

Cirencester Science and Technology Society

The Society's public lecture on Wednesday 10 October was given by Dr Andrew Ives, past president of the Institution of Mechanical Engineers. His topic of "Engineering: The Ultimate Reality Show" dealt with the issue of the role of engineering and how it should be integrated into addressing the problems of the 21st century.

Sir Robert Malpass proposed the definition of engineering as the knowledge required and process applied, to conceive, design, build, operate, sustain, recycle or retire, something of significant technical content for a specific purpose. This led to the concept of engineering being the bridge that enables science to become technology and, in conjunction with marketing, technology to become commercially viable major innovation.

Using his extensive experience in the automotive/electronic world together with examples of the development of the turbojet and nuclear power, Dr Ives then demonstrated the very long time spans, often 25 years or more, from the basic science to full commercialised innovation.

To identify some of the key problems facing the world in the 21st century, Dr Ives drew upon the key findings proposed in "Limits for Growth" published in 1972 and the thirty-year update published in 2004. In 1972, it was suggested that if the growth trends in world population, industrialisation, pollution, food production and resource depletion continued unchanged, the limits to growth on this planet would be reached sometime within the next 100 years.

Whilst some critics felt that this was alarmist, it was generally accepted that even if true, there was plenty of time to develop the technology to address these issues. The update showed that most, if not all of the trends predicted have continued. In the 30 years the world population has doubled, and the growth in industrial production has accelerated. The continued rapid rise in atmospheric levels of CO₂ period since the mid-1900's, caused principally by the burning of fossil fuels and forest destruction, has lead directly to our concerns for global climate change.

Global energy demand is likely to increase by 60% by 2030. Developing countries will account for two thirds of this, and most countries will become increasingly dependent on energy imports. Despite the pressing issue of climate change, the reality is that over the next 30 years plus, most of this demand will still be met by fossil fuels.

The overall view expressed is that the ability of the Earth to provide the resources used by humanity and to absorb their emissions and waste in any sort of balanced way had probably already been exceeded, i.e. that the ecological footprint of humanity was, in 2004, some 20% larger than the carrying capacity of planet Earth. In the words of a control systems engineer, the planet's systems are already in overshoot territory

Even if this conclusion turns out to be somewhat premature and actually we have not yet reached this situation, it is very evident from current trends in world industrialisation, energy and resource consumption, pollution and

population, that we will most certainly reach this point within years rather than decades.

Dr Ives concluded by suggesting that because of the timescales involved in realising innovation, focus must be on the conversion of today's science and technology into useful products and processes, which can halt and then reverse the impact of humanity's industrial footprint on our planet. If it is not already too late, it will certainly become so unless we change our focus of attention and change our mindset. The key to that is engineering but unfortunately in the UK this is not recognised. In a lively question session Dr Ives agreed that the engineering profession had a major challenge to change the current government mindset and also promote engineering as an exciting and worthwhile career option.

The next lecture of the Society will be held at the Royal Agricultural College on 14th November at 7 30pm. Prof. John McWhirter of QinetiQ Ltd will speak on "Mathematics: Who Needs it Anyway?". For further information go to www.cirensience.org.uk or ring Geoff Richards on 01285 651972.