Call for evidence on shore power – ENA Response

April 2022

The voice of the networks

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Distribution

LCT Working Group
Gas Strategy Group

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Energy Networks Association

About ENA

Energy Networks Association (ENA) represents the owners and operators of licenses for the transmission and/or distribution of energy in the UK and Ireland. Our members control and maintain the critical national infrastructure that delivers these vital services into customers' homes and businesses.

ENA's overriding goals are to promote UK and Ireland energy networks ensuring our networks are the safest, most reliable, most efficient and sustainable in the world. We influence decision-makers on issues that are important to our members. These include:

- Regulation and the wider representation in UK, Ireland and the rest of Europe
- Cost-efficient engineering services and related businesses for the benefit of members
- Safety, health and environment across the gas and electricity industries
- The development and deployment of smart technology
- Innovation strategy, reporting and collaboration in GB

As the voice of the energy networks sector, ENA acts as a strategic focus and channel of communication for the industry. We promote interests and good standing of the industry and provide a forum of discussion among company members.

Our members and associates

Membership of Energy Networks Association is open to all owners and operators of energy networks in the UK.

Companies which operate smaller networks or are licence holders in the islands around the UK and Ireland can be associates of ENA too. This gives them access to the expertise and knowledge available through ENA.

Companies and organisations with an interest in the UK transmission and distribution market are now able to directly benefit from the work of ENA through associate status.

ENA members

Cadent – Your Gas Network
electricity north west – Bringing energy to your door
ESB NETWORKS
gtc
nationalgrid
nationalgridESO
Northern Gas Networks
Northern Ireland Electricity Networks
NORTHERN POWERGRID
Scottish & Southern Electricity Networks
SGN – Your gas. Our network.
SP ENERGY NETWORKS
UK Power Networks – Delivering your electricity
WALES&WEST UTILITIES
WESTERN POWER DISTRIBUTION – Serving the Midlands, South West and Wales

Introduction

This document sets out the response to the Department for Transport (DfT) Call for Evidence on shore power1. Please note that this response is on-behalf of all of our Gas and Electricity transmission and distribution network members only and does not include those of generators or suppliers.

We believe that Energy Networks are critical to enabling shore power and the wider decarbonisation of the maritime sector. Networks are ready to support this transition, and look forward to collaborating closely with the maritime industry to deliver it. We note that many of the questions in this consultation are focussed on the vessels themselves, and hence we have provided a general overview based on four key themes that we set out below. We then provide specific answers to some of the questions. We would be more than happy to meet with Department for Transport to discuss this further, and we look forward to continuing our engagement with the Shore Power and Port-side Infrastructure Task and Finish Group (or equivalent going forward).

Our Response

General Overview

1. **A whole energy system approach**

   Energy Networks Association Members continue to explore and consider all future-proof energy demand and generation requirements for the UK's journey to Net-Zero. To enable the appropriate Gas and Electricity Networks of the future, a whole energy systems approach needs to be taken in order to build the right network infrastructure, ahead of need, to meet the future demands for all transport sectors, including maritime, instead of providing capacity incrementally.

   From a shore power perspective, a whole systems approach would mean understanding all existing and future energy requirements of the port and wider port infrastructure, not just that of the vessels themselves. Typically, ports will also have Rail Terminals, Bus Stations and parking for Heavy Goods Vehicles, as well as passenger cars, all of which will be affected by the transition to clean sources of energy. Accordingly, it is important to consider the overall energy requirements in a holistic nature, and not piecemeal over time.

   A whole systems approach means factoring in a wide range of sectors such as heat, electricity demand and generation, hydrogen and other green gases, transport, waste and storage.

2. **Understanding energy requirements at the port**

   The decarbonisation of the maritime industry and the associated port infrastructure will potentially add large blocks of demand onto the Energy Networks, due to increased electrification and hydrogen demand. Energy Networks would like to work with port operators to help them understand their future peak energy demand and generation requirements for vessels and at the port. To do this, and in line with a whole systems approach, a range of new demands and factors will need to be considered. These include, but are not limited to:

   - The type of maritime vessels docking, and their energy requirements (electricity, hydrogen, biomethane, etc)
   - The number of berths
   - The type of heavy equipment and vehicles at the port, eg: cranes, and how they are powered

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1057312/call-for-evidence-on-shore-power-implementing-maritime-commitments-in-the-transport-decarbonisation-plan.pdf

- The number of vehicle parking spaces available, the type of vehicles visiting and their usage patterns, as well as energy requirements at any on-site Railway and Bus Terminals or HGV parking areas

- The types of buildings on site, and how they are heated

- Other activity at the site which has energy demand, eg: industrial processes

By gathering this information, one can then determine the peak energy demand for the site and surrounding area. Different scenarios can also be investigated. Once this has been determined, the future energy networks requirements can be determined, and Energy Networks can then support port operators in the formal connections application process to get a suitably sized connection. It should be noted that National Grid, in partnership with the British Ports Association and Siemens Energy, have already developed a Port Peak Demand Tool[2] for port operators in England, to help them determine their future demand requirements.

Depending on the location, there may also be the opportunity to have energy storage and/or generation on the site in the future. Storage could be in the form of batteries, thermal stores, hydrogen or ammonia, depending on the location and the type of ships. There could also be on site generation; wind, solar or green gas generation. Not only could these technologies help drive the port towards Net Zero, but they could also reduce connection and network usage costs, as well as provide additional revenue streams by participating in national Electricity System Operator (ESO) and local Distribution System Operator (DSO) flexibility and ancillary service markets.

3. Establishing a suitable funding mechanism to support the rollout of shore power

Port owners and operators will need support to cover the capital costs associated with shore power projects, including the associated Energy Networks infrastructure. There are a range of different funding mechanisms or initiatives that could be made available, such as a green maritime fund. Lessons should be taken from other industries that have synergies. For example, we have seen initiatives such as the Rapid Charging Fund[3] (RCF) setup for enabling rapid EV chargepoints to be deployed at Motorway Service Areas (MSAs) across the Strategic Road Network (SRN) in England. While ports are not exactly the same as MSAs, there are some synergies (big future demands on the networks, often in remote or rural locations) that would enable learning to be shared from earlier mechanisms such as this. Exactly which mechanism would work best for ports is ultimately a decision for Government, but Energy Networks would be happy to be involved in the design of any such mechanism, to ensure that networks infrastructure is appropriately considered.

4. Local co-ordination and planning

Energy Networks support a national framework and associated funding mechanism to enable shore power. However, co-ordination with local partners such as Local Authorities will also be critical to ensuring the right Energy Networks infrastructure is deployed in the right locations. Apart from the port infrastructure itself, there will often be other Net Zero related developments in the area, which the Local Authority and other local stakeholders will be involved in. By co-ordinating with local stakeholders and the local energy networks, the right energy infrastructure for the whole area can be developed, which will lower costs for everyone.

A tangible example of this will be offshore wind. Ports along the East Coast of England will likely be in close proximity to new offshore renewable electricity generation. Particularly if coupled with some form of storage (batteries and/or hydrogen), this could help to reduce the cost of connecting to the electricity network, as well as ongoing costs.

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[2] https://www.nationalgrid.com/uk/electricity-transmission/document/137776/download

[3] https://www.gov.uk/guidance/rapid-charging-fund

Specific Questions

Q1, Q2, Q3: No comments

Q4 – In your opinion, what are the key (a) barriers and (b) incentives for ship owner, ship operators and ports to invest in shore power?

Energy Networks can help remove the capacity barrier (whether it be electricity or green gas) to enabling decarbonised ships and port infrastructure provided that requirements for energy use are clear and requested in sufficient time. On this aspect, for sufficiently large ports, it is likely that any connection requirement to the electricity networks will need reinforcement at 132kV with associated cabling and HV substations. Thus the most critical issue is the timing of the new demand, as these installations can take many years to plan, consent and construct.

Q5 – Can you provide estimates of the costs and benefits for any current or future shore power projects in the UK, including emission savings, costs of infrastructure at ports and costs of any upgrades to existing network connections and any reinforcements required to the electricity network? If possible, please provide estimates of cost recovery periods for these projects and estimates of the associated increases in electricity demand?

The costs associated with upgrading Network infrastructure to enable shore power are highly locational. The Network infrastructure required will depend on a range of factors that are specific to that location, including the energy capacity required, proximity to the Energy Networks, existing connection capacity, condition of the Networks, etc. As such, it is difficult to provide cost estimates without knowing the site-specific details. However, it should be noted that:

- Costs could be reduced by exploring options such as flexible connections and/or co-located storage/generation
- Electricity Network reinforcement costs will likely change post-April 2023, when Ofgem introduces new Electricity Access Charging arrangements.

It should be noted that Network Infrastructure has very large economies of scale, and the proposed investments should be designed to meet both initial and long-term requirements for the site and surrounding area, over a period of 40 years (or more). This means that the investment payback should similarly be considered over a long period. If one were to make investments in Network Infrastructure, which is unable to be expanded to meet the final energy demand decades in the future, it will result in such investments being stranded when the larger investment is later required. When capacity limits are reached, this also carries the risk of long delays to the Network Infrastructure being ready when required, as well as much greater costs, as suitable sites will not necessarily be available then.

Q6, Q7: No comments

Q8 – Do you think Government coordinated guidance would be a helpful tool for ports and other operators to navigate the complexity of shore power projects? If so, which topics should be included to maximise the value of such a document?

Q9 – In your opinion, how could government's coordinating function be deployed to accelerate collaboration across the maritime sector to facilitate shore power projects? Can you please provide examples?

Broadly speaking, co-ordination at a National level would be beneficial. General guidance for ports and shore power providers on collaborating with and connecting to Energy Networks would be recommended. This co-ordination will enable Networks to plan and upgrade Networks in an economic manner that delivers benefits for everyone. ENA would be happy to co-ordinate this activity for Government.

A critical issue is how to manage the risk associated with larger investments being made now to cater for future load requirements (i.e. investment ahead of need and the assets becoming stranded). In this aspect it is critical to consider the difference between the risks associated with any extra costs of delivering excess capacity early, vs. the consequential losses to society of not delivering adequate capacity when it is required. These risks are asymmetrical.

Q10, Q11, Q12(1), Q12(2), Q13: No comments

Q14 – In your view, what would the impacts of a mandate on port operators to install shore power infrastructure be on (a) ship owners (b) ship operators (c) UK ports, (d) energy network operators, and (e) the wider UK economy?

As discussed, a mandate would mean that there will be large additional demands coming onto the Energy Networks. Any mandate should come with a target date, as this then gives Networks some certainty, and enables them to build this into their planning timescales. With appropriate early warning, planning and collaboration with port operators themselves, Energy Networks will be ready to deliver the connections and energy capacity required to deliver shore power. Early warning by port and shore power operators will enable them to take a whole systems approach and explore all their options for decarbonisation, including use of electrification and hydrogen, which will reduce costs.

Timescales for building Energy Network Infrastructure are typically long. These timescales are highly dependent on the location and a number of other factors, but small increases in capacity can still take years. Larger demands will need larger connections, meaning higher voltage or pressure connections – these can sometimes take 10+ years to establish. Timescales are often driven by Planning and Wayleave issues, as well as site acquisition.

There may also be options to 'future proof' the Networks connections. For example, with Electricity Networks in some cases it may be possible to connect initially using 132kV equipment, but have it operated at 33kV. Then later on when the expected demand comes, the operation of the equipment can be uprated to 132kV.

Q15, Q16, Q17, Q18, Q19, Q20, Q21: No comments

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