

Growing the Supply Chain for Accelerated Transmission Network Build: Next steps

Position Paper for the Electricity Products Supply Chain Council Transmission and Distribution Networks Forum (EPSCC)

GB is in a global race to secure supply chain capacity for transmission network infrastructure components and workforce. In order to improve supply chain capacity, the Winsor review and the TAAP identified the need for longer-term strategic planning, accelerated regulatory approvals, earlier procurement of key transmission network components, and for transmission owners' (TOs) to harmonise equipment requirements. Following the Government's request as part of the Transmission Acceleration Action Plan (TAAP), BEAMA established the EPSCC Transmission and Distribution Networks Forum, as a sector-specific group within the pre-existing EPSCC.

This paper sets out key recent developments and suggested next steps in terms of promoting investment in the supply chain for transmission network equipment¹. It covers strategic planning and long-term visibility for manufacturers and their investors (section 1); how to catch up with the rest of the world in terms of regulatory framework (section 2) and procurement practices (section 3); and finally views on the topic of bulk purchasing, including harmonising technical requirements (section 4). Section 5 outlines the need for a comprehensive workforce strategy led by Government. Section 6 highlights a specific concern in the transformer sector that could pose constraints in future.

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¹ This paper focuses on steps required to secure supply chain capacity *globally*, to avoid delays in implementing required transmission network upgrades and extensions. Additional Government and regulatory interventions that can help drive investment in manufacturing capacity *locally* in the UK, and promote inward investment will be covered separately in BEAMA's forthcoming response to the Government's consultation on the Industrial Strategy (November 2024) and other submissions.

1. Long-term visibility: a clear line of sight

Greater clarity on when owners and developers of network infrastructure will procure what is needed between now and 2050 in terms of network infrastructure is required so that OEMs and contractors can make investments in manufacturing capacity and workforce. A process is required to provide the transmission sector supply chain with visibility of the 'National Workbook' that is informed by strategic system planning (SSEP and CSNP) to invest in increasing capacity. This would cover projections of onshore network needs driven by asset replacement and new load, offshore transmission needs, interconnectors, as well as network equipment behind the meter for renewable generators.

In the transmission sector, the move to strategic planning by the National Energy System Operator (NESO) is a positive step and means that high-level assumptions on the volumes of work will be available in future, before Ofgem approves funding and before TOs go to procurement. The TAAP also stated that "The longer-term Centralised Strategic Network Plan (CSNP) should be used to support Transmission Owner (TO) engagement with the supply chain and evidence the scale of investment required over a longer time period".

This visibility has been difficult to achieve, and a better process is needed in future which may also require regulatory changes. The NESO holds assumptions on volumes of work associated with the most recent strategic plan, the CSNP-t2 ('Beyond 2030' Report) published in the Spring 2024. Whilst the headline figure of £112Bn has been published by the NESO as part of communications about the CSNP-t2, information on numbers of switchgear bays, transformers, km of lines etc. is not in the public domain which makes sizing the market and attracting investment difficult. Some TOs have begun to share projected volumes they are looking to procure bilaterally, but it is not clear that in future they will share information early enough, or with sufficient confidence in timing and numbers for supply chains to commit investment for the required capacity expansion. This uncertainty is also in part due to uncertainty over which schemes will be approved by Ofgem when.

Changes to regulation may be needed, so that strategic energy network planning can provide a clear line of sight on volumes of equipment that are projected will be needed. This visibility is needed ahead of regulatory approval and procurement engagements by TOs. It will also aid government in assessing supply chain resilience and providing support for expansion.

2. Regulation that allows early commitment

Ofgem's decision to accelerate regulatory approval of a programme of work via ASTI has made a positive difference to securing supply chain capacity: some TOs (SPT and SSEN T) have **engaged earlier with the supply chain** than previously and have already procured what they need, while National Grid are in early November coming to a conclusion on their procurement. Moreover, some TOs have as a result of how ASTI approved a programme of work been able to **bundle orders across multiple projects** rather than tendering on a project-by-project basis. SSE Transmission have certainly made this positive move, but for National Grid it is not clear that they are making this change.

It is positive that for RIIO-T3 Ofgem are intending to apply similar principles to accelerate as they applied in ASTI to some future transmission projects, certainly for load-related spend associated with the CSNP. It is key that Ofgem retain the principle of **approving programmes of work** rather than individual projects so that this can translate to TOs procuring programmatically. Ofgem **moving from detailed ex ante assessments to more in-flight and ex-post assessment** of projects will enable early commitment from TOs with OEMs.

It is key that the principles of programmatic and accelerated approval will be applied to all projects including those that are more customised and have greater uncertainty attached, rather than just applied to 'straight forward' projects, and only to part of TOs' overall spend.

Ofgem will soon consult on the 'Advanced Procurement Mechanism' (APM) to allow TOs early engagement with the supply chain for projects they will deliver in RIIO3. This is also a welcome step, however it is important to note that reserving manufacturing slots without adequate project definition has two issues which make it impractical for OEMs:

- The contract scope is usually for delivering an installed system, not just the loose equipment so engineering and site teams and some manufacturing requirements also need to be committed.
- Accounting rules limit what can be booked as order intake. A limited notice to proceed cannot be turned over until it becomes a firm order.

Procuring actual projects as early as possible rather than reserving manufacturing slots therefore needs to be the aim. Otherwise, there is a risk that, while capacity can be reserved through the APM, OEMs don't actually have sufficient commitments from customers to fully drive investment in new manufacturing capacity (and mobilising workforce). At worst this could lead to underinvestment whereby when eventually the orders arrive, OEMs will need to 'novate' their reservation commitment or extend lead-times, even if this incurs a penalty.

Ideally, OEMs would be reserving capacity for their customers as part of strategic partnership contracts that contain actual orders, with staged commitments and risk-sharing between parties (see section 3).

Separating the reservation of capacity from orders because regulatory approval has not been gained by TOs also leads to inefficiency and additional costs borne by the energy consumer ultimately, based on e.g. design engineers waiting for specifications before they can begin work, and workforce teams having to be on standby, or redeployed on short notice. In the short-term, the APM is good to ensure projects in T3 will be deliverable, given they are currently at risk. However, in the long-term the regime must ensure reserving capacity is linked to actual orders, so as to grow a resilient supply chain.

Summary: Ofgem regulation should approve projects across programmes of work. In-flight and ex-post regulatory assessments are preferable to ex ante assessments. Orders are more effective in driving investment in manufacturing capacity than capacity reservations.

3. A new approach to procurement for network owners: strategic partnerships

TOs in GB must further reform their approach to procurement and contracting to be competitive with European counterparts who have begun entering longer-term strategic partnerships, in some cases over decade long terms. These are characterised by greater confidence by both parties in the timing and scope of work and the ability to reduce cost through repetition, longer-term commitments and risk-sharing. There are ways to retain competitive tension, to ensure energy consumers continue to get value for money, and to make available information that allows regulators to confidently assess the efficiency of investment programmes and protecting consumers, without tendering every single project as has been the case in GB. A programme of projects that is competitively bid and the volume procured will support competitive bidding. It is of course important to ensure that long-term commitments are designed in a way to keep space for learning and technological innovation rather than ‘freezing’ requirements in time, certainly in the case of HVDC systems. Here, Tennet in Germany have developed ways to avoid stifling innovation through long-term commitment. As part of the discussion with TOs and ENA, it was suggested that the supply chain could facilitate contact with international peers, such as Tennet to learn about innovation in contracting and procurement. We have tried to facilitate such contact.

Besides making longer-term commitments across programmes of work, TOs must also procure design contractors earlier in the design process to support supply chain engagement and assist in the planning stage (as stated in TAAP SC2). In the case of

substations, the design is often part of the OEM contract scope as this is more efficient and ensures clear responsibility for delivery of a working system. Since the publication of the TAAP, some TOs have begun to procure design contractors earlier, but there is still scope for further improvement in this respect to improve planning and capacity in the supply chain.

TOs should develop their procurement models to be true long term programmatic partnerships. International best practice could be built upon and developed further.

4. Buying in bulk

There is scope to further consider the benefits of more bulk purchasing for GB, and which changes this would require, to make the market more attractive for manufacturers to bid in. One key advantage of TOs on the continent in securing manufacturing capacity has been the aggregation of purchases including cooperation between TOs.

Harmonising equipment requirements between TOs

As an outcome of the TAAP, TOs via the ENA were given the task to standardise equipment needs in the transmission sector, to enable transferring equipment at least between projects, but ideally also between TOs. The benefit would be, at minimum, increased productivity in the supply chain from reducing the number of permutations of e.g. transformers, HVDC substations, high-voltage switchgear and so on. Harmonisation would also enable purchasing greater volumes of equipment, and could support bulk purchasing.

The ENA have embarked on a programme of work to draft technical standards for some relevant asset types, namely switchgear, circuit breakers and HTLS overhead lines. Within these product categories, there has been progress in terms of the ENA and TOs involving the supply chain: in late October, the ENA began scheduling conversations to seek OEM views on proposals for alignment. This is a welcome development.

However, the TOs' and ENA's overall approach to the work programme seems to lack a strategic plan for a phased harmonisation across all relevant asset types, and there has been no clear progress in the key areas of HVDC infrastructure and power transformers. A phased approach to harmonisation would involve:

- First, urgently aligning system ratings across all asset classes (eg rather than one TO procuring 400 kV transformers at 500 MVA and another TO procuring 400 kV transformers at 480 MVA as is currently the case, they would align their requirements). These system ratings are key to be able to plan for a new factory for instance.

- In a next step, harmonising further technical requirement by minimising ‘preferential engineering’ that delays the production lifecycle or increases cost without providing greater benefit.
- Finally, standardising non-functional requirements.

The workplan should be developed urgently, and with input from the supply chain. BEAMA have requested visibility of such a proposed workplan across all asset types from the ENA, highlighting that OEMs understanding when TOs plan to seek their input and align requirements for which product types will help OEMs in their planning, given that investment decisions are being taken on an ongoing basis. So far however, the TOs seem to be lacking a strategic approach to harmonisation that would allow them to produce a forward workplan across product categories.

Fragmented purchasing onshore

There could be benefits if purchasing across the GB-wide transmission ‘Workbook’ was aggregated more, as compared to continued and further fragmentation. Fragmenting procurement of components by applying onshore competition means that the GB market is broken down further rather than supporting bulk purchasing. In considering whether to apply onshore competition, the disadvantages of fragmenting the ‘Workbook’ should be considered, and carefully assessed against the expected benefits of onshore competition.

Offshore Transmission

So far, each offshore wind farm connection is procured separately. Ownership of the asset is later transferred to an OFTO post construction and commissioning. Two procurement approaches predominate: one where the wind farm developer takes overall responsibility for the working system and procures separate subsystems; and another where an OEM takes design responsibility for the whole electrical system.

In future, offshore wind farms could be connected through shared infrastructure. Proposals for coordinated offshore networks will require new commercial arrangements that enable separate investment decisions by wind farms that will ultimately share a connection. This could create an opportunity for independent organisations to build shared infrastructure offshore which would also enable programmatic procurement. This is one of the benefits that offshore infrastructure coordination could bring. So far, there is no developed regulatory model for shared offshore wind connections. We encourage Ofgem and DESNZ to progress this, so that going forward benefits of this approach can be captured where applicable.

From a supply chain perspective, it is however vital that any organisation building shared infrastructure offshore has experience of offshore connections. It would not be helpful to assign purchasing to entities with no expertise and history with offshore connections, and this would undoubtedly further delay procurement and add risk for offshore wind developers.

For procurement in the short term, there is an urgent need for TOs to harmonise their equipment requirements.

For medium-term project delivery, DESNZ and Ofgem should consider the delivery regime for all onshore network infrastructure –including TOs and CATO.

Shared offshore network connections would offer opportunities to bundle procurement. However, any organisation assigned responsibility for developing shared infrastructure must have experience of offshore connections.

5. A Government strategy and Ofgem funding is required for industry to invest in the workforce to design, manufacture, install and service infrastructure

The new Government have established the Office for Clean Jobs as part of DESNZ which is a welcome indication that it takes the challenges of sufficient skills and the availability of workforce seriously. Moreover, the three TOs led by National Grid have invited some OEMs and contractors to a Transmission Industry Skills and Workforce Planning initiative which kicked off on 7th November.

It is imperative that we rapidly move towards a comprehensive workforce strategy. **This has to be tackled as a whole industry to avoid free riding and deliver sufficient workers to meet the whole industry needs.** A strategy should include amongst other measures:

- Align certifications/ create a single certification between TOs so that workforce can be used more flexibly and efficiently across the different companies. At the moment, every TO has their own slightly different requirements
- Create special ‘critical infrastructure’ visas to enable skilled workers to support the short-term needs of the industry
- Establish a standard curriculum and national network of training hubs to train large numbers of workers from multiple employing organisations
- Ofgem must allow costs of training, assessment and extra supervision of recent trainees on sites as part of each project.

Government support will be needed to help the private sector to invest and align its efforts, so as to grow the skills and workforce required across the sector.

6. Specific concern on the transportation of large infrastructure components – transformers

One specific concern in the transformer sector is that constraints could arise in the ability to transport large heavy infrastructure components from where they are assembled to the site of installation. Firstly, the number of heavy haulage companies that manufacturers can hire to transport their transformers to site has decreased down to two (Allelys and Collet, following the recent market exit of a third). Secondly, there are constraints on the routes that can be used to transport the infrastructure because not all roads, bridges and ports meet the required ratings to support these heavy loads.

As part of ensuring the deliverability of the transmission projects to enable the Clean Power by 2030 mission, it is worth investigating whether there is sufficient capacity and resilience in the road, bridge and port infrastructure to enable transportation of these heavy infrastructure components. It may be that investment in the infrastructure is needed to increase the number of available routes, to ensure there is sufficient resilience in the system. The issue of limited supply in heavy haulage companies and vehicles would likely be improved through increasing visibility and making longer-term procurement commitments, as discussed in sections 1 – 3 of this paper. Addressing these issues as a priority would allow investment in the heavy haulage market as well, alongside increasing manufacturing and workforce capacity.

7. Annex: relevant TAAP recommendations and actions

TAAP reference	Recommendations / Actions	Owner	Page
SS1	A Strategic Spatial Energy Plan (SSEP) should be developed to bridge the gap between government policy and Network Development Plans	Government, NESO	25
SS5	The longer-term Centralised Strategic Network Plan (CSNP) should be used to support Transmission Owner (TO) engagement with the supply chain and evidence the scale of investment required over a longer time period.	NESO, TOs	30
SE1	A forum should be created between the Future System Operator (FSO), Transmission Owners (TOs), equipment manufacturers and Ofgem to review and update equipment standards used within Great Britain.	ENA, TOs, NESO	36
SE2	A process should be created to support and enable the work of this forum.	ENA, TOs, NESO	36
RA1	Regulatory approval process should be removed from the critical path within the end-to-end process.	Ofgem	40
Chapter 5 “Supply Chain and Skills”			
SC1	The Transmission Owners (TOs) should form long-term relationships with the supply chain and look to book slots and bulk purchase equipment when possible.	TOs, Ofgem	59
	Ofgem will continue to review the ASTI framework to ensure it has sufficient flexibility to encourage and facilitate early contractor involvement and development of longer-term supplier relationships. Ofgem will also work with TOs and the supply chain to ensure the wider regulatory environment is in place to enable this.		
	Ofgem will also assess the risk sharing and pricing mechanisms used by TOs in their procurement processes to determine whether these represent the most efficient value for consumers and demonstrate effective supply chain management.		
	Furthermore, Ofgem will work with the TOs and supply chain to explore options for bundling up TO orders in 2024.		

SC2	Contractors who will carry out the detailed design work should be procured earlier in the design process.	TOs	60
SC3	Further work and collaboration is required between the Transmission Owners (TOs), supply chain and government to understand how manufacturing capability could be developed in the UK.	BEAMA, Government, TOs	60
SJ1	Government should fund and lead an urgent review and work with industry and academia to identify the skills gaps and actions required to attract, recruit and retain the large workforce needed to deliver Net Zero.	Government	61