Fondazione Umberto Veronesi
PER IL PROGRESSO DELLE SCIENZE

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THE FUTURE OF SCIENCE

THIRD WORLD CONFERENCE

The Energy Challenge

Venice, Fondazione Giorgio Cini
September 19th – 22nd 2007

The Third World Conference on the Future of Science will be held in Venice in September 2007.
In the pursuit of the aim of the programme "The Future of Science" we have chosen to explore another theme that brings science back to the centre of social debate: energy.
The Conference will examine the immense problem of future sources of energy, consonant with the Venice Charter's declaration that major goals of applied scientific research must be:
- reduced use of fossil fuels
- expanded use of alternative energy sources.
Following the tradition of past editions, the Conference will last three days, gathering together in Venice speakers of international renown from various disciplines and once again it will be addressed to scientists, politicians, economists, managers, journalists and all men and women of culture.

The principal themes of the three days of the Conference will be:

- Projections of worldwide energy needs for the next two decades.
- Realistic evaluation of the availability and potential availability of alternative energy sources, including solar, wind, nuclear, hydroelectric, hydrogen, biomass, and hydrothermal.
- Cost-benefit analyses of different energy sources.
- Impact of use of different energy sources on the environment.
- Impact of use of different energy sources on human health.
- Advances in energy research, scientific expectations.
- Political power derived from the possession of energy sources: future geopolitical scenarios.
- Economic dependence and risks of conflict

September 19th, 2007
OPENING CEREMONY

h. 6.00 p.m. - *Opening speeches*
h. 7.30 p.m. - *Welcome cocktail*

Program draft_updated May 10, 2007

September 20th, 2007
ENERGY: PRESENT AND FUTURE SOURCES

The capability of evaluating the environmental, social and economic impact of different approaches to energy production and storage is a target of paramount importance. To tackle this very complex problem a correct understanding of the scientific basis underlying present and future energy sources is necessary. Technological challenges and solutions must also be considered and discussed in order to address the intimate link between technology, social and economic organisation. The aim of this session is to provide the basic scientific and methodological elements characterizing energy production and transformation, the related advantages and problems, the possible solutions. The principal production methods will be reviewed with particular attention to those aspects, such as availability and sustainability, that are critical for the assessment of future energy sources. Technological and economic aspects related to efficient energy distribution and use will be also presented and discussed.

Peter Atkins
Department of Chemistry, Oxford University, UK

János Béer
Chemical and Fuel Engineering, MIT, USA
- Fossil fuel based power generation in a carbon constrained world

Maurizio Cumo
Department of Nuclear Plants, La Sapienza University, Rome, Italy
- Nuclear fission: present and future

Stephen Connors
Laboratory for Energy and the Environment, MIT, USA

Michael Bevan
Head, Cell and Developmental Biology Department, UK
- Plant biomass for sustainable fuel production

Carlo Rubbia
Nobel Laureate in Physics, Italy
- Innovation: the key to future renewables

Zhores Alferov
Nobel Laureate in Physics, Russia
- Is solar energy conversion an option to solve the energy problems in future?

Louis Schlapbach
EMPA (Swiss Federal Lab for Materials Science and Technology), Swiss
- New materials for energy technologies

Jefferson Tester
Department of Chemical Engineering, MIT, USA
- The future of geothermal energy as a sustainable pathway

Jeffrey Byron
California Energy Commission, USA

Peter Atkins Department of Chemistry, Oxford University, UK	**Chair Panel Discussion**

September 21st, 2007
ENERGY: ENVIRONMENT AND HEALTH

Since the beginning of the industrial revolution the burning of fossil fuels to sustain mankind's energy needs has resulted in the release into the atmosphere of greenhouse gases such as carbon dioxide that appear to be provoking climate change on a massive scale. These changes are so profound that they will affect all aspects of our daily lives, our economies, and our societies, as well as the well-being of our planet. The far-reaching effects of past and future energy use will be discussed with respect to the state of Earth's atmosphere and the health of our ocean and terrestrial ecosystems. The projected climatic changes and resultant consequences for biodiversity will be highlighted. Finally, the impact of energy use on the individual and collective health of our own species will be presented and discussed.

Veerabhadran Ramanathan
Scripps Institution of Oceanography, University of California San Diego, USA

Richard Lindzen
Department of Earth, Atmospheric and Planetary Sciences, MIT, USA

Ahmed Ghoniem
Department of Mechanical Engineering, MIT, USA

Victor Smetacek
Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany

Dianna Bowles
Department of Biology, University of York, UK
- An evidence base for energy sustainability

Chicco Testa Chairman Organizing Committee 20° World Energy Congress Rome2007, Italy	**Chair: Panel discussion**

James Lovelock
Gaia hypothesis, Oxford University, UK

Gennaro De Michele
Enel Research, Italy

Antonio Boccia
Epidemiology, La Sapienza University, Rome, Italy

Richard Klausner
Former Director Global Health , Bill&Melinda Gates Foundation, USA
- Climate change and health – projecting and dealing with a threat already here

AIRC Conversation: *Energy sources and cancer*

September 22nd, 2007
ENERGY: ETHICS, POLITICS AND ECONOMY

The energy challenge is becoming deeply related to the global environmental challenge, as shown in the climate change issue. Both imply economic, political and ethical dimensions. Both must be placed in the perspective of sustainability, whose definition is now emerging from cooperation between physical and natural sciences on the one hand and social sciences on the other hand. However, the sustainability of the development process is put under serious pressure by the exceptional and continuous growing experience of Asian countries involving billions of people. To take these new facts into account strategies for addressing both challenges require integrated global economic and environment modelling, as a basis for stable international agreements, but they also require clear understanding of the ethical implications of economic and political choices involving future generations.

Joachim Schellnhuber
Potsdam Institute for Climate Impact Research, Germany

Vaclav Smil
Department of Environment, University of Manitoba, Canada

Carlo Carraro
Department of Economics, University of Venice, Italy
- Climate policy in the post-Kyoto world. Incentives, institutions and equity

Partha Dasgupta
Department of Economics, University of Cambridge, UK

Ignazio Musu University of Venice, Italy	**Chair: Panel discussion**

David Blackbourn
Department of History, Harvard University, USA

Jean Jacquinot
CEA, France
- The case for a world collaboration on fusion and ITER

Fulvio Conti
Enel, Italy

Giuliano Amato Italian Ministry of Internal Affairs, Italy	**Closing Lecture**

Final Remarks