

**Dick Olver FEng**  
**Chairman, BAE Systems**  
**The Foundation for Science and Technology - 7 July 2009**  
**Speech responding to House of Commons Select Committee Report -**  
**Engineering: turning ideas into reality**

Good evening, ladies and gentlemen.

Thank you to the Foundation for Science and Technology for asking me to come and speak to you here tonight.

I was especially delighted to receive the invitation, since it gives me an opportunity to respond to the Inquiry into Engineering by the House of Commons Committee on Innovation, Universities, Science and Skills and to thank the members publicly for their valuable contribution to the debate about the future of engineering in the UK.

As well as providing an excellent summary of key issues, the Committee's report creates a focal point and baseline for further discussion, and maps out a way forward for UK engineering.

I must say that I wholeheartedly agree with the vast majority of the Committee's conclusions. One of the most interesting is its recommendation that the Government create two new roles, firstly a "Chief Scientific and Engineering Advisor", and secondly a "Chief Engineer" to coordinate and advance its thinking and strategy in this vital area.

I was very happy to see that the Government did respond positively to the report in general, although I note that, in its response, it did reject the idea of a Government-wide or departmental head of engineering. Nevertheless, I still think this is an idea very much worth pursuing. I believe we have a language problem in this country and cannot assume that science is understood to mean science and engineering.

But that's for the future. Let me now return to the present by looking at the current state of UK engineering in the context of the challenging economic environment now facing us.

On one level, the downturn has painted a poor short-term picture for UK engineering and manufacturing. In February this year, *'The Economist'* reported that manufacturing in the UK had suffered its sharpest decline since 1974.

Every day there are press reports of economic problems at major UK-based manufacturers such as Vauxhall, Corus, and Jaguar Land Rover. Just last month, the van-maker LDV collapsed, costing 800 jobs directly and putting thousands more at risk in dealers and suppliers.

So it seems it's all bad news out there. But don't let these headlines make you think engineering is any less important to the UK now than in previous economic cycles.

Despite the widespread tendency to regard the UK as a primarily services-based economy, engineering remains at the heart of UK plc's current and future economic performance. What's more, as the Select Committee's report recognises, engineering is pivotal not just to our modern economy, but to the very fabric of our society.

The current downturn doesn't change the vital importance of engineering one iota. Indeed, one thing most people don't realise is that UK manufacturing industry contributes 13% of the country's GDP, which is more than the financial services sector.

What's more, the importance of engineering to the UK will — if anything — increase in the coming years, with engineers occupying the front line in meeting the most critical challenges now facing mankind.

Only through world-class engineering can the UK and the world hope to halt the deterioration of our eco-systems, and navigate our societies towards sustainable development.

In the years to come, the search for alternative and sustainable sources of energy, water and food, will demand new skills and technologies, and more qualified engineers, leading to a scarcity of the necessary talent. Again, these shifts bring UK industry a real opportunity for world leadership.

To make the most of this opportunity, I agree with the Select Committee's view that we will need a 'clear and sustained' national strategy for engineering.

From the industry perspective, such a strategy must address the need for our engineers to

have new technical and management skills reflecting the many changes under way in their work.

Changes including:

- the rising complexity of engineering projects, including the need for different systems to talk to each other;
- the ongoing shift away from traditional design and manufacturing, and towards providing 'through-life' engineering capabilities as a service;
- the rising tide of safety and environmental legislation;
- the requirement to re-skill the workforce continually, to adapt to changes in the marketplace.

Put together, these changes are hugely disruptive, creating new possibilities. What we are looking at today is nothing less than a restructuring of the British economy, including — for example — the dramatic rise of lower-carbon industries and technologies. As the Select Committee again identifies in its report, while the current economic crisis creates short-term challenges for UK engineering, it also opens up massive longer-term opportunities.

So, despite the doom and gloom, there are reasons to be positive about the importance and role of engineering going forward.

To compete successfully through and beyond this global recession, UK engineering and manufacturing now need to focus on where and how we can compete most effectively in the global market.

How can we do that, when statistics show that it can be up to 20 times cheaper to produce goods in China or India than in the UK? Because the key to future economic success is not about cornering the market in manufacturing, but in talent and Intellectual Property.

This is why the Chinese are trying to build education institutions to rival Oxford and Harvard. And why India and China are working to keep more of their top graduates at home instead of seeing them migrate to the West.

And, whatever the doom-mongers say, the UK does have competitive advantages over many other countries in the race to be a leader in Intellectual Property and innovative talent.

For example, we're already a world-leading exporter of high-tech goods, continuing to outperform many of our competitors in the developed world. In 2006, 25% of the goods exported from the UK were classified as high-tech, compared to 22% of the USA's exports, 15% of France's and 11% of Germany's.

What's more, we have a highly educated work force, underpinned by a global business culture, infrastructure and relationships. Our legal system is admired and applied worldwide to support business contracts and protect intellectual property. And we have a history of entrepreneurial growth and innovation, plus a high-tech infrastructure base.

Perhaps most importantly, we have a history of achieving great things without significant resources or a large population. In other words, a history of winning worldwide purely through "know-how". This is our real competitive advantage!

Given this track record of success, I believe UK engineering can compete and win in the future in the high-tech and high valued-added sectors, where the differentiators are the high performance and quality created by skilled designers and technicians.

This success could come in areas of technology where the UK has already set the pace ranging from pharmaceuticals to unmanned aircraft, from silicon design to geo-engineering and from fuel cells to plastic electronics. It could also come on the new frontiers, such as information and communication technology; cyber security and the opportunities created by the new security industry sector; biotechnology; new sources of energy; and nanotechnology. In every case, the key to differentiator for success is high value-add, not low manufacturing costs.

This point was brought home to me in January of this year, when I had lunch with a group of young local business leaders at the British Ambassador's Residence in Muscat, Oman. One of Omanis there told me: "If I need something built that is highly technical or requires high quality, I will hire a British firm. If I have a low-tech project to be done at the lowest cost, I will hire a Chinese firm. British firms should not even try to compete solely on cost."

So we have real advantages — often greater than we realise. However, as the Inquiry report rightly points out, UK engineering does face real challenges, most notably a shortage of the skills needed to sustain world leadership.

The problem was highlighted in April this year, when the CBI's latest Education and Skills Survey reported that despite the wider economic problems and rising unemployment, 66 per cent of employers were experiencing difficulties in recruiting science, technology, engineering and maths — or 'STEM' — graduates and postgraduates.

To sustain the role of engineering and science as the driving-force behind the UK economy, we need to ensure that world class scientists, engineers and technicians are developed through the UK education system. Currently, however, demand for these skilled people far outstrips supply.

Closing this gap requires not just change in the educational system, but in society's view of engineers and engineering.

True, we must work collectively both to encourage the successful study of STEM subjects.

But we must also confront the deeper social issue that ours is an economy and society where engineering sector has long been undervalued. So, to attract our brightest people into STEM related careers, we need to build far deeper and wider understanding, recognition and support for the achievements of the science and engineering communities, highlighting their attractiveness as a career choice for the most capable people. I believe one way industry can help better promote the status of engineering is by encouraging more engineers to be registered professionally.

What's more, the engineering industry's skills gap is not purely due to external factors. We also need to take a long hard look at ourselves.

For example, one glaring reason for the skills shortage is the lack of diversity among qualified engineers. The Select Committee highlights that women account for only 2 per cent of engineering apprentices, and only 14 per cent of engineering graduates — compared with over 60 per cent in other subjects.

While there has been some recent improvement in these figures, the Committee says we need to move further and faster and calls for new research to give a better understanding of the career choices of women and other underrepresented groups. Equally alarmingly, only 4 per cent of engineering apprentices are from ethnic minority backgrounds. Put simply, the

UK engineering industry is missing out on a massive amount of talent, as well as failing to reflect the diversity of UK society.

As well as focusing on getting more qualified engineers, attention also needs to be focused further down the skills hierarchy. In 2006 the Leitch Report presented a gloomy assessment of skills in the UK workplace, with one employee in five facing problems with basic literacy and numeracy. It went on to recommend tough improvement targets to ensure the UK remains globally competitive.

In response, the Government set a target of having 90 per cent of the workforce at Level 2 — equivalent to 5 GCSEs — by 2020, and 40 per cent of the workforce at Level 4 — equivalent to graduate level.

We at BAE Systems are fully behind these efforts. In fact, we have recently launched a major project to assess our future skills capability needs and to identify skills gaps looking forward at 5, 10 and 15-year milestones. We also signed up to the Leitch Skills Pledge in 2007, committing to helping all our employees acquire basic literacy and numeracy skills. And we also have a range of other initiatives aimed at helping to raise and expand the national skills base.

- For example, we run a network of around 300 active Science and Engineering Ambassadors across the UK, working with schools locally as advocates for science and engineering, and promoting these areas as career choices.
- We provide work experience to 14-to-16 year olds, giving them insight into careers in engineering.
- We are providing one million pounds over 5 years to promote high-quality training for science teachers, at the new National Science Learning Centre.
- And over 60,000 young people, aged between nine to thirteen, have taken part in our schools roadshow in which we use drama to inspire young people about science and engineering.

These initiatives all reflect our view that improving the skills of the UK workforce is the only way for this country to compete sustainably on a global basis.

As we in the UK seek to improve our skills base, the good news is that we have three key strengths to draw on.

The first is a growing commitment to building skills in the engineering field through collaboration and partnership between Government, industry and education.

A good example of this is the creation of the UK Commission for Employment and Skills, an employer-led organisation that will help drive Government skills policy and funding. One of BAE Systems' senior executives has been appointed as Commissioner for engineering and manufacturing. A further positive collaborative development is the revitalisation of the UK's apprenticeship system. There are now a quarter of a million apprenticeships a year.

The UK's second strength is the world-class engineering research in our universities. The December 2008 Research Assessment Exercise rated between 15 and 20 per cent of our university engineering-related research as "world leading". The UK is fourth in terms of G8 engineering research citations behind the USA, Germany and Japan and the Select Committee's Inquiry noted the high level of respect in both China and Japan for our university-based engineering research. However, we could do even more if we followed the President Obama's example in the US and made investment in critical emerging technologies part of our economic stimulus package, positioning research as a 'once in a generation opportunity' to strengthen our future capabilities.

And the UK's third strength is increasing collaboration on engaging school-age pupils with STEM careers. I've already mentioned some of our own efforts. Meanwhile, industry-wide examples include the 2009 Big Bang science and engineering fair. Involving over 6,500 young people, it was a great example of how Government, employers and the education sector can work together successfully.

What do these efforts mean for the UK going forward? As I've already said, we are at our strongest when competing not on price, but on innovative value-add. In the future, with the right skills in place, we can pinpoint where and how we can apply this edge most effectively in the global market.

And, at the risk of talking up my own business, one of those areas where we can compete and indeed already have a proven world-class presence is in the aerospace, security and defence sector.

This is an industry that we must not take for granted. In the Committee's report and the Government's response, we do appreciate the focus on specialist disciplines such as plastic engineering, geo-engineering and nuclear engineering. And particularly nuclear, where our nuclear submarine design capabilities make us a key customer. However, nothing is said about aerospace and defence. This is both surprising and disappointing, given the strategic importance and competitive advantage that this sector delivers the UK.

It goes without saying that this industry is core to our country's armed forces, and to UK's ability to defend its national security and strategic interests. But its importance goes much further and deeper.

The industry is a major high-value contributor to the UK economy, creating thousands of jobs directly and in its supply chain, and achieving consistent success in export markets. Ten UK engineering companies rank in the 100 largest global defence businesses. In just four years between 2002 and 2006, the UK secured defence exports valued at 41 billion pounds. And over 300,000 UK jobs are dependent on UK defence spending.

What's more, the industry supports and fosters skills and innovation. We at BAE Systems are the UK's largest employer of qualified engineers. And the Department for Innovation, Universities and Skills' R&D scorecard shows that UK companies invested 2.4 billion pounds in aerospace and defence research in 2006, making the sector the UK's second largest by R&D spend.

It's also an industry that is actively seeking our new opportunities. For example, in recent years it's begun to take the lead in the fast-growing global market for electronic security and personal identity services. World-class science, technology and engineering capabilities will be critical for maintaining and growing that lead.

In my view, aerospace, security and defence exemplifies how UK engineers can be world-beaters given the right training and investment, including visible support from the government. Going forward, we need to build on our strength in this highly skilled industry, and in others ranging from pharmaceuticals to internet, to drive innovation and economic vitality over the long term.

Well, it's almost time for me to wrap up.

I'll close by stressing that in my view, our country today depends on a strong and vibrant engineering sector as much as ever and maybe more than ever before.

And we in industry are committed working in partnership with Government and the education system to build and sustain the world-class skills and research base that will keep our engineering businesses globally competitive.

As the basis of that partnership, we in business believe there is a powerful argument for a Government-led national engineering strategy to ensure engineering is given the priority it needs and deserves.

We are also ready and willing to collaborate with our partners in Government and education to tackle the challenges identified in the Inquiry report. And we support its major recommendations — including, as I mentioned earlier, the creation of two Chief Government Engineer roles.

I would equally like to back the warning voiced by the Committee in June that we should not let the merger of the Department for Innovation, Universities and Skills and the Department for Business, Enterprise and Regulatory Reform jeopardise the future of science policy. And I agree with its view that we need separate committees for science and for engineering and technology.

But the good news is that we are heading in the right direction. As the Prime Minister commented in May, the UK's continued investment in Eurofighter Typhoon will "create new jobs in advanced manufacturing that Britain needs to emerge stronger and fitter from this global downturn".

I believe the UK engineering and manufacturing sector will play its full part in building the stronger, fitter Britain of tomorrow.

Thank you.