Written evidence submitted by Tidal Range Alliance (IND0005)

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.

The Tidal Range Alliance is convened by the BHA and has responded to the following questions set by the DESNZ Select Committee as part of their inquiry into the Industrial Strategy for Clean Power with respect to the potential to develop 20GW of Tidal Range in the UK.

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

To capture its fair share of the economic potential of emerging or less developed energy technologies, particularly tidal range energy, the UK can adopt a multi-faceted approach that enhances its natural resources, industrial capabilities, and policy frameworks. Here are the key strategies the UK can employ:

1.1. Government and Industry Partnership

Strategic Collaboration: The UK government can form a strong partnership with industry stakeholders, including the British Hydropower Association (BHA) and the Tidal Range Alliance (TRA), to create a coordinated approach to tidal range development. This partnership should focus on developing a Tidal Range Roadmap/Pipeline that outlines clear targets, such as 3GW by 2035 and 20GW by 2050, to ensure a steady pipeline of projects (refer to Q2 - Table 1 for Tidal Range Projects in Development)

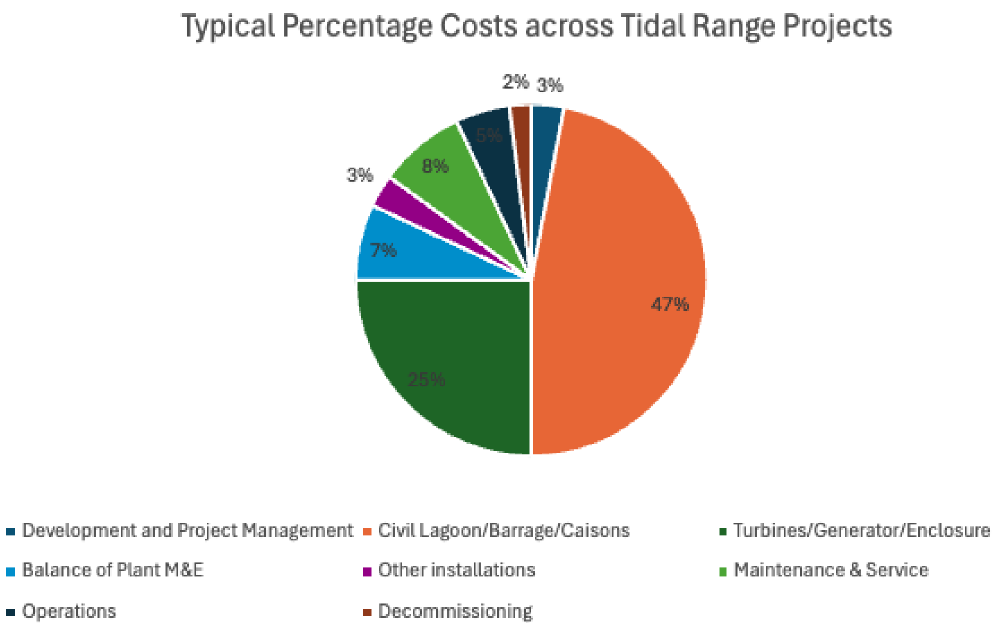
The government should implement a price stabilisation mechanism like the RAB model (Regulated Asset Base Model), which has been successful in other infrastructure projects, to de-risk investments and attract private capital. This would provide long-term financial certainty for developers and investors.

1.2. Supply Chain Development

Local Content Maximisation: The UK should aim to maximise local content in tidal range projects, particularly in turbine manufacturing and civil engineering. Western Somerset Lagoon project estimates that at least 60% of total cost will be sourced from the UK, with the potential to increase this to 80% UK content with the right incentives, compared to the current 40% in offshore wind.

This would involve:

- **Incentivising Local Manufacturing:** Provide subsidies and incentives for UK-based manufacturing of turbines, generators, and other critical components. Companies like GE and Andritz have expressed interest in establishing local manufacturing facilities if a sustained pipeline of projects is guaranteed.
- **Upskilling the Workforce:** Invest in training programs to develop a skilled workforce capable of supporting tidal range projects, particularly in regions like Merseyside, Swansea, and South Wales, which have historically suffered from industrial decline.
- **Civil Engineering and Construction:** The civil engineering component of tidal range projects (approximately 60% of total costs) offers significant opportunities for UK-based construction firms. The use of concrete caissons and other locally sourced materials can further boost UK content.



1.3. Policy and Financial Support

Green Finance Initiatives: Leverage green finance mechanisms, such as green bonds and infrastructure investment funds, to support the development of tidal range projects. The UK's Green

Industries Growth Accelerator (GIGA) programme could provide additional funding for tidal range development.

Support pathfinder projects, such as the Mersey Barrage and Western Somerset Lagoon, to demonstrate the feasibility of tidal range technology and drive cost reductions through innovation and economies of scale.

1.4. *International Collaboration*

Partnership with South Korea: The UK should enhance its Clean Energy Partnership with South Korea to extend to Tidal Range and help enable the UK to access advanced manufacturing capabilities and share expertise in tidal range technology. South Korea's experience with the Shiwa Lake Tidal Power Station (the world's largest tidal power plant – finalised in 2011) can provide valuable insights into scaling up tidal range projects. An example of this type of partnership happened with the Mersey Gateway bridge, where Samsung C&T was a core member of the bridge's design, construction, and maintenance.

Export Opportunities: By developing a robust domestic tidal range industry and collaborating with industrial partners, the UK can position itself as a global leader in tidal energy technology, exporting turbines, expertise, and engineering services to other countries with tidal resources, such as Canada, India, and China.

1.5. *Economic Co-Benefits*

Regional Economic Regeneration: Tidal range projects can revitalise coastal regions by creating thousands of high-skilled jobs in construction, manufacturing, and operations. A single tidal range project, could create 1,225 direct jobs and contribute to regional economic development. This aligns with the government's levelling-up agenda and can help address regional economic disparities.

1.6. *Environmental Co-Benefits*

Flood Protection and Coastal Resilience: Tidal range projects can double as flood defences, reducing the costs of insuring against coastal erosion and flooding. This dual-use infrastructure can provide significant savings for the government and local communities.

1.7. *Grid Stability and Energy Security*

Grid Stability and Energy Security: Tidal range energy offers predictable, baseload power, which can stabilise the grid and reduce reliance on imported fossil fuels (displacing high gas prices for peak demand). This enhances the UK's energy security and reduces exposure to global energy price volatility.

1.8. *Research, Development, and Innovation*

Innovation in Turbine Technology: The UK should invest in research and development of Very Low Head Tidal Turbines (VLHTT) and other advanced technologies to improve the efficiency and costeffectiveness of tidal range energy. This would not only benefit domestic projects but also create export opportunities for UK-developed technology.

1.9. *Long-Term Infrastructure Investment*

Intergenerational Benefits: Tidal range projects have an operational lifespan of 120+ years, making them a long-term infrastructure investment with low maintenance costs compared to other renewable energy sources like on/offshore wind and solar, which require repowering every 25-30 years. Their predictable, baseload power reduces grid intermittency costs and proximity to industrial hubs lowers transmission expenses, enhancing UK business competitiveness, particularly for energy-intensive sectors. Additionally, ports and shipyards benefit from turbine installation demand, positioning the UK as a potential tidal tech export hub and driving maritime industry growth. This long-term perspective should be reflected in government policy and financing models.

2. *What more can the Government do to encourage greater domestic supply chain investment in the energy industry by 2035, including through the Contracts for Difference scheme?*

2.1. *Targeted action for growth*

To encourage greater domestic supply chain investment in the energy industry by 2035, the UK Government could implement the following targeted actions, building on the long-term advantages of tidal energy and related infrastructure outlined earlier:

Key Targets:

1. Mandate Domestic Content Requirements: Set a target of 50% domestic content in publicly funded tidal/offshore energy projects by 2035, incentivising local manufacturing of turbines, cables, and ancillaries.
2. Port Infrastructure Upgrades: Invest £1 billion by 2030 to transform ports (e.g., Merseyside, Swansea) into dedicated hubs for tidal energy assembly, maintenance, and export.
3. Workforce Development: Train skilled workers in tidal energy technologies via apprenticeships and partnerships with technical colleges.
4. Supply Chain Clusters: Create e regional industrial clusters (e.g., Severn estuary, North Wales/ Merseyside,) focused on turbine production and grid integration by 2030.
5. Regulatory Streamlining: Fast-track permitting for tidal projects and supply chain facilities to reduce delays (e.g., 12-month approval timelines).
6. Innovation Funding: Launch a £100 million Tidal Innovation Fund (2025–2030) for R&D in UK-made components, with matched private-sector funding.

Outcome Certainty

By creating anchor projects like tidal range (120-year lifespan), the government can signal generational demand for domestic supply chains, attracting sustained investment. Predictable policy frameworks (e.g., binding renewable targets) and port/industrial zone upgrades will further reduce risks for manufacturers. Leveraging the UK's existing maritime expertise and proximity to industrial demand centres ensures cost-efficiency and export potential, creating a self-reinforcing cycle of investment.

2.2. *CfD Reforms and alternatives:*

While the CfD scheme has been effective for other renewable technologies such as solar/wind, its current structure does not adequately address the unique challenges for tidal range energy. Tidal range projects, such as barrages and lagoons, require significant upfront investment in civil engineering (eg concrete caisson, sluice gates and turbines). Hence, like the Thames Tideway and New Nuclear projects, a Regulated Asset Base model it necessary to de-risk the high upfront costs of tidal range projects and attract private investment. It should also be noted that CfD does not recognise the grid stability/predictability and resilience, and the co-benefits of flood protection, coastal resilience, and regional economic regeneration.

2.3. *Funding (Regulated Asset Base [RAB] Model) and Roadmaps:*

Tidal range projects require significant upfront capital but can be financed through:

- Regulated Asset Base (RAB) model, like New Nuclear or Thames Tideway financing, providing long-term cost certainty.
- Public-private partnerships, leveraging institutional investors and green finance mechanisms .

Allocate GIGA (Green Industries Growth Accelerator) funds to tidal range, supporting port upgrades and offshore manufacturing hubs (e.g., Port Talbot, Merseyside). These can sit alongside other renewable energy hubs for Floating and Offshore wind farm construction.

Develop a Tidal Range Roadmap to align with Industrial Clusters and strategic spatial energy planning, ensuring projects are located near demand centres. Table 1 provides the potential list of tidal range projects that are all under various stages of development, which are predominantly along the west coast of the British Isles, but near load centres. Many are already near post-industrial regions (South Wales, Merseyside and Morecombe Bay) and hence do not need large scale grid upgrades.

Table 1 – Pipeline of Tidal Range Projects in Development

Item	Project	Est. Cap. Ex. (£ billion)	GW	Annual Generation (TW/y)	Construction (Years)	Grid Connection	Distance to Grid	Est Grid Connection Date	Website
1	Aberthaw (Pilot VLHTT Turbine)	0.5	0.1	-	1.5	Aberthaw PStn	0.5km	Available	https://ccrenergy.com/ccr-energy-to-pioneer-testing-facility-for-low-head-tidal-turbines/#:~:text=The%20Cardiff%20Capital%20Region%2C%20with,range%20energy%20testing%20and%20implementation.
2	Oldbury (Severn-Somerset)	2	0.2	0.05	3	Oldbury Substation	0.5km	Available	https://www.chilternvitalgroup.com/
3	Mersey Tidal Power	3.5	3.8	0.552	7	Birkenhead/Capenhurst/Breck Road	10-20km	2035	https://www.liverpoolcityregion-ca.gov.uk/
4	West Somerset Lagoon	10	2.5	6.5	5	Shurton 400kV S/S	15km	2037	https://www.westsomersetlagoon.com/
5	Natural Energy Wyre (Fleetwood)	0.15	0.1		3	Private Network	0	-	https://naturalenergywyre.org/
6	Blue Eden (Swansea) {Blue Mountain Internet]	1.7	0.35	0.52	5	Baglan S/S	10km	-	https://www.tidallagoonpower.com/
7	North Wales Tidal Lagoon (Prestatyn & Llandudno) [North Wales Tidal Energy & Coastal Protection Ltd]	7.5	2.5		5	Wylfra/Deeside	35-50km	2040+	https://www.facebook.com/TrafalgarPR/?locale=en_GB
8	Mostyn SeaPower (Nth Wales) [Port of Mostyn Ltd]	0.6	0.2	0.3	4	Deeside 400kV S/S	5-10km	-	https://www.portofmostyn.co.uk/
9	Northern Tidal Power Gateway (Morecombe) - North West Energy Squared	8.5	7.8	20	7	Heysham 400kV S/S	1-20km	2040+	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://eprints.lancs.ac.uk/id/eprint/171327/1/Professor_George_Aggidis_Thomas_Lowe_Gray_Lecture_2022.pdf
10	Centre Port (East Anglia-Wash)	3	0.4	0.8	5	Walpole 400kV S/S	10-20km	-	www.centreport.uk
11	Severn Bar	10	5		7	Bristol Channel/Severn Est/Celtic Sea	10-50km	-	https://www.severncommission.co.uk/
12	North West Energy Squared (Kirkcudbright-Wokington)	15	7.5	10	7	Harker 400kV S/S	50-60km	None	

2.4. *Pilot / Pathfinder Projects:*

Accelerate a Commercial Pilot Project for very low head turbine technology (VLHTT) technology to demonstrate viability and attract private investment. Cardiff Capital Region Energy (CCR) in partnership with universities and private businesses are in the process of developing an ex-coal fired power station at Aberthaw to advance the VLHTT and the opportunities this can create, not just in the UK, but as an exportable technology.

The Mersey Tidal Power Project aims to construct a tidal barrage spanning the Mersey whist also providing important connectivity between Birkenhead and Liverpool. The project is seen as a pathfinder for larger tidal energy schemes, demonstrating the viability of tidal range technology while addressing technical, environmental, and economic challenges. It is expected to provide long-term, stable energy generation with a lifespan of over 120 years, far exceeding that of wind and solar projects.

Beyond energy generation, the Mersey Tidal Power Project promises significant economic benefits. It could create thousands of jobs during construction and operation, revitalising local industries and establishing the Merseyside region as a hub for tidal energy innovation. The project also aligns with the UK's broader goals of decarbonising energy systems and enhancing energy security. However, careful planning is required to mitigate potential environmental impacts, such as changes to tidal flows and effects on local ecosystems. If successful, the Mersey Pathfinder could serve as a blueprint for future tidal energy projects, both in the UK and globally, cementing the country's leadership in marine renewable energy.

The Modular Tidal Bar concept could serve as a first-of-a-kind (FOAK) project, integrating UK-made turbines. Predominantly, in the past, rock aggregate has been used to create the barrage or lagoon. However, using dry dock modulisation the barrages and lagoons can be constructed with higher efficiency of time and costs.

2.5. *Workforce Development:*

Job Creation and Skill Development

- A single tidal range project, such as Swansea Bay Tidal Lagoon, was projected to create 1,225 full-time equivalent (FTE) jobs during its construction phase and sustain hundreds of long-term operations and maintenance (O&M) roles.
- Large-scale deployment (20+ GW capacity) across multiple projects could generate over 20,000 UK jobs in marine energy, covering construction, manufacturing, engineering, and maintenance.
- The University of Strathclyde Target project estimated that each tidal range installation typically supports around 2,000 jobs per year during the construction phase. A steady pipeline of projects would sustain employment for decades.

2.6. *Skilled Workforce Requirements*

Tidal range projects require expertise in various disciplines, including:

- Engineering: Civil, structural, electrical, and mechanical engineers for turbine design, fabrication, and system integration.
- Welding and Fabrication: High-demand for skilled welders and metal fabricators for turbine manufacturing and large-scale steel structures.
- Marine Specialists: Dredging, hydrodynamics, marine logistics, and offshore construction professionals.
- Environmental Consultants: Specialists in marine biodiversity, sediment management, and ecological impact assessment.
- Project Management & Logistics: Managing large-scale infrastructure developments with international supply chain coordination.

2.7. *Regional Economic Development & Job Distribution*

- Coastal and industrial regions with historic economic decline stand to benefit the most. Key locations include:
  - Liverpool & Northwest England
  - Swansea & South Wales
  - Somerset & Southwest England
- Infrastructure and job development in these areas will support economic regeneration and workforce transition from declining industries (e.g., fossil fuels and steel manufacturing).

2.8. *Workforce Transition from Fossil Fuel Sectors*

- Tidal range projects align with the UK’s Net Zero workforce transition strategy, providing opportunities for skilled workers from oil & gas, coal, and other fossil fuel-dependent industries to transition into clean energy.
- Upskilling programs and apprenticeships in marine energy technology, welding, and renewable engineering would support this shift.

- The UK government is encouraged to invest in vocational training programs to ensure a qualified workforce for tidal energy expansion.

2.9. *Long-Term Employment Impact*

- Unlike offshore wind and solar projects (which require repowering every 25-30 years), tidal range projects have an operational lifespan of over 120 years, ensuring sustained employment opportunities.
- Ongoing maintenance and technological upgrades will continue to create skilled jobs well into the 22nd century.

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

Tidal Range projects require less electrical network infrastructure and grid reinforcement compared to wind/solar due to:

- Proximity to Load Centres: Coastal cities (e.g., Bristol near the Severn Estuary) reduce the need for long-distance transmission lines, lowering costs, complexity and environmental impact.
- Centralised Design: A single barrage or lagoon consolidates infrastructure, unlike distributed wind/solar farms requiring extensive cabling and substations (nb Offshore Wind Farm typically requires 1000km of cable)
- Predictable Output: Tidal cycles enable stable grid integration, minimising the need for additional grid stabilisation measures.
- Sustainable/Variable Output: Tidal has the ability to react quickly to energy demand and can sustain the output for longer duration than other renewables. Lagoons and barrages can also hold water back, enabling peak generation to be shifted 2 hours either side of high tide. The turbines can also operate in pumping mode, which can help balance the grid and move peak generation.

Nevertheless, the UK currently lacks the full supply chain capacity to deliver our net zero ambitions. The potential exists to build this capacity through strategic interventions for tidal range.

- Existing Gaps**:**
    - Turbine Manufacturing: Critical components like tidal turbines (8-metre diameter) are not currently manufactured in the UK. The only global turbine manufacturers, GE, Voith and Andritz rely on global supply chains, with facilities in Brazil, Austria, and Germany.
    - Skilled Labour Shortages: Deficits in specialised skills for civil engineering, installation, and maintenance pose significant barriers.
- Opportunities for Growth and Synergies with Other Sectors:
    - Civil Engineering: Up to 60–80% UK content is achievable for civil works (e.g., concrete caissons, embankments) if incentives are provided. Port infrastructure (e.g., ABP's offshore wind facilities) could support caisson production.

  - Generator Manufacturing: GE's Rugby facility and Quartzelec and potential new investments (e.g., in Wales) could bolster electromechanical components.
  - Leverage expertise from pumped storage hydro (PSH) and offshore wind to build a resilient supply chain.
  - The National Digital Twin Programme can optimise grid connections and spatial planning for tidal projects.
- Critical Enablers**:**
  - Government Policy: A clear, long-term pipeline of projects (e.g., Mersey Barrage, Severn Estuary schemes) and financial mechanisms like the Regulated Asset Base (RAB) model are essential to attract private investment.
  - Local Content Incentives: Subsidies and policies to restore manufacturing (e.g., turbines, sluice gates) and address labour shortages through upskilling programs.
  - International Partnerships: Collaboration with South Korea (e.g., Samsung's expertise in infrastructure, Shiwa Lake tidal project) could alleviate supply chain constraints and accelerate technology transfer.
- Timeline Challenges**:**
  - Scaling to meet Net Zero targets requires immediate action. Smaller projects (e.g., Mersey) must begin soon to build supply chain momentum, followed by larger schemes. Without sustained demand, manufacturers will not invest in UK facilities.

The below image shows the potential UK opportunities for the Andritz Hydro turbine.

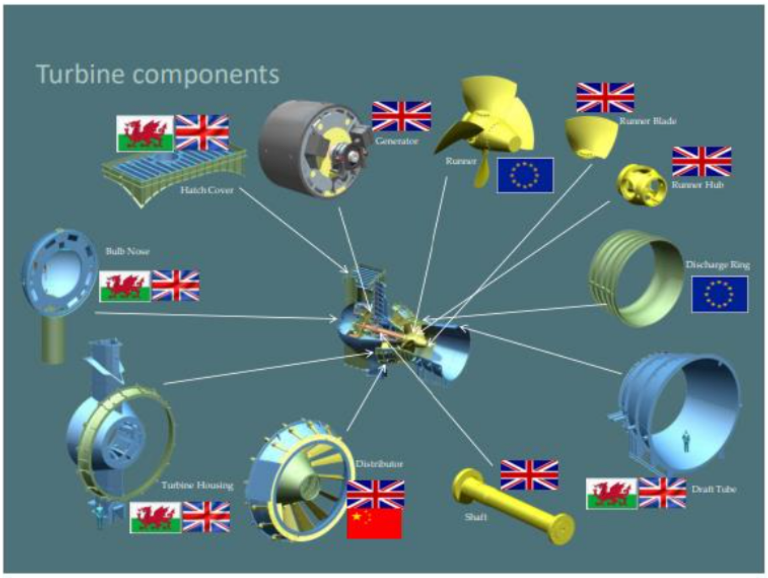


Image: Andritz Hydro plan for Swansea Bay Tidal Lagoon

3.1. __Scalability with Policy Support:__

With targeted investment, UK content could reach 80% for civil engineering (e.g., caissons, dredging) and 50% for balance of plant components (e.g. mechanical, electrical, sluice gates, control and monitoring etc). Repurpose ports (e.g., ABP's floating wind infrastructure) for caisson production, reducing reliance on foreign suppliers.

3.2. *Supply Chain Advantages:*

Global focus on wind/solar has saturated their supply chains, leading to competition and price volatility. Tidal's specialised components (e.g., turbines, sluice gates and balance of plant) face less global demand, offering potential cost stability.

Localised Expertise: Investing in tidal could position the UK as a leader in this emerging sector, fostering a resilient domestic supply chain less vulnerable to international market pressures.

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

Growing the domestic supply chain for tidal range projects would significantly bolster UK energy security by reducing reliance on international suppliers, enhancing resilience against global disruptions, and creating a self-sufficient energy infrastructure. Key contributions include:

4.1. *Reduced Dependency on Global Supply Chains*

- Critical Components: Currently, turbines, electromechanical systems (e.g., transformers, circuit breakers), and specialised skills are sourced abroad. Developing UK-based manufacturing for these components would mitigate risks from geopolitical tensions, shipping delays, or price volatility.
- Local Content Potential: Civil engineering (e.g., caissons, embankments) could achieve 60–80% UK content with incentives, reducing import needs and ensuring project continuity.

4.2. *Enhanced Energy Resilience*

- Predictable Power Generation: Tidal energy's reliability (vs. intermittent renewables solar and wind) provides stable grid input. A domestic supply chain ensures timely maintenance and upgrades, minimising downtime.
- Proximity to Coastal Load Centres: Localised infrastructure reduces transmission losses and dependency on long-distance grid reinforcements.
- Boosting the Manufacturing Base for Net Zero Technologies: The demand for high-quality steel, turbine fabrication, precision engineering, and control systems is growing rapidly across all Net Zero industries, including offshore wind, nuclear, battery storage, and hydrogen production. The UK must scale up domestic manufacturing capabilities to meet this demand and prevent dependence on fragile global supply chains. Tidal range energy can act as a catalyst for re-industrialisation, anchoring high-value engineering and production facilities within the UK. This includes expanding sectors such as:
    - Steel and heavy engineering for turbine casings and barrage infrastructure.
    - Advanced manufacturing for variable-speed turbines and automation.
    - Electronics and control systems for smart grid integration.
- Tight Global Supply Chains & the Race to Net Zero: The global race to Net Zero has intensified competition for key resources, skilled labour, and advanced manufacturing

capacity. International supply chains for renewable infrastructure—particularly for steel, rare earth metals, and semiconductors—are already under strain due to geopolitical tensions, raw material shortages, and surging global demand. China, South Korea, and the EU are securing domestic supply chains, putting pressure on UK projects. Without significant investment in local fabrication and material processing, the UK risks losing out on industrial competitiveness and experiencing costly project delays in Net Zero infrastructure.

- Reduced Vulnerability to Sabotage: Domestic production and maintenance of critical infrastructure (e.g., turbines, control systems) limit exposure to external interference. Localised supply chains minimise reliance on international shipping routes or foreign manufacturing hubs, which are potential targets for physical or cyber sabotage.

1. **Economic and Strategic Benefits**
    - Job Creation: Building turbines, generators, and civil works domestically would create thousands of high-skilled jobs, particularly in deindustrialised coastal regions (e.g., Swansea, Liverpool).
    - Long-Term Industrial Legacy: A 120+ year project lifespan supports sustained local expertise, fostering innovation and export potential in tidal technology.

2. **Mitigation of Risks**
    - Policy-Driven Pipeline: A government-backed pipeline of projects (e.g., Mersey Barrage, Severn Estuary schemes) using models like the Regulated Asset Base (RAB) would attract private investment, ensuring supply chain scalability.
    - Skills Development: Addressing labour shortages through upskilling programs ensures the UK workforce can sustain projects without foreign dependency.
    - Security of Strategic Assets: Domestic control over manufacturing and installation reduces risks of tampering or espionage. For example, UK-managed ports and facilities (e.g., ABP's caisson production sites) can enforce stringent security protocols, unlike overseas suppliers with less oversight.

3. **International Partnerships as a Catalyst**
    - Collaboration with South Korea: Using South Korea's expertise in heavy manufacturing (e.g., turbines, infrastructure) could accelerate UK capabilities while maintaining local control. Joint ventures (e.g., assembly hubs, R&D) would transfer knowledge without full reliance.

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

Key Concerns with Tidal Range Turbines Regarding Raw Material Availability in the Supply Chain

1. Dependence on Imported Components

- The UK lacks domestic turbine manufacturing facilities, relying on imports from countries like Brazil (GE) and Germany/Austria (Andritz). Critical materials such as high-grade steel, reinforced concrete, and electrical components (e.g., transformers, circuit

breakers) are sourced internationally, increasing exposure to global supply chain disruptions and geopolitical risks.
- GE's turbine production is centralised in Brazil, while Andritz sources materials globally.

2. Cost Competitiveness of UK Manufacturing

- Manufacturing in the UK is more expensive than in lower-cost European (e.g., Italy, Czech Republic) and Asian markets. Without subsidies or incentives, companies are reluctant to invest in local production.

3. Rare Earth Material Requirements – Tidal Range vs. Other Renewables

- Tidal range turbines require rare earth elements (REEs), but in significantly lower quantities compared to offshore wind and battery storage projects.
- Neodymium (Nd) and Praseodymium (Pr) are used in high-efficiency permanent magnet generators (PMGs), but tidal projects rely more on direct-drive systems or hybrid technology, reducing dependence on rare earth magnets.
- Dysprosium (Dy) and Terbium (Tb) may be added to improve heat resistance in turbine magnets, though newer designs are exploring lower REE dependency.
- Compared to offshore wind (which has a higher reliance on rare earth-intensive PMGs), tidal range infrastructure is more steel- and concrete-heavy, meaning less exposure to rare earth supply chain risks.
- Reducing REE reliance in tidal range projects strengthens UK supply chain resilience, making it easier to source materials from domestic and allied markets (e.g., Canada, Australia, EU) rather than relying on China.

4. Lack of a Sustained Project Pipeline

- Manufacturers require long-term, guaranteed demand (10–20 years) to justify establishing UK facilities. A fragmented pipeline of tidal projects undermines confidence in domestic supply chain investments.
- OEMs like GE and Andritz need a "credible, government-backed pipeline" to justify local manufacturing.

5. Skilled Workforce Shortages

- Decades of deindustrialisation have eroded the UK's skilled labour pool for critical processes like casting, forging, and precision machining. Labour gaps could delay turbine production and increase costs.
- Labour shortages are a key a barrier to installation and civil works.

6. Infrastructure Constraints

- While UK ports (e.g., ABP Ports facilities) can support caisson production, significant investment is needed to expand capacity. Limited availability of UK-based dredging contractors and large-scale construction firms further complicates project feasibility.
- Developers note the need to upgrade port infrastructure for efficient caisson manufacturing.

Solutions:

1. Government Incentives and Policy Support

- Introduce local content requirements and financial subsidies (e.g., tax breaks, grants) to offset higher UK manufacturing costs.
- Implement the Regulated Asset Base (RAB) model to de-risk private sector investments.

2. Strategic Supply Chain Partnerships

- Collaborate with South Korea to leverage its expertise in heavy manufacturing (e.g., POSCO for steel, Samsung for infrastructure).
- Establish UK-based assembly hubs for turbines using globally sourced components to balance cost and local benefits.

- The UK-RoK (Republic of Korea) Clean Energy Partnership prioritises joint infrastructure and R&D.

3. Building a Reliable Project Pipeline

- Commit to a series of tidal projects (Mersey Barrage, Severn Estuary) to ensure continuous demand.
- Multi-project timelines would justify investments in UK factories and stabilise supply chains.
- A "sustained workload over 10–20 years" is critical for attracting manufacturers.

4. Upskilling and Workforce Development

- Launch targeted training programs in welding, machining, and turbine assembly.
- Strengthen industry-university collaborations to align education with tidal energy needs.
- Andritz stresses the need for "maximizing the local workforce" through government-industry partnerships.

5. Infrastructure Investment

- Upgrade port facilities (e.g., ABP's floating wind infrastructure) to support caisson and turbine production.
- Streamline permitting processes to accelerate project approvals and reduce delays.

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