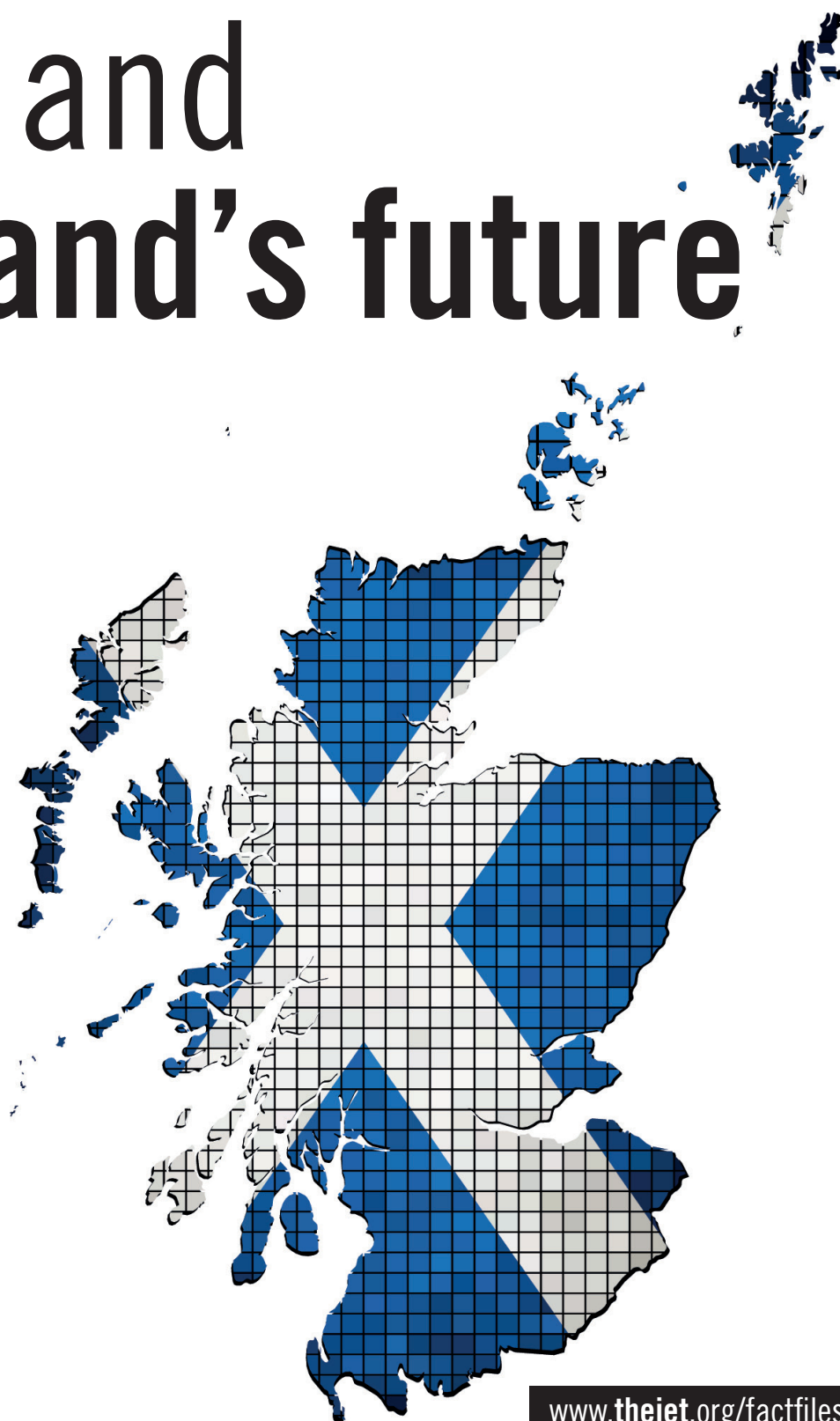


STEM and Scotland's future

Why Science,
Technology,
Engineering and
Mathematics
(STEM) are vital
to securing a
prosperous future
for Scotland



Engineering Scotland's Future

The Science, Technology, Engineering and Mathematics (STEM) fields are vital to securing a prosperous future for Scotland. Scotland has a long and enviable STEM history stretching from Ramsey, Fleming, Napier, Telford, and Clerk Maxwell of the past to the future pioneers currently learning and developing ideas within Scotland's schools, further and higher education institutions, and high technology device and process industries.

This document outlines some of important issues which the engineering profession believes MSPs need to address to ensure Scotland's future economic and competitive sustainability.

These can be summarised as:

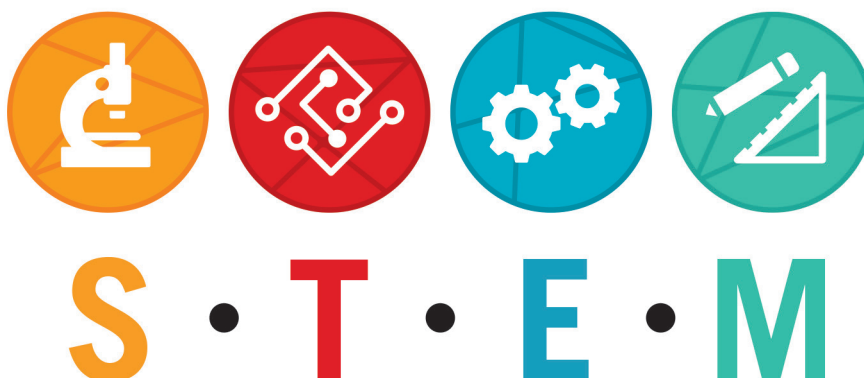
- Greater focus on STEM in schools and colleges
- Provide the necessary resources and pathways to inspire the next generation
- Ensure proper funding mechanisms are in place to drive Scotland's STEM base
- Incentivise the business sector to engage with academia to deliver tomorrow's technological and skills need

Capitalising on Scotland's STEM Base

Our efforts are centred on stimulating lasting improvements in Scotland's long-term economic performance.¹

The 2010 OECD innovation report indicates that investment in intangible assets helped account for between 60-75% of labour productivity growth and highlighted the importance of innovation as a key source of future growth. Innovation requires a highly interactive process of collaboration by diverse networks, all of which are recognised and fostered by STEM. Government can promote this by continuing to cultivate engagement at home and abroad through:

- Increasing the size, strength and diversity of Scotland's economy
- Promoting a competitive business environment to stimulate investment, innovation and skills development
- Ensuring the STEM base is fully utilised and positioned to identify, respond and take advantage of current and future issues, demands and markets
- Encouraging provision and uptake of apprenticeships and graduate training



to ensure Scotland has a highly skilled, educated and transferable workforce

- Assigning STEM responsibilities to a ministerial portfolio or parliamentary committee
- Ensuring public policy receives informed advice and scrutiny from the outset

The future will require new models of cooperation between industry, government and academia to rebalance the economy and drive growth. STEM is about turning ideas into reality, changing and shaping the material world for the benefit of humankind. To do this, we must be able to apply technical and scientific knowledge to a problem while simultaneously working through the cost, sustainability and socio-economic implications of the solution.

Harnessing Scotland's Potential

Governments must continue to invest in future sources of growth, such as education, infrastructure and research. Cutting back public investment in support of innovation may provide short-term fiscal relief, but will damage the foundations of long-term growth.²

While Scotland has chosen to freeze its science budget, competitors are actively investing. The US is doubling basic science spend between 2006-16; China has already increased central funding by 25%; Sweden is to increase funding by over 10% between 2009-12; and Germany will inject €18bn into research and higher education during the coming decade. If Scotland is to retain and raise its international profile it needs to:

- Better recognise and promote the importance of investing in Scotland's STEM base
- Ensure funding mechanisms fully support investment in the Higher Education sector
- Better utilise Scotland's world-class Higher Education STEM research universities to become world's training resource
- Attract investment in future markets and technologies by working with STEM sectors to reduce the funding gap between public and private investment
- Create pro-business and research environments to incentivise and facilitate the efficient knowledge transfer and fast development of networks and markets that enable the creation, circulation and diffusion of expertise and skills Scotland is renowned for its higher education STEM



proficiency. Universities and vocational training are essential nodes for successfully attracting and producing human capital that can stimulate growth, inward investment, skills and innovation. With STEM holding a prominent position in Scotland's economy, it is vital that graduate and skills retention is maintained to build on these strong foundations and drive future prosperity.³

Inspiring Scotland's Next Generation

Our people are the greatest economic asset. A skilled workforce is essential to building our comparative advantage and to the delivery of sustainable growth. Investment by all individuals and by the state in early years, school, further and higher education has a proven impact on the employability and productivity of individuals and in turn business growth.⁴

Scotland should do more to foster STEM learning from an early age. Learning STEM provides children and young people the opportunity to develop an interest in and understanding of the world around them. STEM's breadth enables

them to develop creative, enterprising and research skills that are vital across all sectors of the economy. Scotland needs to:

- Apply greater focus on STEM from an early age to encourage and present young people with the opportunity, resources and tools needed to stimulate an interest
- Readdress incentives offered to ensure the brightest STEM graduates enter the teaching profession to inspire the next generation
- Incentivise interaction between business and academia to ensure STEM curriculum continues to meet the needs of industry
- Reiterate the importance and potential of pursuing a career in STEM

The challenge facing Scotland is to promote STEM in a more positive and realistic image. With the potential to change the world, STEM provides highly challenging, relevant, interesting and exciting educational, skills and career opportunities. Pupils should be exposed to thought provoking curriculum, encouraged to ask questions and seek solutions from an early age to ensure Scotland's next generation are able to flourish in STEM subjects and life.



End Notes

- ¹ The Scottish Economic Recovery Plan: Accelerating Recovery, March 2010
- ² Vince Cable speech 08/09/10 at Queen Margaret University of London, quoting 2010 OECD Innovation Report.
- ³ Aerospace, Defence & Marine 2009 sales were over £5Bn; Chemical Sciences turnover of £9.3Bn; 2008 UK Oil & Gas industry's GVA was £37Bn or 21% of the economy; Creative Industries has a turnover of over £5.2Bn
- ⁴ Scottish Government Economic Strategy 2007



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