

Conference Resolutions

from the

World Conference on Physics and Sustainable Development

(As of January 31, 2006)

PREAMBLE:

We have come together in Durban, South Africa as representatives of the international physics community and many national physics societies, to put forth a plan of activities to confront sustainable development challenges facing the world. We have now agreed upon such a plan. As we leave this conference, we resolve to work vigorously together to put this plan into action. We recognize that the conference will not have been a success unless a year from now we and our physicist-colleagues are actively engaged in follow-up actions. We pledge to do our part to ensure that our planned activities are launched, and our conference goals are achieved.

GOALS:

THEME I: PHYSICS EDUCATION

- 1. To give educators and students in developing countries access to high quality physics education resources by establishing a website and Physics Education Resource Centres in Africa, Asia and Latin America**
- 2. To develop supplemental instructional materials for secondary physics courses that help students understand how the mastery of physics concepts can enable them to contribute to sustainable development in their own countries.**
- 3. To develop model workshops for teacher-trainers in Asia, Latin America and Africa that exemplify how active learning methods can be adapted to help meet the needs of students in developing countries.**
- 4. To establish a structured multi-disciplinary mobile science community that provides support to mobile science practitioners, enabled by a web and internet site at www.mobilescience.info hosted by the Institute of Physics (UK).**

THEME II: PHYSICS and ECONOMIC DEVELOPMENT

1. Establishment of a training programme for physicists for the application of economic development in developing countries.

The purpose of the training programme is to provide short courses of probably four weeks' duration to provide physicists from developing countries with commercial awareness and skills. The main focus will be on intellectual property, patenting, etc. and how to bring a technology-based product to market whether through the establishment of a start-up enterprise or through licensing of the technology. The course will be piloted at the Abdus Salam International Centre for Theoretical Physics.

2. Development of a network on physics and agriculture making materials available on the web.

Physics plays an important role in a number of aspects of agriculture, including post-harvest technology, and plays an important role in developing countries. The establishment of a network will enable developments in physics in agriculture to be shared more efficiently. It is also relevant that other physicists and the public at large should appreciate the importance of physics in this area.

3. Development of a network on nanoscience and nanotechnology for economic development, focusing on water, air and energy.

It was decided that the new technologies (i.e. Information Technology, Biotechnology, and in particular Nanotechnology) will be crucial to the sustainable economic development in the countries of the South. These technologies should be able to create favorable grounds for placing the economies of these countries on a firm technological and knowledge-based foundation. It was agreed that several fields of nano-technology will be relevant to the needs of many countries in Asia, Africa and Latin America. These fields include:

1. Energy production and storage
2. Water treatment and remediation
3. Air pollution and remediation

These fields are also identified in the United Nations Millennium Development Goals as fields towards which nanotechnology should be able to make a direct contribution. An international network (with local contacts identified in all continents) will be set up to pursue research in the above three fields via joint collaborative works funded by such agencies as the World Bank.

THEME III: ENERGY and ENVIRONMENT

The development of expertise and building knowledge bridges in energy development and environment protection is an essential prerequisite for the successful enhancement of currently available technologies and processes, in particular for the implementation of the following project proposals:

1. Enhancement of Efficiency and Reduction of Pollution in Transportation

Investigate new battery technologies and improved internal combustion technology for hybrid application. Hybrid technology appears to be the most effective short to medium term approach to higher energy efficiency (thus lower pollution, especially greenhouse gases and local air pollution) in the transportation sector.

2. Promotion of Use and Application of Solar Energy

Development of solar photovoltaic (PV) technologies including the development of new and environmentally friendly materials and processes for the generation and storage of electricity. In addition to a PV cell cost barrier – though steadily declining – the use of toxic materials in the production of solar cells and lack of low-cost and efficient local storage electricity technology pose limitations to the expansion of PVs as standalone electricity supply systems.

3. Develop a model for an inexpensive biomass energy plant

Development of an inexpensive multifunctional, efficient and non-polluting biomass energy mini-plant that covers the basic community level energy needs (electricity, bio fuels, heat) for small rural communities, based on locally available biomass and operated and maintained by local micro enterprises with process control supported by low-cost IT technology with the possibility of solar thermal and PV integration.

THEME IV: PHYSICS and HEALTH

This grouping, represented by a wide cross-section of Physicists from across the world, recognized the need for a thorough basic education and training for all Physicists contributing to Health. The need for Physicists in the Radiation Oncology environment was highlighted owing to the silent crisis in cancer incidence, particularly in developing countries [<http://www.iaea.org/PACT>]. The need for well-trained Medical Radiation Physicists to support safe and effective radiation therapy was recognized.

The projects recommended to achieve these goals are:

1. Physics and engineering resources for healthcare and development

Several organizations and institutions are providing educational resources that are available to physicists, engineers, and other healthcare professionals in the developing countries. The resources can be used to support academic programs and for continuing education and professional development. The various resource projects can be accessed through the portal website: <http://www.wcpsd.org/health/perhd.cfm>

Facilitator: Perry Sprawls

2. Curriculum development and program validation for physicists in medicine

The effective application of physics to clinical medicine on a global basis requires professionals with the appropriate education and training at the graduate level. The development of local academic programs to meet the needs for qualified physicists will be enhanced by a model curriculum based on successful programs in various countries and supported by international recognition. The development of a model curriculum for a general MSc program in Medical Physics is an on-going project coordinated by the Education and Training Committee of the International Organization of Medical Physics (IOMP).

Facilitator: Slavik Tabakov

3. Development of regional training centers for the physics of radiation therapy

Modern radiation therapy units offer a wide range of modalities and the demands on Medical Physicists in these environments is often overlooked despite the worldwide shortage of these key personnel. In developing countries, applied thinking to enhance the optimal use of limited resources is often a major challenge. Regional and national partnerships are key to continued professional development and to overcome isolation. The project will facilitate collaborative partnerships between Institutions, Organizations and Agencies throughout the world to promote shared resources and professional development.

Facilitator: Debbie van der Merwe

4. Development of a web-based training tool for radiation therapy physics

The education and training of medical physicists in radiation oncology on a global basis requires high-quality materials and media developed by a consortium of international medical physicists and made available for use in all countries. This will be achieved through the *Web-Based Training Tool Project* modeled after the highly successful web-based training tool for Radiation Dosimetry at Stanford University. The web-based materials will be used under the direction of qualified mentors who manage and contribute to the education and training of individual physicists.

Facilitator: Arthur Boyer

5. Recognition of physicists in health

Many Physicists are active in the health-related fields of , however they are not directly involved at a clinical service level in a Hospital environment. All Physicists contributing to Health should be encouraged to share forums where mutual exchange of ideas, research, experience and knowledge is possible. This project enhances the promotion of collaboration between traditional Institutes of Physics and Physicists in Medicine to ensure effective, high-quality medical services to patients.

Facilitator: International Organization of Medical Physics (IOMP)

6. Explore avenues by which technology can make modern healthcare available to less developed or remote populations through applied telemedicine and other electronic communications .