Written evidence submitted by Ceres (IND0014)

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

As a clean energy company requiring advanced manufacturing of its technology, there are three key barriers to investment: (1) capital intensity and delivery timescales of technology development; (2) investor risk aversion; and (3) geographical disparity in access to finance.

Capital intensity and delivery timescales of technology development - Ceres is developing solid oxide fuel cells for power generation and electrolyser for green hydrogen in an emerging market. There are many technological proof points that are required to build confidence in the technology amongst the target markets across a variety of metrics: efficiency, cost, safety. This requires companies to absorb the cost, resource, and time to validate these proof points. Despite consistently reaching significant milestones, it is a lengthy process to prove-out industrial technology. Building first-of-a-kind demonstrators requires significant capital. Often this can be subsidised by partnering with commercial partners to build and develop capital intensive projects. Product development is more difficult in emerging, though necessary, industries. It is a new path that requires the creation of supply chains, manufacturing process and equipment, and the development of new skills. All of which takes significant capital.

Investor risk aversion - UK investors are fairly risk averse towards scaling-up companies, compared to US or Asian counterparts. Risk aversion is particularly relevant in the clean energy sector as there is no consensus between governments and amongst companies on the energy mix in the future, as evidenced by the rollback of oil and gas' companies commitment to carbon reduction or the efficient utilisation and end markets for hydrogen. Without clarity on where the energy landscape will be globally in the future, investors are hesitant to commit to new technology and would prefer to support companies once they have successfully scaled up. Investment from government can also signify belief in the technology and the end markets it endeavours to address. Therefore, that support helps crowd in additional private investment.

Geographical disparity - Many other countries have committed significant financing to accelerate clean energy and the green hydrogen industry. For example, Japan has promised 15 trillion-yen, equivalent to USD$98 billion, in private and public investment for the hydrogen industry. The EU has committed EUR658 billion towards climate action. Practically this means that direct competitors of UK companies in the hydrogen space have all received in excess of $100Mn and two specific companies have received in the region of 500Mn dollars in the US and euros in the in the form of grants. Whilst the UK has recently broadened the remit beyond infrastructure as the National Wealth Fund to increase the accessibility of funding for suitable growth capital in the UK, the pace at which its deployed and the risk appetite that is mandated will have a direct impact on the resultant success.

Government can help mitigate these challenges so that the time and financing companies are current spending addressing these challenges can be redirected to clean energy sector development. The hydrogen economy is expected to approximately quadruple by 2050. As a global market, Ceres is well placed to secure a significant share of the global market through its technology licensing business model.

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?

One of the best ways to promote market dynamism is to qualitatively evaluate different business models on their net impact on the UK economy, even if it's not a traditional route.

Clean energy and the hydrogen economy are going to be global industries. The UK is an intellectual hub, though we trail manufacturing giants such as the Asian economies. It is important to support the UK's manufacturing capabilities, but the global economy will require manufacturing globally. Whilst a drive to shorter supply chains has been present for some time, this only increase in emerging protectionist trend. With our licensing business model, we do not vertically integrate mass manufacturing into our operations, instead we partner with global original equipment manufacturers such as Bosch and Delta to leverage their expertise in scaled manufacturing to produce our technology at scale and pace. "global economy will require manufacturing globally" - There is a global trend to shortening supply chains and, through its business model, Ceres benefits from the desire to build local jobs and content and avoid some of the geopolitical uncertainties that damage prosperity in emerging and developed economies alike. Using the Industrial Strategy, including funding mechanisms like the National Wealth Fund, the UK can accelerate innovative companies' growth trajectories, creating a showcase for the global deployment of technology which will enable an expansive and successful global trading strategy and inward investment and growth for the UK.

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

40% of our supply chain is based in the UK. Through our partnerships overseas we can broker introductions which could lead to UK supply chains gaining a largest portion of market share due to the access to global markets and not just UK markets.

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

It is clear that the scale of the economic opportunities globally will be larger than the relevant economic activity in a single economy like the UK. The hydrogen economy is expected to quadruple by 2050, creating a $1.4 trillion annual market. Asia is leading in this space through strong industrial strategies that provide incentives to the energy transition and create local jobs and supply chains. UK companies like Ceres, which leverage licensing models, are well-positioned to participate in this market while feeding benefits back into the UK economy. Aligning with global partners on clean energy and advanced manufacturing policies will ensure the UK remains competitive in high-growth sectors. Partnerships allow leverage. Ceres' entire commercial model is based on building global partnerships where we leverage their balance sheet, their brand, their human resources and their supply chains to deploy UK technology and harvest back royalties to fund highly paid R&D and product roles in the UK.

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

According to a recent report - Material Futures Materials innovation lies at the heart of our future.

- It powers the advancements urgently required for our modern world and underpins our aspirations for a sustainable future.

- In addition, the necessity of sustainability and resilience has added an essential new dimension to discovery and innovation processes.
- The UK has a world-renowned depth of materials science expertise in academia and industry.
- It stands uniquely positioned to be a leader in this field. Innovation in materials drives tangible benefits for society and secures our place in the global science and technology landscape.

However

- Scarcity is growing
- Costs are increasing
- Performance demands are increasing
- Safety concerns and provisions are a huge factor. At Ceres our licensing business model helps us be more resilient to the raw materials supply chain, since we don't mass manufacture ourselves and our partners are developing their own supply chain which we could access if needed. In addition, due to the widely available materials we use in our technology, we experience fewer pinch points when it comes to raw material availability.

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