

Future Government Policy Actions for Photonics

PHOTONICS
LEADERSHIP GROUP

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Underpinning defence, communications, health and manufacturing; the deep technology of **Photonics - the control of light** - is critical to a resilient 21st century economy.

\$2.4 trillion worth of goods and >\$10 trillion of services across the world depend on photonics, yet we are only at the start of the light age. Photonics is enabling progress in new and old industries alike; vital to the realisation of AI, quantum, autonomous transport, 3d printing, virtual reality, the energy transition, advanced healthcare diagnosis/treatment and future agriculture. Modern defence leverages photonics; from situational awareness and unmanned systems, to precision munitions and directed energy; making enhancing UK photonics capability essential.

Without **decisive policy actions** to accelerate domestic commercialisation of enabling photonics technologies and strengthen

Policy Action: To build on the UKs photonics strengths embedded in over 1,200 firms and 50 global renowned research institute, the **Photonics Leadership Group** has identified five key policy areas where action is essential to enable the industry to prosper and supporting all areas of the economy whilst enhancing our national resilience.

manufacturing infrastructure, the UK will be increasingly dependent on imported photonics hardware. This weakens UK's ability to solve the societal challenges of Net-Zero, productivity and health, eroding the UK's economic and technological trade balance, jeopardising our economic and security independence.

The UK has been an international power house of photonics innovation for over 200 years. With £15.2 billion of annual photonics output, the UK has the second largest photonics industry in Europe. Policy actions that anchor this industry in the UK will protect over 80,000 jobs and by increasing domestic adoption, will enhance the UK's economic and technology resilience and boost sustainability; with the potential to generate another 80,000 direct jobs and far more in the AI and quantum industries of the future.

There is a committed and passionate native photonics industry, experienced in engaging and winning on the global stage as technologists and exporters, willing to engage with Government to create lasting impact in society.

As representatives of that industry the Photonics Leadership Group recommend:

1. **Increase Confidence in Investment:** Accelerate the next Spending Review to provide certainty to departmental budgets. Protect innovation support alongside support for fundamental science to enable to UK to make more of its global science leadership.
2. **Tax Credits:** Enhance tax credit delivery. Removing incentives for HMRC to negotiate down tax credits companies are due and targeting a 30 day period to pay tax credits in line with the government's own targets for paying invoices from SMEs
 - o Protect and expand capital equipment tax reliefs to support manufacturing scale-up in the UK, including 100% Full Expensing of capital equipment.
3. **Skills:** Photonics creates high GVA jobs, at over 200% of the UK average. Industry requires a skilled workforce to grow, which needs a pipeline of incoming talent.

- Instigate a review of careers education for 16-18 years olds to ensure that careers professional are aware and communicating the opportunities, impact and prospects for career options in modern manufacturing design and innovation in the UK.
 - Support the develop of skill training matrix between educators and industry to highlight required and missing skills now and anticipated in the future
 - Streamline and accelerate the visa sponsoring process for STEM skills at all levels, reduce the time SMEs take to fill positions where UK candidates cannot be found.
4. **Future Proof Resilience:**
- Support photonics companies to develop solutions for quantum and AI technologies, reducing the risks and providing incentives to invest in markets of vital importance to the UK but where scale and timing remain highly uncertain.
 - Proceed at pace with the recommendations of the UK semiconductor infrastructure feasibility review. Providing support at scale for compound semiconductors and integrated silicon photonics where the UK has a leading innovation lead and globally competitive position on which to build.
5. **Balance Innovation Support:** Instruct government agencies to balance support between challenge focused initiatives and maturing underpinning technologies in photonics, acoustics, fluids and electronics that are vital to supporting progress in all challenges and enable solutions to be realised with maximum UK supply chain content.
- Enhance Capex support in grant funding from UKRI agencies to support development of advanced automation by reimbursing 100% of hardware equipment costs used within projects to demonstrate new/updated manufacturing processes.
 - Prioritise incentives to accelerate deployment of the latest production equipment across whole of UK manufacturing. Intrinsically digital and clean, wider adoption of photonics production techniques is essential to the deployment of AI, digital manufacturing and emission reduction. The UK is currently falling behind its competitors in adoption, jeopardising our future manufacturing competitiveness.
 - Update the UKs Advanced Manufacturing Plan and scope of Made Smarter to explicitly include machine vision; 3d printing; laser machining, joining and cleaning.
 - Develop a National Strategy for future modern manufacturing facilities in the UK. To cover the planning and incentivisation and derisking of investing in the hi-tech manufacturing facilities required by the businesses of tomorrow.

Risks: The photonics industry is heavily globalised. Many UK firms export over 80% of their output, supporting the trade balance, yet making them vulnerable to relocation overseas to be nearer customers as industry responds to deglobalisation. The UK must make strategic choices about where it has strength and depth delivering long term global competitiveness and be cognisant to form strategic partnerships in other areas, not just around raw materials, but throughout the supply chain from components to systems.

Policy action is essential to expand the customer base in the UK, enhancing economic resilience and prosperity through faster deployment of next generation UK photonic solutions into end industries. Without action established end industries from agriculture to health, and next generation industries in AI and quantum, will increasingly depend on buying in critical photonics components from overseas. Those solutions will not be UK optimised and vulnerable to unpredictable trade frictions.