

## The next greatest engineering challenge

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THE magic of science and technology, especially in the various fields of engineering, have without a doubt provided great benefits to our lifestyles.

Think about the many gadgets, that have made significant impact all round. Our lives were significantly changed, for instance, since 1900 when Nikola Tesla patented a "system of transmitting electrical energy" or when Eastman introduced his "Kodak Brownie camera".

At the same time, among the greatest damage to Mother Earth are also the consequences of some of these engineering "feats". Not least are the addiction to fossil fuels and the carbon footprints left behind which have led to climate changes.

It is, therefore, not surprising to read that a recent announcement by the US National Academy of Engineering (NAE) listing the fight against global warming by capturing carbon dioxide from burning fuels and storing it underground as one of the challenges. The growth in emissions of carbon dioxide has been implicated as one of the major causes of global warming.

NAE reckons that "a grand challenge for 21st century engineers will be developing systems for capturing the carbon dioxide produced by burning fossil fuels and sequestering it safely away from the atmosphere".

But this is just one of the 14 of what is termed as "the grand challenges for engineering in the 21st century".

These were decided by a diverse committee of world-renowned experts when they convened at the request of the US National Science Foundation.



Summarily, the challenges can be categorised into four themes, with environmental sustainability considered to be the largest. The rest are health, reducing vulnerability and joy of living. Every one of them has the aim of making humanity flourish even more and envisaged improving the quality of life.

This is largely mirrored in the goals clearly set for the challenges, including making solar energy affordable, providing energy from fusion, developing carbon sequestration methods, managing the nitrogen cycle, providing access to clean water, restoring and improving urban infrastructure, advancing health informatics and engineering better medicines.

Others involve reverse-engineering the brain, preventing nuclear terror, securing cyberspace, enhancing virtual reality, advancing personalised learning and engineering tools for scientific discovery.

Top concerns of the people are making solar energy economical, providing energy from fusion and providing clean water. The development of carbon sequestration methods are placed at number six, behind reverse-engineering the brain and advancing personalised learning. The last three are managing the nitrogen cycle, securing cyberspace and enhancing virtual reality.

One of the eminent experts said: "After you've got health and environmental soundness and you feel protected against the bad side of human nature and Mother Nature, there is still something else to aspire to: self-knowledge and enlightenment."

Perhaps, this is what "the joy of living" is all about. But what is certain is, unless science, technology and engineering (STE) are properly understood and harnessed as a public good then that "joy" remains beyond the reach of billions of people.

The greatest challenge remains to prioritise STE for humanity, meaning it too must be mobilised as a tool to narrow the various human-made gaps among the populations in this so-called "globalised" and "democratic" world. Most definitely that needs serious consideration to "re-engineer" our global society!

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