Written evidence submitted by British Hydropower Association (IND0006)

Industrial Strategy for Clean Power: How can UK plc captures its fair share of the economic potential of the energy transition?

Background

The British Hydropower Association (BHA) is the leading trade membership association solely representing the interests of the UK hydropower industry and its associated stakeholders within the wider community.

Our Mission is to drive growth in the sector by engaging, influencing, and promoting Hydropower, Tidal Range and Pumped Storage Hydro, as firm, renewable power, providing critical infrastructure for achieving Net Zero and Energy Security.

BHA has responded to the following questions as part of the Industrial Strategy for Clean Power Committee within the context of Pumped Storage Hydropower Development in the UK. With the opening of the Cap and Floor mechanism in the coming months, there will be delivery of Pumped Storage Hydropower for the first time in over 40 years in the UK. This is a great economic opportunity, but we need to ensure that UK Plc captures the benefits through a strategic approach.

1. How can UK plc capture its fair share of the economic potential of emerging or less developed energy technologies?

1. Stable Policy and Regulatory Framework

- It is crucial that UK Government maintains a stable policy framework with clear targets and delivery routes. This gives certainty and enables the supply chain to build to meet need.
- Finalising and implementing a suitable cap and floor mechanism that will provide investors with price certainty and therefore lower the cost of capital.
- Ensure there are clear PSH targets in the strategic spatial energy plan .

2. Unlock Investment and Financing

- Encourage private sector investment by de-risking projects through government-backed funding models.
- Leverage financial institutions such as the National Wealth Fund to de-risk private sector participation
- Ensure PSH is prioritised in grid connection as PSH is part of the grid solution, not the grid problem.

3. Support a UK-Based Supply Chain

- Ensure that the PSH supply chain is supported within the UK, capturing local economic benefits and creating high-skilled jobs through cross Government planning and support.
- Invest in manufacturing capacity for PSH components to reduce reliance on imports and boost domestic industries (see Quartzelec case study in the appendix)
- Working with Scot Gov and across departments, develop a workforce training strategy to ensure a pipeline of skilled labour for PSH and other emerging energy storage technologies

4. Streamline Planning and Permitting Processes

- Reduce delays in planning approvals, particularly for projects that have already received environmental assessments and grid connection agreements

- Set up fast-track permitting for PSH projects identified as critical infrastructure to prevent unnecessary delays

5. Maximize Economic Benefits Through Job Creation

- The construction of six leading PSH projects alone could generate up to 92,800 job-years, with 14,800 peak jobs annually
- Expand investment to rural areas where many PSH projects are located, supporting economic growth and reversing demographic decline

By acting swiftly on policy, investment, supply chain development, and planning reforms, the UK can position itself as a global leader in PSH and long-duration energy storage, capturing economic benefits, reducing energy costs, and enhancing energy security for decades to come.

2. What more can the Government do to encourage greater domestic supply chain investment in the energy industry by 2035.

The UK can learn from Australia, who have scaled up PSH in similar circumstances to the UK, ie they had not build a scheme for over 40 years.

There are some key activities that we can undertake to strengthen the UK-Based Energy Supply Chain

- Provide incentives (e.g., tax relief, grants) for companies to build and expand manufacturing facilities for PSH technology.
- Mandate local content requirements: Include UK supply chain requirements in energy infrastructure projects to ensure domestic economic benefits.
- Establish regional hubs for civil engineering, tunnelling, and mechanical expertise needed for large-scale PSH projects.
- Introduce specialised training programs and apprenticeships in collaboration with universities and technical colleges.
- Provide funding for skills development in hydropower engineering, tunnelling, and advanced grid infrastructure.
- Introduce an Energy Storage Investment Tax Credit and provide capital allowances and tax relief for companies investing in PSH component manufacturing, construction, and technology development.

3. Does the UK have the supply chain capacity to deliver the required energy infrastructure by 2035, including an expanded electricity network?

The UK has strong expertise in civil engineering and project management, but major gaps in manufacturing, supply chain resilience, and workforce capacity. Without urgent investment in UK-based supply chains, the UK risks increased costs, project delays, and over-reliance on foreign suppliers. Policy support, strategic investment, and workforce development are essential to ensure timely and cost-effective energy infrastructure expansion.

3.1. Current UK Supply Chain Capacity

Strengths

- **Existing PSH expertise**: The UK has a history of successful PSH projects, such as Dinorwig and Cruachan, and a skilled workforce in hydropower engineering
- **Strong civil engineering sector**: Large-scale tunnelling and infrastructure projects, such as Crossrail and HS2, demonstrate the UK's ability to handle construction.

Weaknesses

- **Limited UK-based manufacturing for key components**:
    - turbines, generators, and high-voltage transformers are mostly imported, increasing costs and lead times
- **Workforce shortages**:
    - The energy transition requires skilled electrical engineers and renewable energy specialists, but current training programs are insufficient.

3.2. Gaps in the UK Supply Chain

- **PSH and Long-Duration Storage**
    - Civil engineering capacity exists, but UK mechanical and electrical supply chains can be bolstered, this will be needed across net zero agenda as we look to electrification of motors away from combustion.
    - Turbine and pump manufacturing is dominated by overseas suppliers, leading to reliance on imports.
- **Energy Workforce Development**
    - The UK needs tens of thousands of new workers in electrical infrastructure, power systems engineering, and storage technology deployment.
    - More jobs in energy manufacturing and engineering, leading to a stronger economy and skilled workforce

3.3. What can the UK Government do?

- **Develop a National Supply Chain Strategy**
    - Set UK-based manufacturing targets for PSH components and electricity network infrastructure.
    - Provide financial support (e.g., tax incentives, grants) for companies investing in UK production.
    - Ensure domestic content requirements for new grid infrastructure projects.
- **Invest in UK Workforce Development**
    - Launch a National Energy Workforce Strategy to train engineers, electricians, and energy technicians.
    - Provide grants for skills retraining in energy storage and grid expansion.
    - Expand apprenticeships and partnerships between government, industry, and universities.
    - Reduce or exempt **business rates for PSH developments**, to improve project economics.

.

4. To what extent would growing the domestic supply chain bolster UK energy security?

Growing the domestic supply chain is not just an economic opportunity—it's critical to energy security and to deliver for Net Zero. Investing in the domestic energy supply chain is the UK's best path to a secure, stable, and self-sufficient energy future.

By onshoring energy manufacturing capability the UK can:

- Reduce foreign dependence on key infrastructure.
- Ensure rapid deployment of critical energy assets.
- Lower energy costs for consumers.
- Create thousands of high-quality jobs while ensuring long-term energy resilience.

4.1. Reducing Dependence on Foreign Supply Chains

The UK imports most of its key energy infrastructure components, including hydro turbines, transformers, grid cables, and battery storage. Delays in global supply chains (e.g., from China or Europe) can slow down critical projects and geopolitical risks (e.g., trade disputes, protectionist policies) threaten access to essential energy technologies.
Manufacturing hydropower and other components in the UK reduces reliance on imports and minimises risks from global shortages or supply chain disruptions. Local sourcing of PSH components ensures maintenance and spare parts are readily available, avoiding long delays for maintenance requirements. A robust energy supply chain supports a just transition by creating long-term, high-skilled jobs in renewables and storage technologies.

5. What are the key concerns with respect to the availability of raw materials in the supply chain and how might those be addressed?

Requirement for raw materials in PSH:

- Steel and concrete: Needed for PSH dams and tunnels. UK steel production is declining, and concrete supply is under pressure.
- Copper and aluminum: Essential for transmission lines, electrical components, and transformers, but largely imported from Chile, China, and Russia.

Soaring demand for raw materials due to global energy transitions is causing:

- Higher costs for energy projects
- Longer lead times for components like transformers and high-voltage cables.
- Increased competition from the EU, US, and China, all of which are heavily investing in domestic supply chains.

6. Appendix – Quartzelec case study

Case Study: Quartzelec and the Challenges of Skills Shortages in the UK's Manufacturing Base

Quartzelec, founded in 1896, is a privately owned, British engineering company, acknowledged as the highest quality and most innovative in the world, specialising in rotating machines and high/low voltage contracting services. Quartzelec has over 10 locations within the UK mainland, typically in or around major UK cities, the traditional heartlands for engineering and manufacturing.

Quartzelec services are provided to all industry sectors. Their 100 year + Institutional knowledge and technical expertise of their people, is their biggest USP.

Skilled trades employed being classed as 'on the tools' include – Armature winders, electrical fitters, mechanical fitters, machinists, electricians, SAP (Senior Authorised Person), project managers, cable jointers, test engineers, welders, fabricators.

This case study epitomises both the potential and challenges facing the UK manufacturing sector as it confronts the demands of large-scale decarbonisation through electrification. With over 580 UK employees, including 105 apprentices, Quartzelec represents a homegrown success story of resilience, having survived industrial decline and thrived amidst evolving industry demands. However, the company's experience highlights critical challenges in workforce development, skills retention, and the necessity for strategic government support.

The Challenges at Quarzelec:

R**eplacement of Experienced Staff**:

- Recruitment efforts indicate that replacing experienced employees on a like-for-like basis is nearly impossible.
- Wage demands for experienced hires exceed those of current employees by over 20%.

Persistent Vacancies:

- Monthly vacancies have remained static at approximately 25 for the past 36 months, with skilled trades comprising the majority.

Investment in Apprenticeships:

- Due to limited confidence in recruiting experienced workers, the company has heavily invested in apprenticeships.
- Apprentices account for about 20% of the workforce, a high percentage that incurs costs beyond direct employment, including reduced productivity.

Retention Concerns:

- Retaining 'homegrown' skilled workers poses a significant challenge given the low confidence in short- to mid-term improvements in the employment market.

Resource Constraints:

- The primary challenge lies in resourcing projects due to the shortage of suitably experienced personnel, despite significant efforts to win work.

Competitive Landscape:

- Within the UK, competitors face similar workforce challenges, creating a level playing field.
- Internationally, UK companies are at a disadvantage due to limited access to skilled labour.

Impact of Brexit:

- Brexit led to the departure of many qualified and experienced non-British nationals, reducing the available skilled workforce.
- The European labour pool for recruitment has significantly diminished, exacerbating workforce shortages.

Systemic Challenges across Industry:

1. **Skills Shortages**: The UK faces acute challenges due to a scarcity of skilled tradespeople. Salary inflation, driven by high demand and low supply, has made retaining experienced workers and competing with other employers increasingly difficult. Post-pandemic

dynamics, including hybrid work expectations and a diminished labour pool, have exacerbated these shortages.

2. **Retention and Training**: Due to the skills shortage there is much movement across the labour market with companies struggling to retain trained individuals. Poaching between competitors offering higher salaries and better benefits means that companies are paying higher and higher wages for less skilled people.

3. **Aging Workforce**: Over 33% of Quartzelec's employees are over 51, creating a looming demographic challenge as experienced workers retire. The lack of younger, skilled replacements threatens continuity and institutional knowledge retention. This is common across many engineering sectors.

4. **Global Supply Chain Reliance**: Brexit and other geopolitical shifts have limited access to skilled labour from abroad. Coupled with international supply chain pressures, this reliance on global resources stifling the UK's growth potential.

The Path Forward:

To meet the challenge of decarbonisation and electrification, the UK must rebuild its manufacturing base by addressing systemic issues in workforce development and supply chain resilience.

1. **Government and Industry Collaboration**: The government must incentivise workforce development through subsidies, tax reliefs, and partnerships with companies like Quartzelec to scale training programs. A Centre of Excellence for training with companies such as Quartzelec could serve as a model for addressing national skills shortages.

2. **Strategic Investment in Apprenticeships**: By increasing funding and support for apprenticeship programs, the UK can ensure a pipeline of skilled workers. Quartzelec's emphasis on practical assessment centres and over-recruitment to mitigate dropouts provides a replicable framework.

3. **Preserving Institutional Knowledge**: Retention strategies, such as competitive remuneration, enhanced career development paths, and workplace flexibility, are essential. A focus on intergenerational mentorship can also help transfer critical skills to younger workers.

4. **Onshoring Manufacturing**: Building a robust domestic supply chain for electrification projects, such as Tidal Range and pump storage hydro, requires significant government backing. Encouraging local production of essential components, like electrical steel, would reduce reliance on volatile global markets.

5. **Resilience Planning**: In an increasingly interconnected and unpredictable world, Quartzelec's focus on supply chain resilience is crucial. The UK government must map existing industrial clusters and integrate them into a cohesive plan to support clean energy targets like **Clean Power 2030**.

Conclusion

Quartzelec's story underscores the urgent need to rebuild the UK's manufacturing and skills base to meet the challenges of decarbonisation. The company's resilience, despite large scale deindustrialisation in the UK, serves as a case study and should inspire strategic government-industry partnerships that have the potential to be transformative. With the right investments and policy frameworks, the UK can leverage companies like Quartzelec to drive a sustainable, skilled, and resilient industrial future, ensuring success in the race to net zero.

However, significant obstacles must be overcome. There is a critical shortage of skilled workers in the essential trades, with these roles struggling to attract applicants for apprenticeship programs. This scarcity has led to artificially inflated salaries, further complicating workforce planning. As a result, organic business growth is hindered, and the outlook remains challenging. The difficulty in recruiting for these vital trades underscores the urgent need for coordinated efforts to address the skills gap and secure the future of the UK's industrial sector.

February 2025