



A class of their own

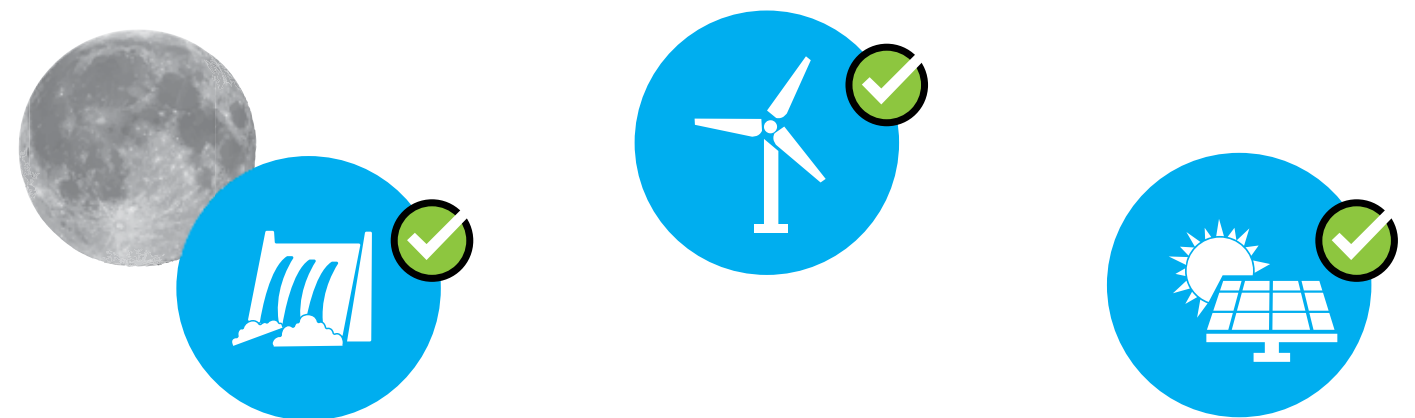
Each year, a select group of people are chosen to take the TRIUM Global EMBA programme. These are successful people, but also people who know they can achieve more. They are highly knowledgeable, but they want their opinions challenged. They are independent, but appreciate the enormous value they get from their peer network.

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Alumni featured above are:
Barry Green, Class of 2007 / Quintin Potgieter, Class of 2014 / Sonja Laud, Class of 2015
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SHOOTING FOR THE MOON

Can the cost of clean energy be reduced enough to replace fossil fuels as the world's primary source of power? A group of leading experts thinks it can. **Richard Layard** explains why the world needs the Global Apollo Programme to tackle climate change.

Governments faced with existential threats have traditionally called on their scientists and engineers to provide solutions. Yet, although leaders around the world speak often of their concern about, and desire to tackle, climate change, incredibly, only 2 per cent of the world's public research and development is directed towards meeting this challenge. This must change, and it is why a group of individuals across the worlds of science, public service and academia put forward a proposal earlier this year for a concerted, international effort of research and development – a Global Apollo Programme.

The objective is blindingly simple. If clean energy can be made less costly to produce than energy from fossil fuel, the fossil fuel will simply stay in the ground. And the need is urgent. Climate change threatens us all with increased risk of drought, flood and tempest, which in turn will lead to mass migration and conflict. On present policies the world's temperature will reach 2°C above the pre-industrial level soon after 2035 and stay above that level for a few centuries. Eventually the whole Greenland ice cap will have melted, and the sea level have risen by 6 metres.

Fortunately governments of the world are beginning to realise the need for publicly funded research to stop this

happening. After the recent G7 meeting in Bavaria, the leaders declared: "We will work together and with other interested countries to raise the overall co-ordination and transparency of clean energy research, development and demonstration, highlighting the importance of renewable energy and other low-carbon technologies. We ask our Energy Ministers to take forward this initiative and report back to us in 2016."

The Global Apollo Programme proposed by seven authors including myself in June this year is the obvious way to proceed. Like the moonshot Apollo programme before it, it is a ten-year programme with one clear goal: to reduce the cost of clean energy, and to do it fast. Within ten years, base-load electricity from wind or sun has to become less costly than from coal throughout the world.

Is this feasible? Although undeniably a challenge, we think it is. There is an almost exact precedent in the history of semi-conductors, whose price has fallen steadily for 40 years. This is called Moore's Law, but it did not happen by magic. It happened largely through a major pre-competitive programme of research and development, financed chiefly by governments. This whole effort has been co-ordinated by an International Technology Roadmap Committee of the world's leading countries and companies. This

committee has identified year by year the bottlenecks to further price reduction, and has commissioned research to unblock those obstacles.

Leading scientists like Martin Rees and businessmen like John Browne believe that the same could be done with energy from sun and wind. The price of silicon photovoltaic solar modules (which are semi-conductors of a kind) is already falling rapidly, as the graph shows. But it needs to fall even further and faster, as does the cost of the remaining "balance of systems". Though in many sunny areas solar, and in many windy areas wind, are now competitive when they are in use, they are intermittent. They cannot currently provide a baseload 24-hour service. For sun and wind to be able to do so, we need cheap methods of storing electricity and better ways of feeding intermittent electricity into the grid (using smart grids and better interconnectors). And, to further cut CO2 emissions, we need to be able to electrify all land transport, which means cheaper mobile storage of electricity.

These are scientific challenges. They are problems, like putting a man on the moon, that can be cracked if the effort is properly organised and financed. Hence the proposal for a ten-year Global Apollo Programme involving as many of the world's nations as possible.





Social science in action, worldwide

Supporting the public sector management reform agenda in Pakistan

A custom workshop took place in Karachi for 26 officials of the Sindh Revenue Board, in support of its tax revenue mobilisation and public sector management reform agenda. The Tax, Governance and Public Policy workshop developed themes and issues relating to taxation using international comparators as well as processes of public consultation. It shared knowledge with the participants about relevant international institutional developments and concentrated on interactive discussions to help the participants identify key multipliers for the further success of the Board.

“In this endeavour my biggest priority was to work on the capacity building of my officers so that we can be at par with the best performing tax authorities in the world. I had many choices but decided that I cannot find a better institution than LSE. I am sure this beginning with LSE Custom Programmes will lead us towards the capacity building of all Government officers in Sindh and Pakistan.” Tashfeen Niaz, Chairman of the SRB

Keeping British trade advisers informed about current geopolitical crises

Professor Emeritus Michael Cox welcomed a group of 40 international trade advisers from UK Trade and Investment to LSE for a one-day masterclass, opening the day with a “Tour d’horizon” of current crises and their interconnectedness. Discussion questions were circulated in advance for interactive sessions by Rear Admiral Simon Williams and Julius Sen on the collapse of oil prices, the Ukraine crisis and Russian sanctions, ISIS and its impact on the Middle East and beyond, China’s declining economic growth rate and finally the Ebola crisis. The masterclass topics were aimed at giving delegates a new insight into the global context of British business, enhancing their support to UK-based companies who want to grow their business overseas.



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SHOOTING FOR THE MOON FEATURES

“IN TERMS OF VALUE FOR MONEY, A GLOBAL APOLLO PROGRAMME IS AN ESSENTIAL COMPONENT OF ANY SERIOUS ATTEMPT TO MANAGE THE RISKS OF CLIMATE CHANGE”

To take the space analogy further, at current prices the moonshot cost \$15 billion a year for ten years. That amounts to 0.02 per cent of today’s world GDP and provides an appropriate minimum scale for the Global Apollo Programme. Our proposal, that any government joining the Programme consortium will pledge to spend an annual average of 0.02 per cent of GDP as public expenditure on the Programme from 2016 to 2025, has been met with interest by governments worldwide.

Many of the world’s leading nations have expressed interest, and we hope that all major countries will join in the coming months.

The Programme will produce, year on year, a clear roadmap of the scientific breakthroughs required at each stage to maintain the pace of cost reduction. There will be a Commission consisting of one representative of each member country and, under it, a Roadmap Committee of some 20 senior technologists and businessmen who will construct and revise the roadmap annually. By working methodically, and tracking breakthroughs as they occur, we believe that a set of co-ordinated plans to tackle the roadblocks will emerge.

The top priority for the programme will be the storage of electricity. Unless this can be done more cheaply it will be difficult to roll out renewables beyond around 30 per cent of total needs. Smart grids will also be essential. But equally important is sheer reduction in the cost of generating electricity from sun and wind.

Although the programme will be co-located with the International Energy Agency (IEA) in Paris, it will of course include many countries not belonging to the IEA. Transparency will be essential, and all results discovered through the programme will be made

publicly available (although patentable intellectual property will be protected and will remain with those who made the discoveries).

Do we believe we can fix the world with this ten-year programme? Well, no. If we are truly to tackle climate change we need more energy efficiency, more nuclear power and taxes on carbon until fossil fuels finally disappear from use. But, in terms of value for money, a Global Apollo Programme is an essential component of any serious attempt to manage the risks of climate change. Without it, targets of emissions reduction will be extremely difficult to deliver.

The Global Apollo Programme will contribute powerfully to a safer and better world at a relatively low cost. It will reduce global warming, add to energy security and reduce the polluting effects of fossil fuels which now kill millions of people. It may even generate sufficient savings in energy costs to completely cover its own cost. Hopefully by the end of the year all major countries will have decided to join and we will have taken the first steps towards a co-ordinated and truly global effort to improve our world for the generations to come. ■



Lord Richard Layard is Director of the Wellbeing Programme at LSE and co-ordinating author of the Global Apollo Programme report.

A Global Apollo Programme to Tackle Climate Change is available at www.globalapolloprogramme.org. The authors are David King, John Browne, Richard Layard, Gus O’Donnell, Martin Rees, Nicholas Stern and Adair Turner.



“...Earth, with its spectacular variety of creatures and landscapes is now in danger. Just one thing, however, would be enough to halt climate change. If clean energy became cheaper than coal, gas or oil, fossil fuel would simply stay in the ground. The Global Apollo Programme is a positive and practical way to make that happen.

...All the electricity we now require is available from limitless sources like wind and solar. The sun delivers 5,000 times more energy to the Earth’s surface than humanity needs. But renewable energy is intermittent... so we must find even better ways of storing the energy and carrying it long distances to where it’s needed.

A co-ordinated ten-year programme of international research and development will meet these challenges – better batteries, cheaper renewable energy, smarter electricity grids. We hope that all major countries will join this programme. A relatively small investment will contribute powerfully to a safer and better world.”

Sir David Attenborough, who attended lectures by LSE Professor of Anthropology Raymond Firth, lends his backing to the Global Apollo Programme – watch the full video at www.globalapolloprogramme.org