

British Hydropower Association



Large Scale Hydropower Deployment & Reindustrialising Britain Event Report

How Britain's next generation of hydropower
can help turn infrastructure investment
into productive capability



Executive Summary

Britain is preparing for an extraordinary period of infrastructure investment at exactly the point when decades of deindustrialisation have depleted some of the productive capacity needed to deliver it.

For the first time in over four decades, Britain is preparing to build major new large-scale hydropower infrastructure. Refurbishment of the existing hydro fleet is already creating work; the first major pumped storage hydropower (PSH) projects are moving towards delivery; a further PSH pipeline sits behind them; and tidal range could provide the next major wave. Together, this represents tens of billions of pounds of investment and potentially decades of work.

The central question is therefore not simply whether Britain needs this infrastructure.

It is whether the next generation of infrastructure will strengthen Britain's productive capability, or whether too much of the value will be imported through overseas equipment, expertise and supply chains.

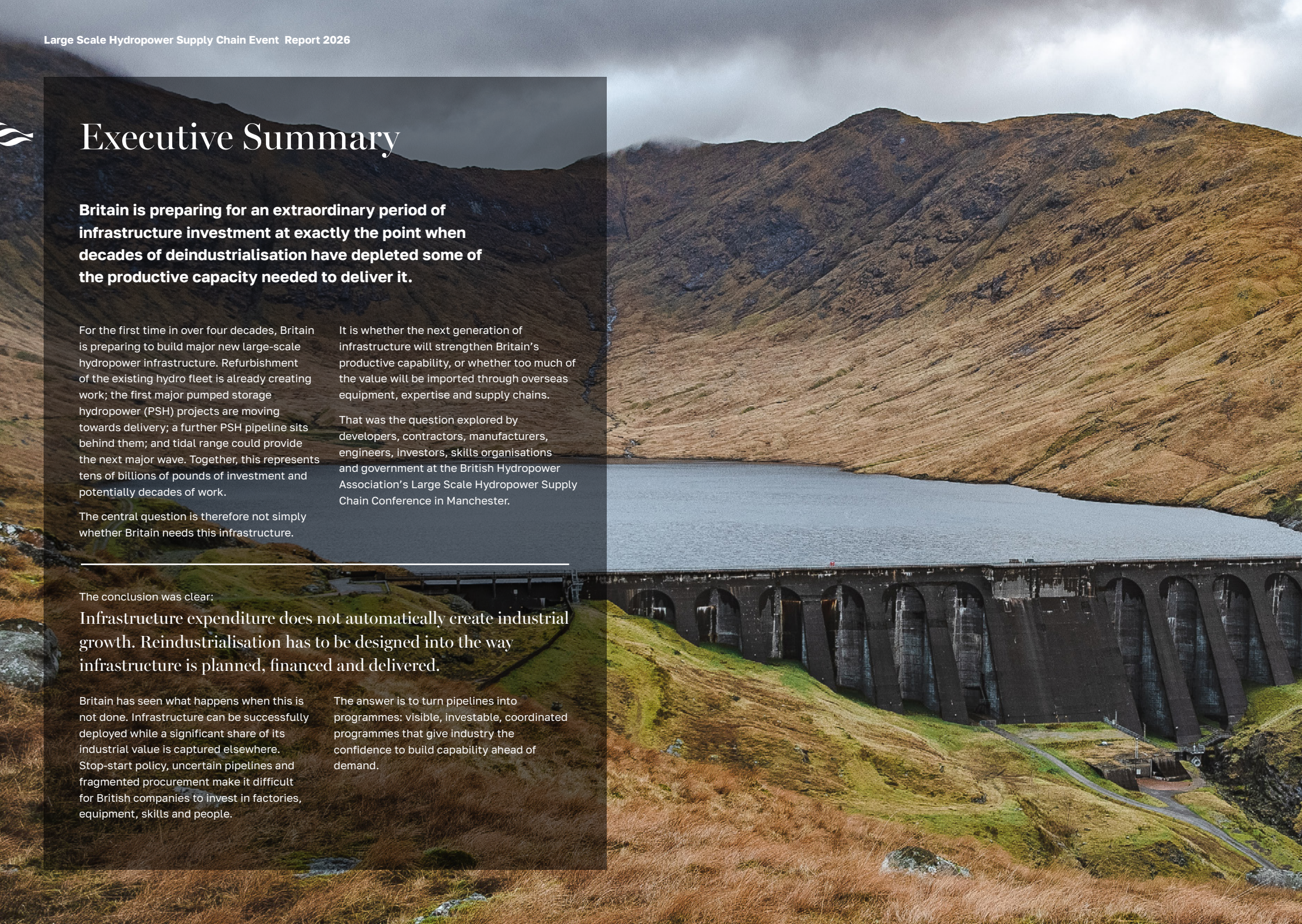
That was the question explored by developers, contractors, manufacturers, engineers, investors, skills organisations and government at the British Hydropower Association's Large Scale Hydropower Supply Chain Conference in Manchester.

The conclusion was clear:

Infrastructure expenditure does not automatically create industrial growth. Reindustrialisation has to be designed into the way infrastructure is planned, financed and delivered.

Britain has seen what happens when this is not done. Infrastructure can be successfully deployed while a significant share of its industrial value is captured elsewhere. Stop-start policy, uncertain pipelines and fragmented procurement make it difficult for British companies to invest in factories, equipment, skills and people.

The answer is to turn pipelines into programmes: visible, investable, coordinated programmes that give industry the confidence to build capability ahead of demand.



This report argues that four actions are needed.

1. Turn pipelines into credible order books

Government should provide sufficient visibility, certainty and continuity across hydropower and related infrastructure programmes to give businesses the confidence to invest in equipment, facilities, skills and people. A theoretical pipeline is not enough. Manufacturers, contractors, colleges, ports and investors need confidence that projects will proceed and that capability built for one project can be redeployed on the next.

Certainty is therefore not only a policy condition; it is an economic intervention. It unlocks private investment, supports supply-chain readiness and reduces the repeated cost of mobilising, losing and then rebuilding capability.

2. Coordinate delivery across Clean Power 2030 and the wider UK infrastructure portfolio

Pumped storage hydropower, tidal range, grid, offshore wind, nuclear, transport and other major infrastructure programmes will draw on overlapping resources: roads, ports, grid connections, accommodation, materials, tunnelling expertise, specialist equipment and skilled people.

No individual developer can optimise these shared constraints. Government must therefore manage the spaces between projects, not project-manage the projects themselves. A programme-level coordination function is needed to identify, own, tag, track and unblock shared constraints before they become cost, delay or community impacts.

3. Design in reindustrialisation

Britain should use aggregated infrastructure demand to identify the productive capabilities it can competitively build or rebuild. These may include electrical equipment, steel fabrication, tunnelling, construction materials, logistics, engineering, digital capability and specialist skills.

The objective is not to recreate yesterday's industrial model, but to organise today's fragmented capabilities into investable opportunities. UK suppliers may have technical competence but still lack finance, certification, facilities, scale or routes

into major contracts. Policy, procurement, public institutions and private finance should help capable firms cross that gap.

4. Use repeatability to improve productivity

Reindustrialisation will not succeed if Britain remains structurally too expensive at building infrastructure. Each project must therefore contribute to a shared learning curve. Standards, procurement, digital systems, early contractor involvement, sequencing and cross-project learning should be aligned so that the next project is easier, faster and less expensive to deliver than the last.

A programme approach allows Britain to move from first-of-a-kind delivery towards repeatable, transferable capability. That is how infrastructure investment becomes not only an asset base, but a productivity strategy.

These four actions require capital as well as capability. The conference heard that private institutional capital should be available for investable infrastructure once projects have sufficient revenue certainty and construction risk is manageable. The harder gaps often sit earlier: in development finance, supply-chain working capital, training capacity and investment ahead of confirmed demand. Public institutions, private finance and industry therefore need to work together to bridge the gap between policy ambition and investable delivery.

The UK already has a Modern Industrial Strategy. The task now is to mobilise it through aligned ambition: government, industry, institutions, places and communities each understanding the problems they are best placed to solve, and working together to ensure that infrastructure investment builds lasting productive capability.

The test should be simple: does each project leave Britain more capable of building the next one?



Action 1: Turn pipelines into credible order books

1.1 Creating visibility, certainty and continuity

Britain is creating a large scale hydropower pipeline with expected investment of over £10Bn. The first projects are already progressing through planning, design, ground investigation and procurement. Beyond them sits the potential for tidal range, with the UK's accessible tidal resource capable of supporting a further major infrastructure programme. But businesses do not experience a theoretical pipeline as an order book, manufacturers considering new machinery, a contractor considering new plant or automation, a college considering a new training programme or a port considering hundreds of millions of pounds of investment cannot make that decision because a project might happen.

PSH will be supported by the Long Duration Energy Storage Cap and Floor being designed by Ofgem. This future revenue insurance policy provides protection against long-term market risk while retaining strong incentives to control costs. Through the Cap and Floor, Government is giving visibility and certainty, and it is this potential for certainty that Government now needs to leverage into added value for UK Plc. A well designed mechanism should be optimising for wider value, not just delivering on a narrow target on a tight timeline.

1.2 Why certainty matters for reindustrialisation

Boom, bust and cliff edges

Without continuity, Britain repeatedly builds and then loses productive capability. The previous small-hydro boom demonstrated this clearly: contractors moved from project to project, developed expertise, improved quality and reduced costs, but much of that capability disappeared when the pipeline ended following the closure of the Feed-in Tariff. The result is a costly cycle of mobilisation, demobilisation and rebuilding skills when the next opportunity arises. The answer

was not necessarily to keep the FiT, but to ensure that public funding that had been used to grow capability had a planned route for redeployment.

U-turns and flawed metrics

The publicly popular Swansea Bay tidal project secured its DCO in 2016, but the previously supportive Government subsequently concluded that its levelised cost of electricity (LCOE) was too high. A decade on, Treasury has not evaluated the opportunity cost of the Swansea Bay Tidal Lagoon, but we do know that the UK based manufacturers and supply chain lined up to service the project lost their order book certainty.

The use of the LCOE as the single metric to determine this project's fate, fails to acknowledge wider value, including Gross Value Added (GVA) and looks shortsighted in this new era where resilience of the UK is under the spotlight.

Businesses had committed considerable management time and money to prepare supply chains and investment propositions for an opportunity that ultimately did not proceed. That experience affects the willingness of businesses to respond to the next policy signal requiring the mobilisation of workforces or building of shop floors.

Capital availability

Capital availability is not necessarily the constraint; creating certainty around investable opportunities is. The conference heard that long-term institutional capital should be available once PSH projects reach Final Investment Decision with revenue certainty and construction risk sufficiently managed. The more difficult gap sits earlier, when development, planning and consenting risks remain. This creates a potential role for GBE and the National Wealth Fund to provide recyclable development capital, guarantees or other risk-sharing mechanisms that help projects reach investability before long-term private capital takes over.

The same issue exists deeper in the supply chain. Tier 2 and Tier 3 businesses may have the technical capability to deliver major packages but lack the working capital or balance-sheet capacity to invest in people, equipment and inventory ahead of payment. Supply-chain finance, advance-payment guarantees and other commercial mechanisms should therefore form part of the programme's financing strategy.

1.3 How we deliver it

Government needs to provide a credible direction of travel. Cap-and-floor decisions are more than revenue stabilisation mechanisms: they signal to the whole delivery ecosystem whether to invest and prepare. Government may treat final approval as the starting pistol, but the supply chain cannot mobilise overnight; businesses need time to train people, qualify suppliers and invest in facilities and capacity.

Certainty becomes more powerful when demand is aggregated across PSH, tidal range, offshore wind, transmission, nuclear and transport, turning intermittent projects into a credible national order book. Providing certainty is therefore an economic intervention in its own right, capable of unlocking private investment, skills, productive capability and GVA.

The cost of uncertainty is also amplified by international competition. UK projects are competing for specialist contractors, Original Equipment Manufacturer (OEM) capacity, transformers, materials and skilled people against a growing global PSH and infrastructure market. Delay does not simply move UK investment to a later date: manufacturing slots, people and capital can be committed elsewhere, increasing the eventual cost and lead time of delivery.

Government should ask not only, "What does certainty cost?", but also, "What is its value, and what is the opportunity cost of uncertainty?" The story of offshore wind deployment demonstrated that infrastructure can be successfully deployed, but may not capture industrial value in the UK. The same question applies to infrastructure that

does not proceed: what factories, apprenticeships, machinery, port investment and GVA were consequently lost?

This strengthens the case for the independent infrastructure institution proposed by the Public Private Partnership Commission. Chaired by Sir John Armitt, the [Commission proposes a body reporting to Parliament](#), with credibility comparable to the OBR, capable of independently scrutinising the infrastructure pipeline and assessing material changes to major projects. Decisions would remain with elected governments, but the costs and consequences of delay, redesign or cancellation would be transparently assessed. Such a body could begin to expose what conventional appraisal often misses: the opportunity cost of uncertainty including lost investment, skills, supply-chain capability and GVA.



Action 2: Coordinate delivery across Clean Power 2030 and the wider UK infrastructure portfolio

2.1 Manage the spaces between the sectors and the projects

One of the clearest conclusions from the conference was also one of the most encouraging: these PSH projects are buildable, the engineering capability exists, the technology exists, international OEM capability exists and British contractors possess significant relevant expertise.

However, the biggest concerns are often elsewhere. A number of major Scottish PSH projects could be under construction in broadly the same geography and at broadly the same time. They could rely on the same roads, bridges, tunnelling expertise, accommodation, materials, specialist equipment and skilled people. At the same time, major transmission and other infrastructure programmes will be drawing upon many of those same resources. The A82 provided a practical example during the discussion. Non-standard bridges, abnormal-load movements and ordinary traffic could all become material constraints. Sometimes the problem may be as mundane as a blocked drain or a local traffic issue. None of these is a £2 billion engineering problem, but each could delay a £2 billion project. These constraints affect not only project cost and scheduling, but also the safety and resilience of the communities through which construction traffic and workforces must move.

2.2 Why it matters

A developer can manage its design and construction, procure its turbines and control many of its project risks. What it cannot do is optimise the wider infrastructure ecosystem. Three developers may need the same tunnelling workforce or rely on the same road, while transmission construction may require the same accommodation and offshore wind may need the same port. No organisation operating at individual-project level has the mandate or visibility to manage these interactions.

Where simultaneous demand creates artificial scarcity, competition can increase costs rather than reduce them. The issue is therefore not competition versus coordination, but where each creates value. Competition remains essential to affordability and innovation, but it must operate on a level playing field. Comparing projects at very different stages of design, investigation and cost maturity can reward apparent rather than real value. Equally, competition for genuinely scarce tunnelling capacity, OEM slots, transformers or specialist skills can drive costs upwards. Programme-level visibility should help government distinguish where competition will reduce costs and where coordination or sequencing will deliver better value for consumers.

2.3 How we deliver it

The principle emerging from the Manchester conference was that project risks should remain with individual projects, while shared risks and non-project constraints should be managed at portfolio and programme level.

PSH cannot sensibly be programmed without understanding the demands across the wider Clean Power 2030 and the wider UK infrastructure portfolio of transmission, offshore wind, nuclear, transport and other major construction programmes. It will require coordination between the UK and Scottish Governments, local authorities, transport bodies and individual developers. Government's role is not to project-manage PSH, but to manage the interfaces and spaces between projects. This means identifying cumulative demand for roads, logistics, accommodation, planning resources, grid capacity, workforce and OEM slots before they become constraints.

No individual developer can perform this convening role. It requires government to see the whole portfolio and ensure that shared constraints are identified, owned, tagged, tracked and addressed. Government must also remember that it remains embedded in delivery as it is a critical gatekeeper through planning, grid, regulation and system coordination.

Action 3: Design in Reindustrialisation

3.1 Build capabilities across the sectors

The conference heard a frank assessment of Britain's depleted industrial position, including the closure over several decades of UK facilities manufacturing turbines, generators and transformers. However, the UK retains substantial capability in engineering, design, specialist contracting, fabrication, materials, electrical engineering, digital capability and SMEs. The conclusion was not that Britain can no longer make things. Relevant capability still exists, but it is fragmented and often lacks the demand certainty and scale needed to attract investment. There is also an important distinction between technical capability and commercial readiness. Businesses may have the expertise to undertake the work but lack the balance sheet, certification, track record, facilities or Tier 1 relationships needed to compete for major contracts.

3.2 Why it matters

Britain could spend billions of pounds decarbonising its energy system while importing much of the productive value created by that expenditure. Offshore wind has demonstrated how infrastructure can be successfully deployed without capturing enough of the associated manufacturing and supply-chain value in the UK.

One PSH project alone may not justify rebuilding a factory, however, when demand from all PSH projects is combined with tidal range, offshore wind, grid, nuclear and transport investment, the commercial proposition becomes much stronger. A transformer manufacturer, steel fabricator or port does not ultimately care which government policy, or infrastructure sector created its order book. The market sees capability and demand, while government too often sees separate sectors through their different departments.

Creating a pipeline will not automatically ensure that British businesses secure the resulting work.

Government and industry must deliberately help capable UK suppliers overcome barriers to participation through investment in facilities, certification, collaboration, commercial readiness and routes into major contracts.

3.3 How we deliver it

Government should move from sector strategies towards capability strategies, identifying the productive capabilities Britain's combined infrastructure programme will require over the next 20 years. These include steel fabrication, transformers, tunnelling, construction materials, ports, logistics, engineering and specialist skills.

Government has visibility across aggregated national demand that no individual company possesses. It should use this to identify where Britain can build a comparative advantage. Policy and procurement must also help capable UK suppliers overcome barriers involving facilities, certification, finance and access to major contracts.

NESO, DESNZ and Ofgem must remain aligned from the identification of system need through to policy design and implementation, ensuring that industrial objectives are not lost during policy delivery. The devolved governments also have an important role in supporting skills, local infrastructure, supply-chain readiness and investment.

Collaboration matters too. **Celtico** is a 'single-entry alliance of engineering solution providers' and demonstrates how SMEs can combine their capabilities, share risk and compete for contracts that would otherwise be beyond their individual scale.

Reindustrialisation does not necessarily mean recreating yesterday's industrial giants. It can mean organising existing capabilities differently and recognising that ports, training facilities and factories may require investment ahead of demand, before contracts exist. This is where public institutions, private finance and the governments Clean Power 2030 and wider infrastructure portfolio must work together.

Action 4: Use repeatability to improve productivity.

4.1 Britain has become too expensive when it comes to building infrastructure

The conference did not only ask how government could support industry; it also challenged itself by thinking about the way infrastructure is delivered in the UK. One of the starkest observations came from comparing Britain with other European countries: why can an equivalent engineering scope require 15 to 20 people in Scandinavia, but 50 in Britain?

Participants identified multiple layers of subcontracting, contract management, project controls, technical and lenders' advisers, assurance and duplicated oversight 'man-marking'. Every additional layer and interface can add people, risk, margin, time and cost. In some cases, more people can end up managing and assuring the work than physically delivering it.

Productivity problems can also begin before construction. Insufficient time for planning, design development and early supply-chain engagement can leave projects trying to resolve avoidable problems during delivery, when changes are more difficult and expensive.

4.2 Why it matters

There is little value in rebuilding British industrial capability if Britain remains structurally more expensive at delivering infrastructure. Reindustrialisation must therefore mean becoming better at building as well as increasing domestic participation. If every project begins from scratch, Britain repeatedly pays the first-of-a-kind premium. Uncertain or delayed decisions can also create a "hurry up and wait" cycle in which businesses reserve people and equipment, release them when projects stall and then incur the cost of remobilising later.

A programme approach creates the continuity needed to move from first-of-a-kind to nth of a kind for subsequent projects, allowing teams, equipment and learning to transfer between sites. Repeatability, standardisation and accumulated experience can

then improve productivity and reduce costs over time. Capturing the learning curve dividend and economies of scale must be considered in Government's development of policy.

4.3 How we deliver it

The objective should be that cross project learning is brought together across sectors and programmes. The Thames Tideway Tunnel was a first-of-a-kind project, but many of its processes and lessons can be applied to other projects, supporting nth-of-a-kind repeatability..

Early supply-chain engagement is itself a productivity intervention. Tier 1 contractors, specialist Tier 2 and Tier 3 suppliers and OEMs should be able to influence projects before designs and delivery strategies become fixed. Early Contractor Involvement allows construction methodology, logistics, risk, standardisation and innovation to be designed in rather than expensively resolved during construction. Government may regard final approval as the starting pistol, but effective mobilisation requires this work to have begun much earlier.

Digitalisation is key, ensuring BIM and common information models flow beyond Tier 1 contractors through Tier 2 and Tier 3 suppliers. Robotics already provides mature solutions for labour-intensive repetitive processes such as welding. AI will create further opportunities, but significant productivity gains can already be captured by improving basic digital construction and information management.

Government's role is not to tell engineers how to build projects, but to help create the common environment in which productivity can improve. This includes appropriate standardisation, interoperable information, collaborative contracting, cross-project learning and reviewing whether procurement and assurance requirements create unnecessary layers.

Industry, in return, must use the visibility and continuity provided by a programme to improve productivity, retain learning, work with Government to sequence work effectively and build learning curve efficiencies and economies of scale. Government policy needs to embed wider UK plc value add outcomes, not just focus on narrow targets and timelines.

5. Skills: rebuild the machinery that builds people

Skills emerged throughout the conference as the thread connecting all four actions in this report. Britain cannot turn pipelines into programmes, build domestic capability or improve productivity without the people to deliver them. But the skills challenge cannot be separated from certainty, sequencing and investment.

Businesses cannot sustain apprenticeships and specialist training against a stop-start pipeline. Equally, waiting for final project approval before addressing workforce requirements is too late. The same principle that applies to factories and supply chains applies to people: capability has to be built ahead of demand.

A credible 20–30-year infrastructure programme gives employers greater confidence to train and retain people and allows a young person to see not a temporary job on one project, but a career across successive projects and sectors. This is particularly important in places such as the Highlands, where sustained infrastructure investment could support skilled careers close to home and help address rural population decline.

Much of the capability required is also transferable. Electricians, mechanical engineers, pipefitters, construction specialists, project managers and

other skilled workers will be required across hydropower, transmission, offshore wind, nuclear, transport and other infrastructure programmes. Skills planning should therefore respond to aggregated infrastructure demand, rather than each project or sector trying to solve its workforce requirements independently.

Industry also has responsibilities. Quartzzelec demonstrated what sustained employer commitment can achieve: after six to seven years of focused recruitment, it now has more than 100 apprentices in training, helping to address its workforce demographic and build the next generation of skilled employees.

But individual employers cannot solve the national challenge alone. Government, industry, education providers, institutions and places need to create the machinery that builds people: shared training capacity, clearer career pathways and mechanisms that allow skills and institutional knowledge to move from one project to the next. Models such as All Together Cumbria demonstrate how major employers, SMEs and places can collaborate around shared workforce needs.

The objective should be simple: a programme that creates careers as well as projects, and retains the skills created by public and private investment so that they are available to build what comes next.

6. Conclusion: Aligned Ambition

a new compact for building Britain

The message from Manchester is ultimately an optimistic one. Britain can build these projects. The engineering capability exists, the technology exists, private capital is available for investable infrastructure, and there remains significant capability within UK industry.

The challenge is how we organise ourselves to capture the full value of what we are about to build.

The four actions in this report are interconnected. A credible order book creates the certainty to invest. Programme coordination addresses constraints that individual projects cannot solve. Aggregating demand creates opportunities to rebuild productive capability. Repeatability allows learning and productivity to accumulate. And running through all four is the need to build and retain the people capable of delivering them.

None of this can be achieved by government or the market acting alone. It requires Aligned Ambition: clarity about what each part of the system should do independently, where responsibilities overlap, and where collaboration is essential.

- The public sector must set long-term direction and address system-level barriers that individual projects cannot resolve.
- The private sector must invest, innovate, deliver and use greater certainty to improve productivity.
- Institutions and conveners must connect the system – aggregating demand, identifying capability gaps, facilitating finance and transferring learning between projects and sectors.
- Communities and places must be active participants, connecting infrastructure investment to local businesses, skills, colleges, careers and lasting economic value.

But, as the diagram on the next page shows, some of the most important activity happens between these actors: creating investable order books; coordinating infrastructure delivery; building supply-chain capability; developing the future workforce; enabling place-based growth; and aligning national infrastructure requirements with local opportunities.

This is not an argument for government to project-manage infrastructure. Nor is it an argument for insulating UK industry from competition. It is about putting responsibility with those best able to carry it and recognising where coordination creates value that individual actors cannot create alone.

That requires a longer view of value. PSH and tidal range assets can operate for 80 to 100 years or more. Decisions about them should recognise not only immediate cost, but longevity, resilience, GVA, skills, productive capability and the opportunity cost of delay or non-delivery. Independent infrastructure oversight, as proposed by the Public Private Partnership Commission, could help maintain that longer-term perspective across political cycles.

Britain already has a Modern Industrial Strategy and an enormous infrastructure requirement. Hydropower gives us a practical opportunity to connect the two. The test for success should therefore be simple: does each project leave Britain more capable of building the next one?

If greater certainty allows businesses to invest, if shared constraints are resolved before they become delays, if UK capability grows, if people build careers across successive projects and if each project becomes easier and more productive to deliver than the last, then we will have achieved more than building infrastructure. We will have begun to turn infrastructure investment into reindustrialisation.



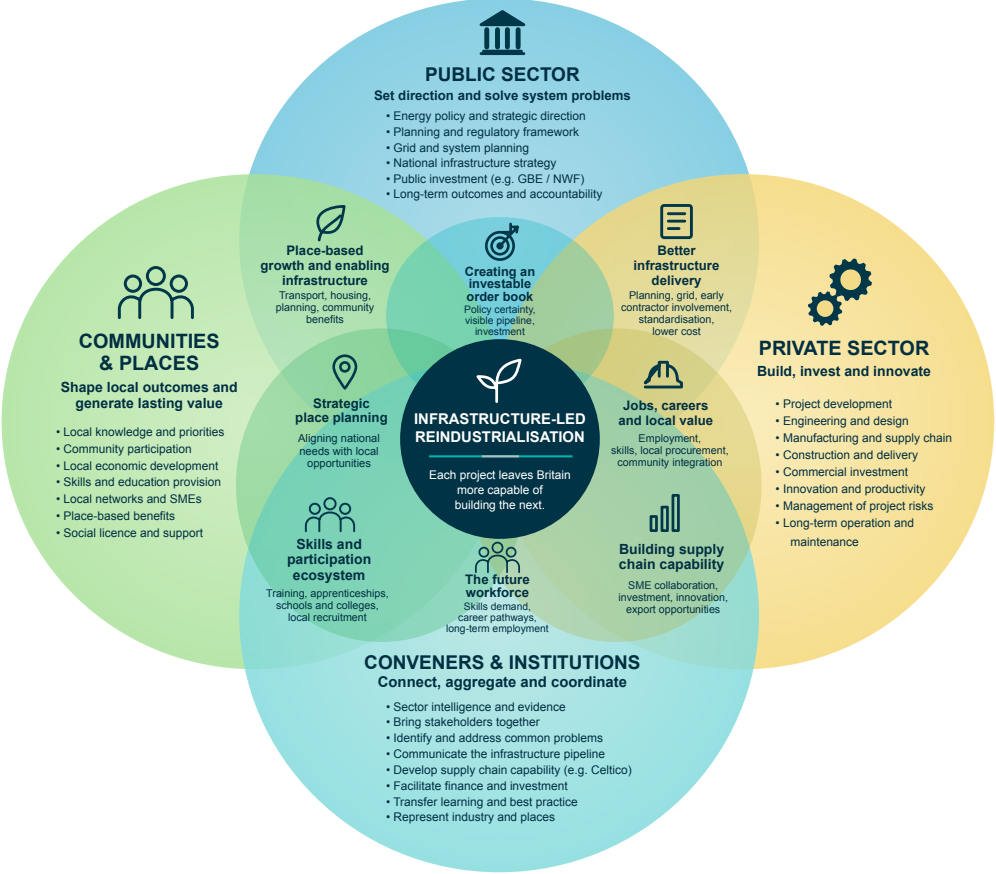


Figure 1: Aligned Ambition – working together to ensure that infrastructure investment builds the productive capability Britain needs.



The British Hydropower Association is the leading trade membership association solely representing the interests of the UK hydropower industry.

Our mission is to drive growth in the sector by engaging, influencing and promoting hydropower, tidal range and pumped storage hydro, making these technologies relevant within the Government's ambition to enable a decarbonised, secure grid by 2030.



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