support economic growth and the transition to net zero.

Policy costs	Costs added to electricity bills to fund government energy policies, such as renewable-energy support and electricity-system capacity mechanisms.
RESP	Regional Energy Strategic Plan. A strategic plan being developed for each region to identify future energy needs and inform investment in local energy networks.
TCR	Targeted Charging Review. Ofgem's reform of electricity network charging, which moved the recovery of residual network costs away from consumption and peak-use charges towards fixed charges.
TNUoS	Transmission Network Use of System charges. Charges associated with the cost of installing, operating and maintaining the high-voltage electricity transmission network.
TRL	Technology Readiness Level. A scale used to describe how mature a technology is, from early-stage research through to proven commercial operation.
UK ETS	UK Emissions Trading Scheme. The UK's carbon-pricing system, which now includes specified maritime emissions.
UK SHORE	UK Shipping Office for Reducing Emissions. The Department for Transport programme supporting research, development, demonstration and deployment of clean maritime technologies.
ZEVI	Zero Emission Vessels and Infrastructure. A UK SHORE funding programme supporting zero-emission vessels and associated infrastructure, including shore power and vessel charging.