Grand Challenges for Engineering

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National Academy of Engineering

Goals

- Generate discussion within the news media, among leaders, in schools, "at the watercooler…"
- Improve public understanding of how engineering can address current and emerging societal challenges.
- Inspire young people to consider an engineering career.

Committee

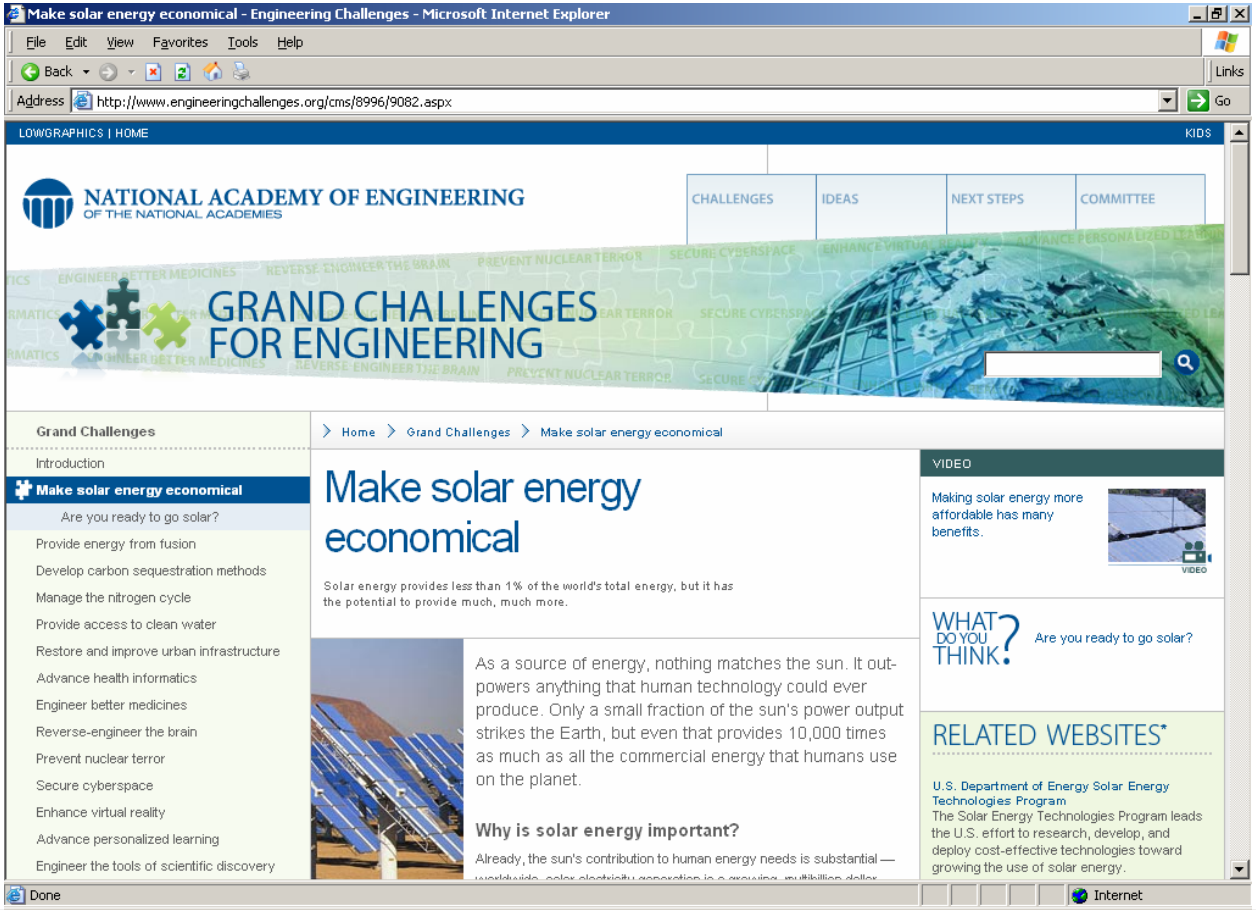
- William Perry (NAE) – chair
- Alec Broers (NAE)
- Farouk El-Baz (NAE)
- Calestous Juma (NAS)
- Wesley Harris (NAE)
- Bernadine Healy (IOM)
- Daniel Hillis (NAE)
- Dean Kamen (NAE)
- Ray Kurzweil (NAE)
- Robert Langer (NAE/NAS/IOM)
- Jaime Lerner
- Bindu Lohani (NAE)
- Jane Lubchenco (NAS)
- Mario Molina (NAS/IOM)
- Larry Page (NAE)
- Robert Socolow
- Craig Venter (NAS)
- Jackie Ying

Website Homepage

Grand Challenges for Engineering

- Make Solar Energy Economical
- Provide Energy from Fusion
- Develop Carbon Sequestration Methods
- Manage the Nitrogen Cycle
- Provide Access to Clean Water
- Restore and Improve Urban Infrastructure
- Advance Health Informatics
- Engineer Better Medicines
- Reverse Engineer the Brain
- Prevent Nuclear Terror
- Secure Cyberspace
- Enhance Virtual Reality
- Advance Personalized Learning
- Engineer the Tools of Scientific Discovery

A Challenge


Make solar energy economical - Engineering Challenges - Microsoft Internet Explorer
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OF THE NATIONAL ACADEMIES
CHALLENGES
IDEAS
NEXT STEPS
COMMITTEE
GRAND CHALLENGES FOR ENGINEERING
Grand Challenges
Introduction
Make solar energy economical
Are you ready to go solar?
Provide energy from fusion
Develop carbon sequestration methods
Manage the nitrogen cycle
Provide access to clean water
Restore and improve urban infrastructure
Advance health informatics
Engineer better medicines
Reverse-engineer the brain
Prevent nuclear terror
Secure cyberspace
Enhance virtual reality
Advance personalized learning
Engineer the tools of scientific discovery
Home > Grand Challenges > Make solar energy economical
Make solar energy economical
Solar energy provides less than 1% of the world's total energy, but it has the potential to provide much, much more.
As a source of energy, nothing matches the sun. It out-powers anything that human technology could ever produce. Only a small fraction of the sun's power output strikes the Earth, but even that provides 10,000 times as much as all the commercial energy that humans use on the planet.
Why is solar energy important?
Already, the sun's contribution to human energy needs is substantial —
VIDEO
Making solar energy more affordable has many benefits.
VIDEO
WHAT DO YOU THINK?
Are you ready to go solar?
RELATED WEBSITES*
U.S. Department of Energy Solar Energy Technologies Program
The Solar Energy Technologies Program leads the U.S. effort to research, develop, and deploy cost-effective technologies toward growing the use of solar energy.
Done
Internet

Announcement

- **AAAS press conference and session on Feb. 15**
  - With NAE President and several committee members
  - MSNBC.com, *Financial Times*, *USA Today*, lots of web articles and blogs
- **Re-launched website with new content, including challenge write-ups**
  - Audio from AAAS
  - Video and excerpted portions of interviews
  - Poll to choose the most important challenge

News Conference

News Coverage

World News

CONFERENCE American Association for the Advancement

Engineers set 'grand challenges' to enhance life

Panel suggests main goals for humanity

List designed to guide policymakers

By Clive Cookson in Boston

The world's leading engineers have proposed 14

capture one part in 10,000 of the sunlight that falls on Earth to meet 100 per cent of our energy needs," said Mr Kurzweil. "This will become feasible with nano-engineered solar panels and nano-engineered fuel cells to store the energy in a highly decentralised manner."

Another environmental

fossil fuels and storing it underground.

Much less well known than the carbon crisis is the need to avoid dangerous interference with Earth's natural nitrogen cycle. "In the process of fertilising the planet we are massively increasing the amount of biologically available nitro-

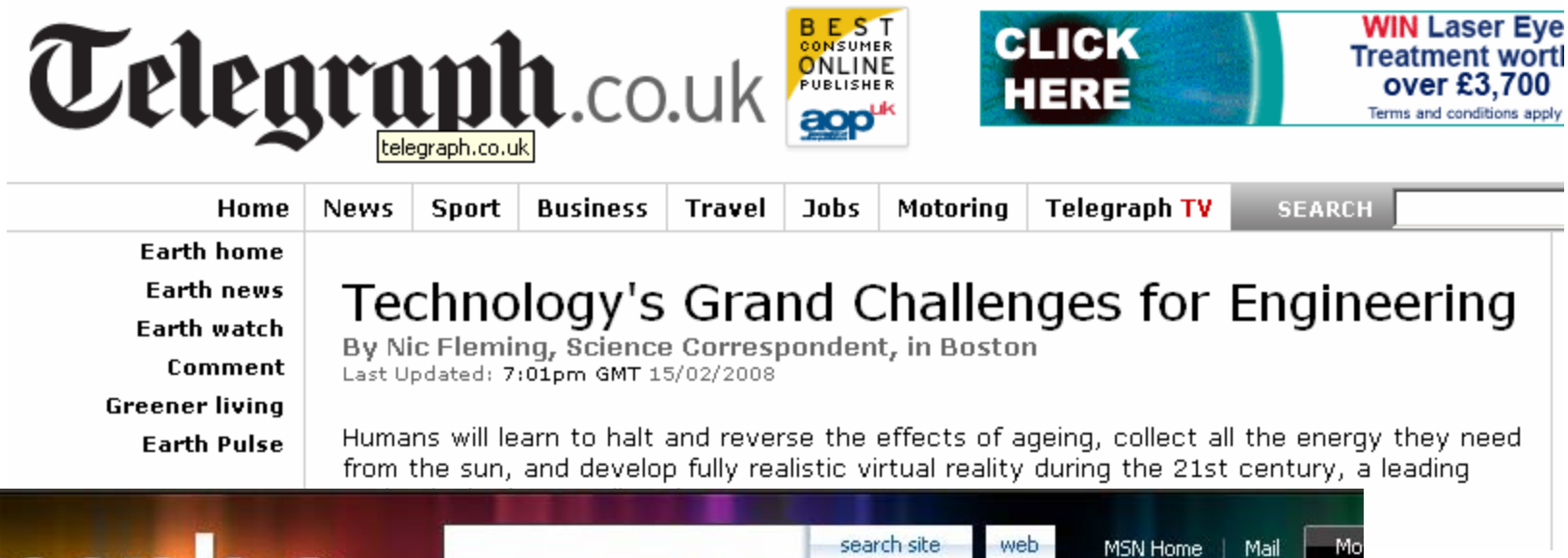
USA TODAY

day's issue of the journal Science.

Challenges for the 21st century identified

Coming up with ways to make solar energy more affordable, pulling carbon from the atmosphere and providing access to clean water are among the 14 "grand" engineering challenges for the 21st century that can improve the way we live, says a top panel of engineers and scientists. The National Academy of Engineering identified the challenges based on contributions from scientists and the general public. Noting how developments such as automobiles, airplanes, computers and the Internet transformed the 20th century, the panel says the 21st century will benefit from advances such as technologies for desalinating seawater and purifying local water sources, and leveraging knowledge of human genes and proteins to create an age of personalized medicine. For the full list and to make comments, visit www.engineeringchallenges.org.

News Coverage



Website Visits

- **Month 1 – Feb. 15 through Mar. 14**
  - 86,286 visits
  - 2.78 pages/visit
  - 00:03:04 average time on site
- **Month 2 – Mar. 15 through Apr. 14**
  - 14,148 visits
  - 2.73 pages/visit
  - 00:03:03 average time on site

April 14th Poll Results: 22,059 Votes

- 5085 – Make solar energy economical
- 3590 – Provide energy from fusion
- 2436 – Provide access to clean water
- 1817 – Reverse-engineer the brain
- 1538 – Advance personalized learning
- 1090 – Develop carbon sequestration methods
- 1019 – Restore and improve urban infrastructure
- 992 – Engineer the tools of scientific discovery
- 917 – Advance health informatics
- 780 – Prevent nuclear terror
- 728 – Engineer better medicines
- 701 – Enhance virtual reality
- 699 – Manage the nitrogen cycle
- 667 – Secure cyberspace

Next Steps

- **Print versions of findings**
  - » 32-page booklet (overview, two-page spread on each challenge, committee list, website)
  - » Magnetic bumper stickers
- **Enhancements to website**
  - » Video of additional committee members
  - » Photo albums
  - » More content
- **Public Event NAE Annual Meeting (Oct. 6)**

Possible Next Steps

- **Documentary films**
  - *Imagine It!*
  - Produce film series highlighting human elements
  - Web-based video contest
- **Inducement Prize**
  - *US News* piece suggested this
- **More web enhancements**
  - News service, posting the latest developments on each challenge
  - Directory of people and projects related to each challenge
  - Something that could help bring researchers together to collaboratively solve the challenges
- **Focus on kids and education**