

**Joint ISTIC-UNESCO Conference on
Ethics in Science and Technology**

**“Enculturation of Ethics for Scientists and
Engineers for a Sustainable Future”**

15 June 2009 Kuala Lumpur

**Evolution of the Code of Ethics for
Engineers**

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Federation of Engineering Organisations (WFEO)**

The Two Greatest Global Challenges :

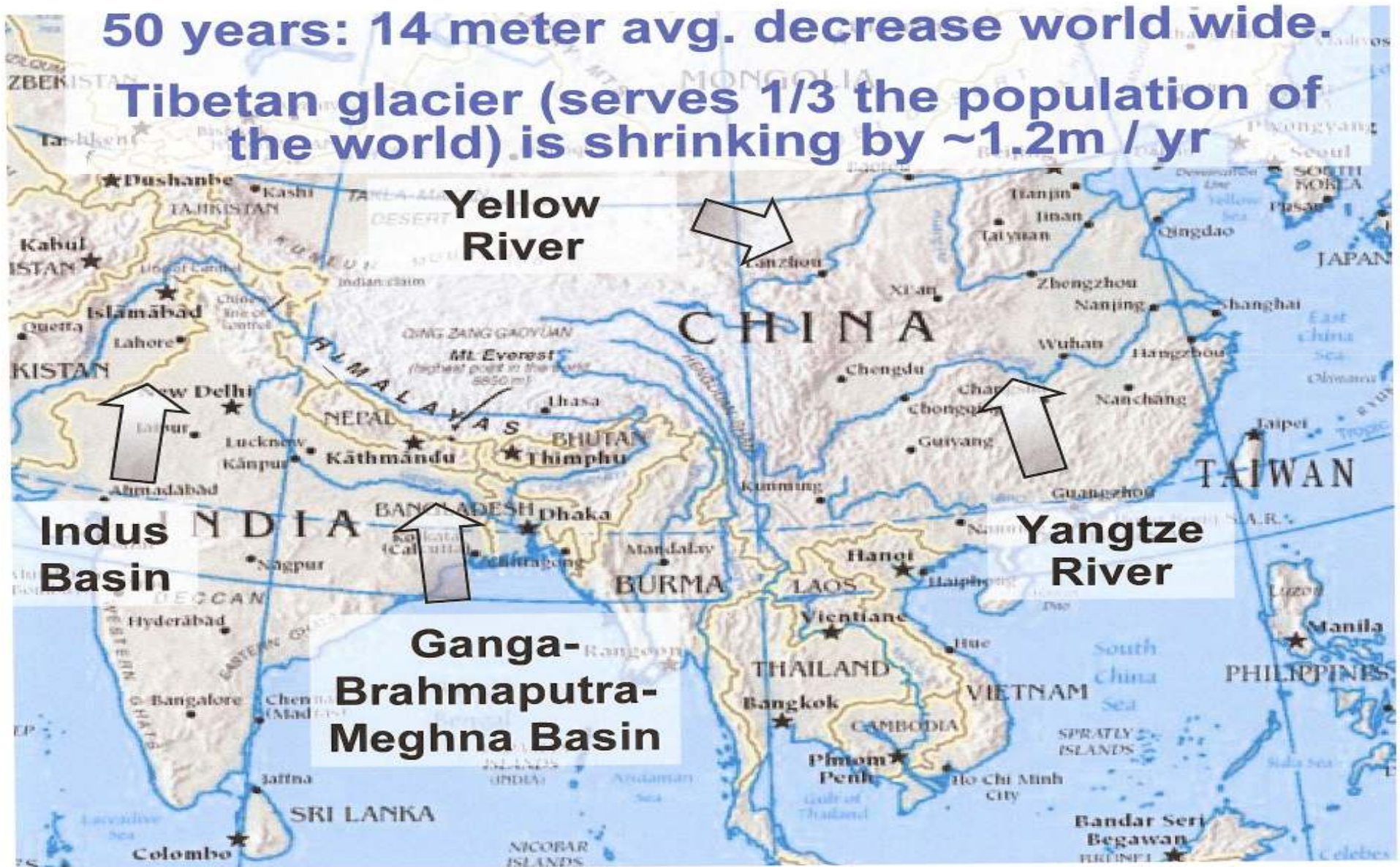
- **Reducing the Disastrous Effects of Global Climate Change caused by Carbon Dioxide Emission through Burning of Fossil Fuels;**
- **Global Poverty Reduction.**

Some Irrefutable Evidence:

Melting Glaciers

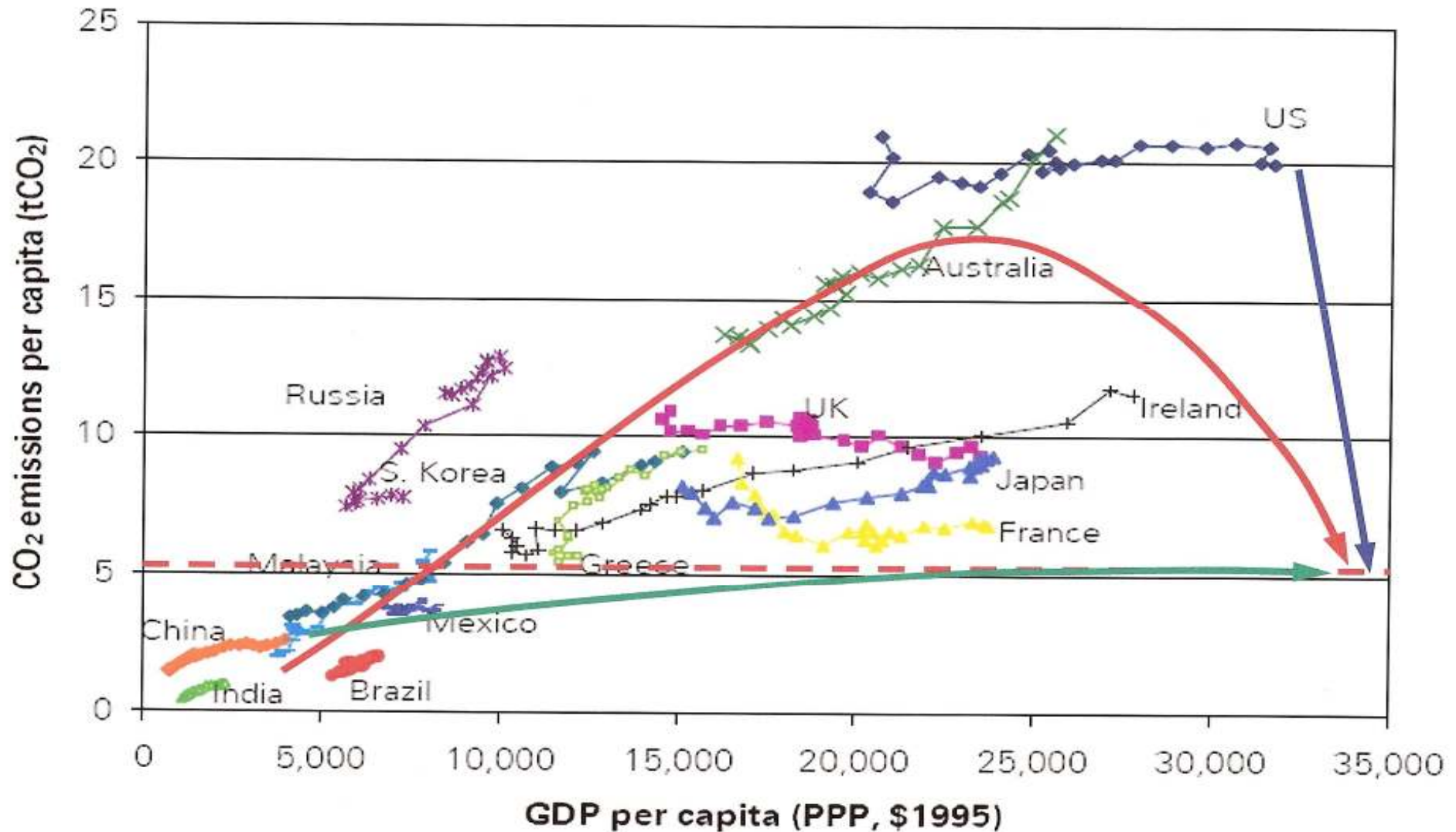
50 years: 14 meter avg. decrease world wide.

Tibetan glacier (serves 1/3 the population of the world) is shrinking by ~1.2m / yr



Excessive Carbon Dioxide Emission per capita

CO₂ emissions of selected countries



Global Energy Demand is Rising

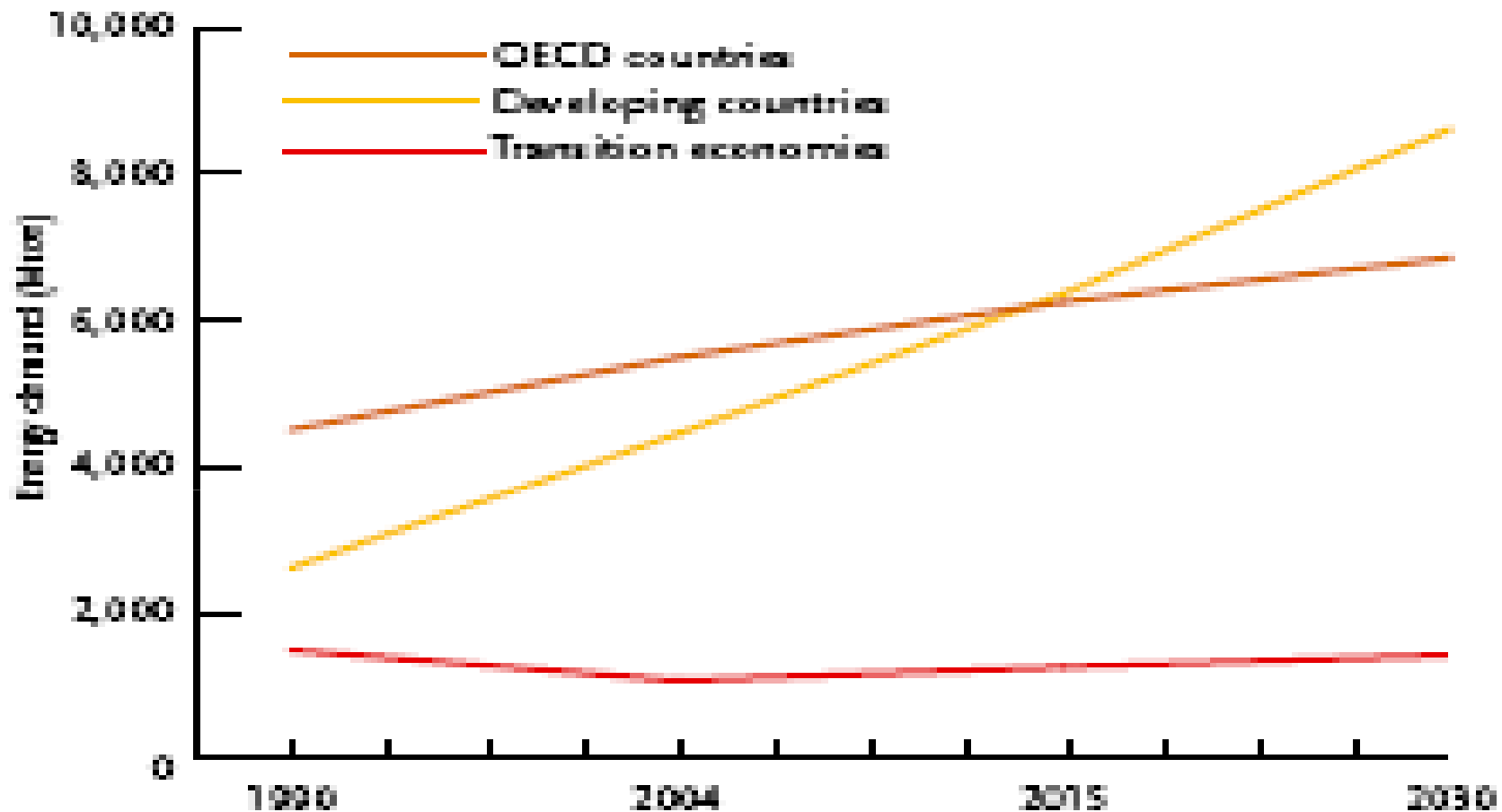


Figure 1.2 Regional shares in world primary energy demand, including business-as-usual projections

Note: 1 megaton oil equivalent (Mtoe) equals 41.9 petajoules.

Source: IEA, 2006

The Today World of Poverty

World Population >6.0 billion.

- (i) Rich (0.8 billion),**
- (ii) Transitional(1.2 billion)**
- (iii) Poor (4.0 billion)**

Criterion: GDP in US\$ per capita (PPP)

- (i) >16,000,**
- (ii) 4000-16,000,**
- (iii) < 4,000 respectively.**

The Rich have Nine times the Wealth, Eight times the Energy Consumption and the Eight times Carbon Emission of the Poor.

1.3 billion live in Abject Poverty, on Daily Income <US \$1.00;

3 billion have Daily Income of <US\$ 2.00;

800 million Suffer from Food Insecurity;

50 million are HIV positive;

1 billion Suffer from Water Scarcity;

2 billion have No Access to Energy.

(Professor John Holdren, Harvard University, IAP Millennium Sustainability Transition Conference Tokyo 2000)

Yet, Much Betterment of the Human Condition through Science, Engineering and Technology (S.E.T), in the second half of the 20th century.

- **Life expectancy at birth is up from 50 to 64 years,**
- **Infant mortality is down from 13% to 6%,**
- **Access to safe drinking water has improved from 35% to 65%,**
- **Literacy rate is up from 50% to 70%**
- **GDP/capita in developing countries has increased from US \$900 to US\$2900.**
- **Living standards of more than 3 billion people have improved**

(Professor Bill Clark, Harvard)

The World Tomorrow

World Population: 9-10 billion by 2050.

Increase: Urban & in Developing Countries & Young

A Daunting Future!

Science, Engineering and Technology (S.E.T) has been a Significant Factor in Widening the Chasm between the Rich and the Poor.

S.E.T has also caused much Environmental and Ecological Damage.

S.E.T can offer solutions for a sustainable future for humankind provided the practice of S.E.T. is firmly grounded in moral and ethical principles.

World Federation of Engineering Organisations (WFEO)

WFEO, founded in 1967 with head office in UNESCO Paris, is the global organization whose 100 National Members are the national Institutions/Societies of Engineers and whose 10 International Members are the regional federations of engineering institutions/societies. WFEO thus represents some 15 million professional and graduate engineers worldwide.

I am first Asian to be WFEO president 2003-2005.

Since the practice of engineering impacts public safety and wellbeing and its failures adversely affects life and property, all national institutions of engineers have codes of practice to govern the professional conduct of their engineers.

Most Codes of Ethics are sets of rules governing the relationship between professional engineers and their clients as consultants and contractors; as well as relations between engineers and engineers in competing for clients and jobs with some degree of decorum.

I find them rather self serving in protecting the interest of the professional engineer!

WFEO Felt the Need To Harmonize The Codes into a Model Code such that established members can update their codes and new members from developing countries can be guided in crafting their codes in line with international practice.

More Importantly WFEO Felt The Model Code must address the pressing issues of sustainable development and protection of the environment, arising from WFEO's engagement with the Rio Earth Summit 1992 and the drafting of the Earth Charter in the late Nineties.

I commend the WFEO Model Code adopted in 2001 as a good guide for Scientific Societies and Scientists.

WFEO Model Code of Ethics www.wfeo.org

Guiding Principle

Professions that have been given the privilege and responsibility of self regulation, including the engineering profession, have tended to opt for espousing sets of underlying principles as codes of professional ethics.

Engineering professional codes of ethics have often been as a set of "rules" of conduct for passive observance.

A code of professional ethics is really a set of principles which should guide professionals in their daily work.

The WFEO Code is based on broad principles of truth, honesty and trustworthiness, respect for human life and welfare, fairness, openness, competence and accountability.

Some of these broader ethical principles or issues deemed more universally applicable are not specifically defined in the WFEO Code although they are understood to be applicable as well.

Only those tenets deemed to be particularly applicable to the practice of professional engineering are specified.

Issues regarding the environment and sustainable development know no geographical boundaries.

Engineers of all nations should know and respect the environmental ethic.

It is desirable therefore that engineers in each nation continue to observe the philosophy of the Principles of Environmental Ethics delineated in this WFEO Code.

PRACTICE PROVISION ETHICS.

Professional engineers shall:

- **hold paramount the safety, health and welfare of the public and the protection of both the natural and the built environment in accordance with the Principles of Sustainable Development;**
- **promote health and safety within the workplace;**
- **offer services, advise on or undertake engineering assignments only in areas of their competence and practice in a careful and diligent manner;**
- **act as faithful agents of their clients or employers, maintain confidentiality and disclose conflicts of interest;**

- **keep themselves informed in order to maintain their competence, strive to advance the body of knowledge within which they practice and provide opportunities for the professional development of their subordinates and fellow practitioners;**
- **conduct themselves with fairness, and good faith towards clients, colleagues and others, give credit where it is due and accept, as well as give, honest and fair professional criticism;**
- **be aware of and ensure that clients and employers are made aware of societal and environmental consequences of actions or projects and endeavour to interpret engineering issues to the public in an objective and truthful manner;**

- **present clearly to employers and clients the possible consequences of overruling or disregarding of engineering decisions or judgment;**
- **report to their association and/or appropriate agencies any illegal or unethical engineering decisions or practices of engineers or others.**

ENVIRONMENTAL ENGINEERING ETHICS

Engineers shall:

- **try with the best of their ability, courage, enthusiasm and dedication, to obtain a superior technical achievement, which will contribute to and promote a healthy and agreeable surrounding for all people, in open spaces as well as indoors;**

- **strive to accomplish the beneficial objectives of their work with the lowest possible consumption of raw materials and energy and the lowest production of wastes and any kind of pollution;**
- **discuss in particular the consequences of their proposals and actions, direct or indirect, immediate or long term, upon the health of people, social equity and the local system of values;**
- **study thoroughly the environment that will be affected, assess all the impacts that might arise in the structure, dynamics and aesthetics of the ecosystems involved, urbanized or natural, as well as in the pertinent socioeconomic systems, and select the best alternative for development that is both environmentally sound and sustainable;**

- **promote a clear understanding of the actions required to restore and, if possible, to improve the environment that may be disturbed, and include them in their proposals;**
- **reject any kind of commitment that involves unfair damages for human surroundings and nature, and aim for the best possible technical, social, and political solution;**
- **be aware that the principles of eco-systemic interdependence, diversity maintenance, resource recovery and inter-relational harmony form the basis of humankind's continued existence and that each of these bases poses a threshold of sustainability that should not be exceeded.**

WFEO Model Code also Provide more lengthy interpretation with respect to:

- **Sustainable Development and Environment.**
- **Protection of the Public and the Environment.**
- **Faithful Agent of Clients and Employers.**
- **Competence and Knowledge.**
- **Fairness and Integrity in the Workplace.**
- **Professional Accountability and Leadership.**

Since 2001, WFEO under my leadership has been deeply engaged in the World Summit on Sustainable Development 2002 Jo'burg and UN Millennium Project for the Millennium Development Goals (MDGs) 2002-2006.

www.unmilleniumproject.org

I was the Co-Chair of the UN Millennium Project Science, Technology and Innovation Task Force.

It is my hope that the WFEO Model Code of Ethics will be updated to include the engineers' duties and responsibilities to help eradicate global poverty.

Any Engineering Code of Ethics is merely a set of motherhood statements on paper unless it is practised as a matter of routine by individual engineers;

The Tenets must also be effectively policed and enforced against offenders.

Education is the key!

I will leave the details of the mechanism of the promotion of the code of ethics of the Board of Engineers Malaysia through the accreditation of engineering courses in universities, the professional interview of registered engineers in their understanding of their role in society and continuing professional development to my colleague from the Board of Engineers Malaysia this afternoon.

In this regard, engineering dons and faculty members must take the lead by being role models. I have been urging in my UN Millennium Project advocacy that engineering dons should not be recruited on PhD and paper publications alone. In addition, they must demonstrate that they have participated in professional and community service.

Such caring engineering teachers will motivate their students to form chapters of such organisations like “Engineers Without Borders” that construct engineering installations in rural communities at home and abroad for the MDGs.

www.ewb.ca

Then as a caring profession, the engineering profession will truly be at the forefront of the battle against climate change and global poverty.

**Extract from Chinese Premier Wen Jia Bao's
Speech at Cambridge University, February
2009 on global financial crisis.**

Premier Wen is a great engineer/statesman.

**“A major crisis is usually followed by a
revolution in science and technology, and no
economic recovery is possible without
technological innovation.”**

“The loss of morality is an underlying cause for the current crisis.

Some people have sacrificed principle and sought profits at the expense of public interests. They have crossed the moral baseline.

Within the body of every businessman (scientist and engineer) should flow the blood of morality.”