

ICE Presidential Commission 2004

Engineering without Frontiers: Report on Phase One

"Our ignorance is not so vast as our failure to use what we know."

M. King Hubbert, Geophysicist

1 Introduction

This report summarises the work of Engineering without Frontiers (EwF) from January to September 2004, and the context within which ICE decided to establish EwF. It outlines the formation and work of EwF, and sets out the findings of the Commission, along with provisional recommendations for the ICE and for the future of EwF.

Vision and Action Plan: Phase 1 and Phase 2

Phase 1 has come together to give us an idea of how we, as engineers, can contribute by focusing on the question of **how** we could help in framing a plan for the delivery of MDGs. It involves radical ideas - Appropriate Delivery Mechanisms, Appropriate Standards, Appropriate Protocols/Contracts, greater recognition by Industry and the Institutions of the work of engineers engaged in development work, Public Realm Strategies, the Engagement of Youth, and the Mobilisation of Partnerships (professional, governmental, business, NGO's, communities, youth), and the notion that the MDGs be viewed as an "engineering project/programme" and focused on delivering solutions.

Phase 2 will develop these ideas in order to disseminate and operationalise them.

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2 Engineering and Development

2.1 The Role of the Engineer

Historically, the engineer has played a significant role in development and the alleviation of poverty. Famously, the London sewers laid by Bazalgette in the 19th century are reckoned to have added an average of 20 years to life expectancy through the reduction of water-borne diseases. A similar task now awaits in the lesser-developed countries, where life expectancy is still far below that enjoyed in developing countries.

However whilst engineering has been immensely successful in many arenas, it has in recent years suffered from an image problem. In the UK and the developed world generally, there has been under-investment in some aspects of basic infrastructure (relying on that of our forebears) coupled with widespread concerns about the deleterious impacts on the environment and sustainability in some of those areas where engineering activity has actually been undertaken. Society, while benefiting from (and often taking for granted) infrastructure and the other services that engineering provides, can be mistrustful of engineering as a solution provider to these new concerns.

In the global arena, statistics and figures about global poverty and about the need for basic services abound. For example, a recent report compiled by UN children's fund UNICEF and the World Health Organisation (WHO) has shown that 40% of the earth's population does not have the most basic sanitation available to them¹. It also states that, if nothing is done to tackle the problem, around 2.4 billion people will be left drinking unsafe water in 11 years time.

Likewise, lack of affordable housing and basic urban infrastructure, coupled with increasing population growth, has resulted in huge numbers of people living in slums and shanty towns. By 2015, for the first time in history, the majority of people will reside in urban centres, mostly in countries that lack the economic, social and physical infrastructures to support a their growing populations². Many high profile engineering projects in developing countries, such as dams, power stations and prestigious commercial centres and highways are not seen to have helped reduce levels of poverty or improved access to services, and the growth of slums outstrips any attempts to service them.

While engineering clearly has a major role to play in alleviating global problems, and in tackling sustainability issues at home, it is just one facet, albeit vital, in an inter-linking set of conditions that impact on the possibility of sustainable development and poverty reduction. In recent years the need to avoid environmental crises has been realised in many quarters, including the engineering community. A similar response needs to emerge over the accompanying social crises which are just as threatening.

If engineering is truly to deliver the best possible outcomes to society, engineers must understand their role in this wider field, and shape their work and their contribution accordingly.

This is the new challenge that faces engineering, both at home and in the global arena. Engineers must remain experts in their fields but must also understand the interaction between their work and the environment, culture and society, and the economy. It is no longer an apolitical activity – indeed if it ever was. Engineering constructions are not monuments, but just parts of complex, changing systems – both human and environmental.

¹ Meeting the Millennium Development Goals (MDG) drinking water and sanitation target - A mid-term assessment of progress, 2004

² The Engineer of 2020: Visions of Engineering in the New Century (2004), Chapter 2, p 28

2.2 International Initiatives and Development

There is now international action to address the problems of poverty and development, much of it now focused on the eight Millennium Development Goals (MDGs).

1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV and AIDS, malaria and other diseases
7. Ensure environmental sustainability
8. Develop a global partnership for development

These were agreed at the United Nations Millennium Summit in September 2000 and nearly 190 countries have subsequently signed up to them. The Goals range from halving global poverty and hunger to protecting the environment, improving health and sanitation and tackling illiteracy and discrimination against women. They are intended to encourage the international community to work together to improve conditions for people in the developing world. Along side the Goals, a series of 18 targets and timescales were also drawn up to make it easier to measure progress.

The intention is that the targets should be achieved by 2015. However, while significant progress is being made towards some of the targets, in many cases progress is patchy, slow or non-existent. Of all the MDGs, the only one apparently on track is that on poverty but this is largely the result of the recent economic boom in China and is not accompanied by a general upward drift elsewhere.

More information on the Millennium Development Goals is given on the UN Millennium Goals website at <http://www.un.org/millenniumgoals/>.

UN work related to the MDGs includes The Millennium Project and its ten task forces (<http://www.unmilleniumproject.org/html/about.shtm>).

The World Federation of Engineering Organisations (WFEO) has its own contribution in this area – the ‘Engineering for a Better World’ initiative (<http://www.wfeo-cee.org/news/v23n4.htm>) and there are also close links between WFEO and the Commonwealth Engineers Organisation. Through the involvement of Dato Lee Yee Cheong (WFEO, UN TF10) Tony Ridley (CEO, UN TF10) and Tony Majoram (UNESCO), the ICE is well-connected to some of the internationally important players.

The UK Government direct their development work through the Department for International Development (DfID; see www.dfid.gov.uk). It has also established a “Commission for Africa” to address particular issues of poverty reduction which map onto the UN MDGs.

Further sources are listed in the Bibliography of Reports and Initiatives in Annex Two.

The MDGs are part of a global policy that needs to be delivered nationally, regionally, and locally through a focus on *solutions*. A holistic vision of this *implementation* may be useful to support individual countries’ Poverty Reduction Strategy Papers (PRSPs) and various action plans. Currently some organisations are challenging the MDGs and surrounding policies directly (eg the Make Poverty History campaign) but few are asking *how* they can be effectively implemented. This is where engineers have a key role. Engineers can make a really distinct input – by addressing the problem from the perspective: *How can it be done?* – How can the MDGs be met,

based on a focused analysis of what needs to be done, within what constraints, and how this can be achieved.

3 The Role of ICE and formation of EwF

The ICE, as one of the world's leading professional engineering bodies, has both an opportunity and a duty to play a prominent role in human development and sustainability. This debate is not new - the ICE report 'Whither Civil Engineering?' in 1996 argued that engineering must change in order to properly meet society's needs and achieve sustainable development. The ICE and its members have had a longstanding interest in development work and disaster relief, establishing the Appropriate Development Panel in 1984, supporting the establishment of RedR in 1979 and establishing the Telford Challenge (now Engineers against Poverty) with the IMechE in 1998. The ICE approved its Sustainability Charter in 2003 and has been actively working to embed sustainability competencies throughout the education and training of the civil engineer. To bring this work together and to explore how to maximise the impact of ICE, the President, Douglas Oakervee, announced the establishment of a Presidential Task Group in his presidential address. In December 2003 Council agreed that the Task Group become an ICE Presidential Commission – "Engineering without Frontiers" (EwF) with the following remit: -

- What does society expect of an engineer in the 21st century?
- What are the critical activities to address caring for Earth and meeting the Millennium Development Goals?
- How can these ambitions be integrated with those of (ICE) organisations already involved and especially ADP, RedR, EAP and our Boards?

Commission to look at role of engineers in meeting UN goals

A PRESIDENTIAL commission is to investigate the role civil engineers have to play in meeting UN international development goals on poverty, education, health and the environment.

Paul Jowitt, professor of civil engineering systems at Heriot-Watt university, will lead the commission. It will ask what society expects of engineers, identify the critical activities needed to meet the UN's goals and suggest what the ICE should do to help meet them.

ICE President Doug Oakervee

announced the establishment of a working group to tackle these issues in his presidential address in November. But Council has agreed to upgrade the study to presidential commission status to reflect the importance of the work.

"What makes the scope of this study most challenging is the outward facing international dimension, and in particular, the inclusion of the 'north-south' aspect," said Jowitt.

"Meeting UN goals moves the agenda on to another plane, in



which the ICE and its members have to see themselves as having a lead role to play internationally as part of a valued and an important profession," he added.

Jowitt expects to spend £27,500 on the study. Initial findings will be presented at the ICE annual conference, to be held in Cambridge in July.

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The Commission currently comprises 8 Members, 5 Special Advisors and 7 International Advisors. They were selected for their experience and expertise, and in order to represent a range of stakeholder viewpoints. A full list of members and advisors are shown in Annex One, along with the Commission's terms of reference. In addition to EwF's core funding from the ICE, external sponsorship of £2500 was kindly donated by Carillion.

Phase 1 of the project was used to obtain information, opinions and ideas for action on the issues. This was gathered from the Commission's members and advisors, and from stakeholders beyond the group through the use of an Evidentiary Hearing on engineering and development issues, and

a detailed survey of ICE members. A huge range of ideas, initiatives and proposals were generated from these sources. A summary of some of the main issues arising is given in sections 4.2, and recommendations as to how ICE could play a meaningful role in relation to the issues are given in section 6. Phase One also included a presentation at the ICE Presidential Conference in Cambridge, July 2004.

Phase Two will run from September 2004 and is due to be completed by December 2005.

Why Engineers should Develop a Vision for MDG Implementation.

The MDGs viewed as an engineering project?

In the past engineers have driven highways and railroads across continents, dammed mighty rivers, tunnelled under the sea and put men on the moon. As engineers we are a key profession for implementation for the change society desires and requires in the world. Yet, our profession is changing in response to new social and environmental challenges – where we claimed to “direct the powers of nature for the use and convenience of mankind” we now need to focus on “working with the powers of nature for the use and benefit of society.”

Humanity faces its greatest challenges - addressing issues of poverty reduction and governance on the one hand and climate change and sustainability on the other. World governments have committed to meet the Millennium Development Goals (MDGs), as an interim step to address poverty reduction by 2025. The UK has committed to a 60% reduction in UK CO₂ emissions by 2050. If we, as a profession, are going to lead the way, working in partnerships to go where others have failed to go, we must aim to take these on as *our* challenges. And, as engineers - not accustomed to just discussing issues - we propose an *implementation plan* that can lead to action that delivers real outcomes.

So this is our challenge: As key implementers, how can we produce an action-based plan, to ensure that the MDGs are met while achieving sustainability world-wide? This is a radical challenge. We propose a plan based on providing solutions, raising the key question of *how* this is achieved - within the caveats of what is appropriate and sustainable to people, resources and to the environment.

The Commission believes that its work needs to be positioned with respect to the UN Millennium Project. We will examine the recommendations of the UN Millennium Project Task Force Reports (and especially TF10: Science and Technology), to show how the ICE could contribute to their vision – ranging from actions at institutional level to the role of young engineers). These results need to be presented as a *vision* and as *action plan*, aligned with the international agenda.

4 EwF Phase One - Scoping, Themes and Work Streams

4.1 Meetings, Events and Activity

The EwF Commission has held a number of meetings and wider stakeholder events to scope out the project and to identify key themes, as summarized in the list that follows:

- Jan 2004, Glasgow workshop to gather data from graduates and student engineers
- March & April 2004, Two EwF Commission meetings to scope out issues
- May 2004 – Evidentiary Hearing to identify key issues in global aspects
- June 2004 – E-survey of ICE members, to gather views on global & national issues

- June 2004, Auckland, New Zealand – presentation to raise profile and access views from NZ (see <http://www.ipenz.org.nz/ipenz/practicesupport/Sustainability.cfm>)
- July 2004, EwF Presentation at ICE Conference (downloadable from http://www.ice.org.uk/knowledge/downloads_environment.asp)
- Sept 2004, London, EwF contribution to an Edge Debate to solicit comments on climate change aspects
- September 2004, meeting with Dundee Area Branch (East of Scotland Region), to explore views from ICE members on society's expectations
- Forthcoming: Nov 2004, EwF Commission Member Lisa Kelvey to present EwF's work to the International Young Professionals Summit 2004 (see <http://www.iyps.org/>)

Contributions have also been received from a wide range of professionals and other players in response to an article placed in NCE and through web-based activity. In addition, the views and comments from ICE membership were gathered through a short but detailed survey sent out to members via ICE-Extra. A wide range of responses was received and analysed. A summary of some of the results is given in Annex Three.

Of particular note was the Evidentiary Hearing run by EwF in May 2004. This was based on the model of a 'House of Commons Select Committee' hearing, with a range of Witnesses and with a series of questions being put to them by a Panel and from the floor. It brought together a wide range of stakeholders connected with engineering and development and was widely regarded as a very successful event. The major themes were:

- Education and CPD for Contribution to Development and Leadership;
- Appropriate Structures in Industry;
- Appropriate Standards and Primary Engineering;
- High Level Delivery Issues.

Further details including the names of Witnesses and Panel of interrogators are shown in Annex 4.

4.2 Initial Findings

Through the methods listed in 4.1 above, EwF has gathered and summarised information under three headings – Context and Prerequisites, Themes, and Work Streams

From these, EwF has produced a series of recommendations that will shape its forthcoming work.

4.2.1 Context and Prerequisites for Development

Members and contributors emphasised the importance of some of the influences that determine whether engineering can contribute to sustainable development. The most important of these include the items summarised here:

- There are certain **Prerequisites for Development**, without which attempts to improve the livelihoods will be unlikely to succeed. Such prerequisites include reasonable governance structures and operation for the area or region; a functioning civil society; and freedom from persecution, conflict, and corruption.
- The impact of **Global Politics, Trade and Conflicts** on development is immense. These include trade rules, tariffs and western subsidies, local and regional conflict, oil diplomacy, governance, trans-national companies, and so on.
- The importance of a thriving **Private Sector** (large and small) in poverty alleviation. A climate in which individual traders and small businesses can thrive is just as important as the growth of larger industry. A functioning business sector can also help deliver poverty-reduction outcomes through direct involvement in the development of infrastructure.

- **Investment:** those mired in poverty do not have and cannot afford all the resources necessary to resolve their plight, and to some degree they will need some external investment and assistance.
- Traditional development concerns, including **Food Security, Health and Well-Being, Gender Issues and Education Levels** are also vital if development is to be successful.

4.2.2 Key Themes

In addition, some key themes running through both UK and global level issues were identified:

- The need for engineering work to be directed towards **Outcomes** not artefacts. It was noted that the outcomes important to society, or to poor people may not be the same as those measured by professionals (eg access may be more important than road standards or width). Strongly related to this is the concept of **Appropriate Standards**. These may support outcomes rather than specific material attributes. They may be variable and may be based around performance.
- **Sustainable Livelihoods** uses 'systems thinking', and can be described as a 'people centred approach to the development problem of poverty'. Its starting point is an analysis of how people survive and thrive. Systems thinking and cross-sectoral partnerships are often needed both to solve problems and to improve outcomes. Related to this are **Transaction Costs** and livelihoods:- Problems for the poor are often not to do with supply but to do with costs of and access to supply. This is an important issue in the debate on the benefits of privatisation of utilities and services. It also raises the issue of whether there is a case for a rights-based approach to local governance – especially important in those communities, which are excluded by virtue of illegal/disputed property rights.
- **Capacity Building and Community Involvement** is important if development is to be sustainable and not imposed inappropriately by external bodies.
- **Emerging Technologies** were raised as a possible influence in development. The general view was that this was probably not a key issue, although certain technologies were seen to have a role (for example, renewable energy as a means of local access to power, and wire-less communications as a means of access to knowledge and indirectly to gender equality),

4.2.3 Workstreams

The Commission identified several areas of concern that would benefit from further work. The issues are summarised in the form of questions under the major workstream headings here:

1. **Education and Professional Formation for Leadership and Contribution to Development and Well-being:** What should the Civil Engineers of the 21st Century engineer be like? To what extent do the ICE's values and aspirations reflect those of young engineers? How can society harness the enthusiasm of youth and our younger membership and develop leadership? Do we currently have the Appropriate Structures in Industry to enable all this to happen? What changes might be needed to enable industry to support engineers who wish to contribute to development in some way?
2. **Appropriate Standards, Primary Engineering and Community Involvement:**
 - i) Are the standards currently required to attract project funding creating a barrier to development and what are the alternatives? What are the merits of promoting and practising the concept of Primary or Local Resource Based Engineering?
 - ii) Are new sustainability standards (for construction, development and planning) that include human and social well-being also desirable in the UK?

- iii) What is the desirable nature and extent of community involvement in engineering projects in the UK and in the developing world? Should engineers lead or follow?
3. **Procurement, Unblocking Barriers and Finding Effective Delivery Models:** How could development infrastructure be realized more quickly? What are the project financing and procurement issues? Could a joint venture 'pain and gain' model, or multi-sector partnership (involving communities, NGO's the private sector, local/national governments, international financial institutions, the professional institutions and engineering youth) be used to help unblock development projects? Are there existing procurement models in the UK that could be adapted? What might the role of CSR be in improving pro-poor outcomes from development engineering? Could the benefit of development funding be improved by tightening conditionality aspects relating to pro-poor outcomes and poverty reduction? And should there be a more appropriate form of contract/contact protocols, involving not just the project funder, local client and the contractor/consultant, but also community groups, NGOs and volunteer engineers, the local engineering professions/institutions.
4. **Related High Level Issues:** What stance might engineering bodies legitimately take in relation to politics and business issues? In particular, what might be their position on the issue of services privatisation in developing countries? Relevant reports are given at these websites: <http://www.wateraid.org.uk/documents/summaries.pdf> and <http://www.waronwant.org/?lid=6533>
5. **Links with Engineering Organisations Overseas.** Links, engagement and possible twinning arrangements with sister engineering organisations in developing countries to understand what support from the ICE might be useful for them. Dialogue to understand what their aspirations and priorities might be with respect to issues such as pro-poor development, disaster risk reduction (DRR) and the brain drain of engineers from some developing countries.
6. **Communication and Awareness:** To what extent and how should the ICE make its members more aware of the issues surrounding development and sustainability?

The Commission is clear that these are not separate issues to be adopted piecemeal – they are synergistic and need to be linked together to achieve the overall objective.

Working groups have been set up to look at the issues in (1) and (2), and a third has started to examine the issues related to (3) Procurement and Delivery Models, which will also take in issues relating to privatisation (4). EwF has started discussions with DfID as to an effective way forward on DRR (5). EwF will work with the ICE's Communications staff to develop appropriate and robust communications to engage and inform the ICE membership about work in this area.

Some of the findings and work of EwF were presented at the ICE Annual Conference in Cambridge in July 2004. A copy of this presentation is available on the web at <http://www.sistech.co.uk/SISTechICEonlineprojects.htm>.

See also

http://www.ice.org.uk/knowledge/specialist_document_details.asp?Docu_id=786&FacultyID=3.

Examining the evidence, issues and opinions of members and contributors within these workstreams has enabled EwF to propose a provisional series of recommendations to the ICE about future work, both by the Commission, and to be taken on by ICE itself. These recommendations are given in section 6.

5 EwF in 2005 - Phase Two

EwF will continue through 2004 and 2005 with a full programme of activity. It will engage more deeply internally with ICE's Boards and Panels, and externally with stakeholders including NGO's, DfID and politicians. It will also seek to undertake similar work through the ICE's international membership and regional associations.

5.1 Society's Expectations of Engineering

EwF will explore society's expectations of engineering through regional stakeholder events in Birmingham, Bristol and Scotland. EwF will work with representatives of different groups within society, to span diversity in age, gender, occupation, race and so on to explore their expectations of engineering and their environment.

5.2 Working Groups and work within the ICE

EwF work for 2005 includes several other work streams. These include taking forward the proposals of the working groups already set up on Appropriate Engineering Standards for Development, and on Youth and Leadership, and developing the work of additional groups including those on Procurement, Appropriate Commercial Environments and the development of Delivery Models

Equally important will be EwF's work within ICE to raise awareness of development issues and to work with existing ICE bodies. The interests of youth in the development agenda will be explored with the Membership Directorate to see if this could be developed as a feature of added value to younger members, providing them with networking opportunities and contacts attractive to their immediate values and aspirations. EwF will develop the work stream on dialogue with its sister organisations through the appropriate people within the ICE. Finally, EwF will be working with ICE's Director of Communications & Marketing to develop an EwF communications strategy.

In addition EwF will work with the ICE Boards and Panels to identify new ideas for action based on some of the ICE cross-cutting themes, including the MDGs, Public Procurement, Sustainable Infrastructure Development, and Developing Sustainable Communities.

Finally, we will be looking at how to develop links and partnerships with key bodies beyond ICE. This will be achieved primarily by seeking inputs from and partnership with external stakeholders including DfID, relevant NGO's and others for the EwF "Engineers Engagement" event planned for spring 2005, as described below.

5.3 "The Engineers' Engagement"

The centre-point of EwF's actions for 2005 will be a high-profile event (working title 'The Engineers' Engagement') inspired by 'The Copenhagen Consensus' ([see www.copenhagenconsensus.com](http://www.copenhagenconsensus.com)).

The Engineers' Engagement event will be designed to get confirmation from engineers, development professionals, recipients and grass-roots workers on the most effective interventions to enable engineering to deliver development and the Millennium Development Goals.

The intention is to run the event as a two day residential "hot house", tasked to emerge with coherent proposals. The event will take place shortly before the UK-based (Gleneagles) G8 Summit in July, and the outcomes will be publicised to coincide with the run-up to the G8 meeting, and if possible, submitted to it.

Some of the material and evidence needed for this event will be gathered through the EwF working groups described previously, through open sessions with the ICE's Boards and Panels, and with stakeholders including DfID, NGO's such as RedR, EAP, Intermediate Technology, and so on.

6 Key Points and Provisional Recommendations

Members, Advisors and contributors provided a huge range of material and expertise to the EwF Commission, along with a wide range of suggestions. These have been used to shape the work of EwF for 2005. In addition, from this material, information and commentary, the EwF team have assembled the following provisional recommendations for ICE.

The text boxes in the following sections contain a selection of comments received from various correspondents. They are drawn from a range of sources and do not necessarily represent the views of the Commission

6.1 The Role of ICE

6.1.1 Core Objectives, Awareness and Diversity

The bulk of the recommendations made here are in line with the Tredgold definition ("Civil Engineering: The art of directing (*working with*) the great sources of Power in Nature for the use and convenience (*benefit*) of man (*society*)"). However, they share the vision that the interpretation

"The core objectives of ICE do not currently equip engineers for development scenarios, and these should be changed to become relevant to this group." (PG).

of this definition must evolve to have greater resonance with the global development challenges of the 21st century, and to acknowledge the environmental limits and sustainability debate that has developed since Tredgold coined his famous phrase.

Many felt that ICE should do more to raise awareness of development and societal issues amongst its membership. Commentators suggested that ICE should bring the debate into the mainstream through measures such as speakers at local evening meetings, articles and case studies in the NCE and journals, and by offering articles to local association newsletters, and so on.

Diversity was also seen as an important issue, with the recommendation that ICE continue its work on diversity to change the membership profile of the ICE and ultimately that of the whole the engineering profession.

"ICE should open a debate on engineering ethics and codes of practice (TM).

Finally, several commentators talked about business and ethics. The general view was that ICE should also support work in this area carried out by others, in particular by Transparency International.

6.1.2 Capacity Building in Sister Organisations

Several commentators, including the ADP, felt that the ICE had an important role in relation to sister organisations in developing countries. The ADP recommended that ICE should work to support and empower indigenous professional organisations in LDCs.

“Development within LDCs is something we are invited to participate in, not something we drive.” (PG)

“ICE should assist national institutions to gain recognition from their governments and to work with these in setting policies for meeting the MDGs.” (BR)

It was also suggested that the ICE should develop the role of its Country Representative network to empower indigenous ICE groups, and encourage and contribute to north-to-south and south-to-south knowledge exchanges (for example, in the manner of the Australasian Virtual Engineering Library

(<http://avel.edu.au/>), and now being extended by UNESCO / WFEO into a Virtual Engineering Library for Sustainable Development (VELSD)))

6.2 Youth and Experience, Education and Professional Formation

A lot of material and comment centred around how to harness the energy and enthusiasm of younger engineers for development, and how to bring value to this through the experience and wisdom of older engineers.

At the moment engineers are all educated to Northern standards, which are not appropriate for all settings (PG).

Related to this were concerns about education, and some commentators felt that ICE should work with others to change the way engineers are educated and qualified.

We should bring poverty awareness into education and professional formation (TM)

“Some form of mentoring for young engineers or shadowing of experienced engineers would be very helpful.” (SS).

“Promotion of links between senior (retired) and younger engineers with experience is achieved through the ‘Design that matters’ scheme in US. This could be replicated by ICE in the UK.” (AL).

Encouraging industry to allow volunteering breaks for young and older engineers would be beneficial for all.” (TM)

To ensure that young engineers were genuinely helpful various schemes were suggested through which they could benefit from the knowledge of experienced practitioners. It was emphasised that this is not about “Gap Year Engineering” - simply as an “experience”. It was also noted that keen volunteers on short-term contracts or placements may not always be effective. Even where such projects are effective they will never be a complete substitute for long-term development commitment.

People from several areas commented that it was hard for young engineers to get overseas experience without getting behind (in terms of their career development) or getting into debt.

“ICE should actively encourage or get involved in creating some CPD options relevant to work in developing countries.” (SK)

“Experience in engineering development could be made to be a required a phase of working towards chartered status (equivalent to Houseman phase in medical traininn) ” (PGm)

“ ‘Context Modules’ should be a part of the final year of engineering, covering politics and so on.” (PC)

“We should provide training in ‘Urban Management Skills’ for engineers.” (JK)

It was also suggested that ICE should help Lesser Developed Countries (LDCs) establish undergraduate courses and PG research to meet their development challenges themselves.

6.3 ICE Support for Related Initiatives

It was recognized that ICE could provide valuable support for others, either through advocacy at a high level, or more practically through providing resources. Some of the suggestions made are given below: -

It seems that there is no unified list of voluntary organisations (e.g. such as RedR, VSO, Engineers without Borders, etc.) that need engineers, and the type of skills that they require. Therefore it would be very helpful if ICE could provide and manage such a network. This might have additional benefits to ICE in terms of its commitment to membership – offering a service to young members that more immediately mapped on to their needs and values.

“Engineering without Borders provides a route for young engineers to contribute meaningfully to development. ICE could support this organisation by providing desk space and providing some administrative resource to embed them into the ICE family.”

ICE could also help support and develop a Module on Development Engineering (distance learning or otherwise).” (AL)

ICE could set up an exchange scheme enabling UK engineers to undertake exchanges with developing country engineers. (PGm)

At a more strategic level, ICE support or leadership towards a joint initiative from professional bodies (including sister engineering organisations and banking and insurance sectors) advocating pre-emptive action in favour of Disaster Risk Reduction could do much to highlight this issue to governments worldwide.

As already mentioned in section 6. 1, it was widely agreed that ICE should support work in business and ethics carried out by others, in particular by Transparency International.

6.4 Harnessing the Power of Industry

The ICE should consider how it could support development through the power of industry. EwF work on procurement, delivery models and contracts will help to address this important area.

What is needed is development consultancy that advocates company involvement in slum development on a commercial basis (AL)

6.4.1 Design / Approach and Appropriate Standards

Traditionally, engineers plan, design and implement major primary infrastructure, which has mainly benefited established middle/upper income people. To meet basic needs of the poor, different engineering skills will be needed

In addition, the imposition of inappropriate standards is getting in the way of the delivery of infrastructure – it could be argued that design standard are often too stringent and results in designs which are unaffordable on the spatial scale necessary. Appropriate development engineering must allow for design failure.

The use of low-cost, renewable, locally available materials for durable, affordable housing and infrastructure needs to be promoted through (local) design standards, and not inhibited by them. (e.g. bamboo, earth, timber, vegetable fibres, rice husk ash, etc.). (RNS)

There needs to be improved engagement of engineers in the whole design of schemes not just in the technical specification. (PG)

The rapid growth of urban areas, in predominantly poor areas was a recurring theme. Development plans need to address not only current needs but should also deal with continuing growth of urban areas. Decentralization of delivery capacity will be essential if the MDGs are to be achieved, and the engineering sector should find ways to support the capacity building this requires.

In some cases local delivery will be through the increased use of non-engineers and primary engineers, but they need to be trained in the use of appropriate techniques and supported. (PG)

Is there a role for self-help groups such as The Barefoot College in India – www.barefootcollege.org and if so what might the ICE do to support their establishment? (JE)

LDCs need engineers with broad based skills in planning, design, implementation, operations and maintenance of infrastructure – i.e. Urban Management. (JK)

If public services are to be contracted out to the private sector, then there is an urgent need to build capacity in local governments to be able to properly manage such contracts (otherwise there is the danger that they will only serve the wealthy (J K)

Finally, for engineering projects to become more sustainable a broad remit is needed right from project inception. This remit must address the social context within which infrastructure will be used and the actual desired outcomes, not just the artefact(s) that relate to those outcomes. (This approach is illustrated in the growth of accessibility planning, not just road and transport planning).

6.5 The MDGs: Critical Roles for the Engineer

Engineers are needed not only at individual project level but are also critically important in strategic planning for development. The ICE should promote and support activity in its members at these levels by promoting the following strategies.

1. Engineers should work with other professionals to promote and support the adoption of pro-poor programmes by national governments.
2. Engineers should contribute to national / regional poverty reduction strategies and programmes.
3. Engineers should work with local agencies to develop sustainable engineering solutions.
4. Engineers should contribute to Capacity Building in LDCs by providing advice to local engineers and SMEs that wish to be involved in the Design, Implementation, Operation and Maintenance (DIOM) of infrastructure programmes or production of local construction materials.
5. Engineers should direct work in the DIOM of water, sanitation, roads, footpaths, drainage, waste management, etc.
6. Finally, expatriate engineers should contribute to training programmes for local counterparts so that their role can eventually be provided by indigenous engineers.

One of the key role of engineers in development should be to provide advice, capacity building and support to municipalities in LDCs (JK).

6.6 ICE – Key Debates and High Level Lobbying

Involvement in high level issues will always have the potential to be controversial. However, the ICE should be bold and, at the very least, consider the position that it wishes to take on some of these issues. Privatisation of services, notably water and sanitation, is one such key issue. The ICE could consider an open debate on the privatisation of utilities, perhaps with a view to establishing a (voluntary) code of conduct for members.

The ICE should work with others including DfID, professional bodies and the WFEO to support concepts such as Disaster Risk Reduction.

On the UK front, many contributors to EwF support the appointment of a Chief Engineer to advise the government on infrastructure and related matters.

“The ICE should urge the UK Government to set up an Infrastructure Commission in the UK – i.e. a route for engineers to advise government on the best means of providing infrastructure for society’s needs.” (RB)

Where appropriate, the ICE’s stance and action on high level issues should be communicated to politicians and others, using the ICE’s Communications and Marketing Directorate.

“We need to examine whether the opening of water markets to the private sector under GATS will help or hinder achievement of the MDGs.”

“We also need to research and understand the wider politics and impacts of water provision: the introduction of piped water may in some cases threaten the land tenure of the poor.” (PC)

7 Conclusions

“Our ignorance is not so vast as our failure to use what we know.”

M. King Hubbert, Geophysicist

A wealth of material, research and experience exists that can inform our actions to ensure global development and sustainability. Much of this material has been known for over ten years, some for over twenty or more.

However, neither information, or experience or knowledge will guarantee either change or improvements in the status quo without the will to make things happen

EFW has reviewed the challenges set by global society to achieve the MDGs by 2025: these challenges are immense and require radical solutions. As engineers we have often been frustrated by the *lack of opportunities* to make progress so far. So we propose that the real challenge is one of *implementation*. We believe that engineers can, through engaging with others, create a *vision-and-action plan* of **how** the MDGs can be delivered *on time* (by 2025 at the latest), *to budget* (within financial, social and environmental resource constraints) and *to the required quality* (maximising social quality-of-life and environmental conservation).

The Commission hopes that some of the recommendations made in this report will be taken on wholeheartedly by ICE to help shape an institution and service that is intelligently placed to help deliver the key goal of this century – global sustainable development for all, and the alleviation of poverty.

“Change happens when people who do not normally speak are heard by those who do not normally listen” *J. D. O’Brien*.

8 Annexes:

Annex One:	EwF terms of Reference, and List of Members and Advisors
Annex Two:	Bibliography,
Annex Three:	Survey of views of the ICE membership
Annex Four	EwF Evidentiary Hearing

8.1 Annex One: Terms of Reference, Members and Advisors

8.1.1 Establishment and Terms of Reference

The ICE Council established the EwF Presidential Commission at its meeting on 15th December 2003 (paper C/5/2004) with detailed terms of reference set out below.

- a. To identify and understand society's expectations of engineering in the UK and beyond.
- b. To identify, review and understand the key drivers for change and the corresponding needs (human, technical, financial, organisational) within and beyond the engineering profession.
- c. To identify those Millennium Development Goals and Sustainable Development Goals where engineers can play a key role and to develop effective mechanisms for their delivery, including the role of the ICE, its Boards and Panels.
- d. To identify and develop appropriate partnerships.
- e. To map the required responses onto an action and communications plan for change.
- f. To assess the impacts of the international agenda on the ICE
- g. To seek additional 3rd party funding to support the study.

8.1.2 EwF Members

First Name	Surname	Affiliation/ Organisation	Role	e-mail
Paul	Jowitt	Heriot Watt University/SISTech Ltd	Chair	paul.jowitt@sistech.co.uk
Jonathan	Essex	WSP	Member	Jon.Essex@WSPGroup.com
Peter	Guthrie	University of Cambridge	Member	pmg31@eng.cam.ac.uk
Annie	Hall	CITB	Member	Annie.Hall@citb.co.uk
Lisa	Kelvey	President, European Young Engineers	Member	lisa.kelvey@arup.com
Bobby	Lambert	Director – RedR	Member	Bobby@redr.org
Robin	Nicholson	Edward Cullinan Architects	Member	robin.nicholson@edwardcullinanarchitects.com
Clare	Short	Member of Parliament	Member	shortc@parliament.uk
Kate	Beckmann	SISTech Ltd	Technical Support	kate.beckmann@sistech.co.uk
Andrew	Crudgington	Institution of Civil Engineers	Technical Support	Andrew.Crudgington@ice.org.uk
Tony	Ridley	Former ICE President, WFEO	Special Advisor	t.ridley@imperial.ac.uk
Haro	Bedelian	ICE VP	Special Advisor	hbedelian@aol.com
Peter	Cameron	Chair, ICE Appropriate Development Panel	Special Advisor	pcameron@cornwall.gov.uk
Graham	Setterfield	Chair, ICE Water Board	Special Advisor	graham@setterfield4.co.uk
Peter	Hansford	Nicholls Group; ICE Finance Committee	Special Advisor	peter.hansford@nichols.uk.com
John	LaRoche	Water for Survival (NZ)	International Advisor	johnlaroche@slingshot.co.nz
Tony	Marjoram	UNESCO	International Advisor	t.marjoram@unesco.org
James	Moody	International Young Professionals Foundation, Australia; TF10.	International Advisor	jimmy@ieee.org
Don	Roberts	Engineers Without Borders-USA	International Advisor	donvnroberts@earthlink.net
Bill	Rourke	Institution of Engineers (Australia)/WFEO	International Advisor	brouke@pcug.org.au
David	Thom	WFEO, IPENZ	International Advisor	dthom@ihug.co.nz
Lee	Yee-Cheong	TF10, WFEO	International Advisor	lyeec@pc.jaring.my

8.2 Annex Two: Bibliography of Reports and Initiatives

Development

UN Development Programme - MDGs: <http://www.undp.org/mdg/>

The Millennium Development Goals are an ambitious agenda for reducing poverty and improving lives that world leaders agreed on at the Millennium Summit in September 2000. For each goal one or more targets have been set, most for 2015, using 1990 as a benchmark.

The Millennium Project <http://www.unmillenniumproject.org/html/about.shtm>

UN Secretary-General Kofi Annan and the Administrator of the UN Development Programme (UNDP), Mark Malloch Brown, have launched the Millennium Project to recommend the best strategies for achieving the MDGs. The website also has reports from some of the ten Task Forces of the Millennium Project

UN Department of Economic and Social Affairs: Division for Sustainable Development:

<http://www.un.org/esa/sustdev/index.html>

The Division for Sustainable Development serves as the substantive secretariat responsible for servicing the Commission on Sustainable Development; for follow-up of the implementation of Agenda 21 as well as the Plan of Implementation (POI) of the World Summit on Sustainable Development.

UK Department for International Development: <http://www.dfid.gov.uk/>

There is also a DfID site about sustainable livelihoods : <http://www.livelihoods.org/>

The Commission for Africa.

UK Commission set up by Tony Blair on Feb 26th 2004, to be chaired by Tony Blair, and overseen by Hilary Benn.

The Prime Minister has launched a new initiative - the Commission for Africa - to take a fresh look at the challenges Africa faces in the context of the global forces in play in the 21st century. The Commission aims to generate increased support for the G8 Africa Action Plan and the New Partnership for African Development (NePAD).

Engineering and Development

Engineering For A Better World: Engineering and Technology for International Development.

To promote capacity building in engineering and technology for poverty eradication, secure and sustainable social and economic development

Proposal coordinated by the World Federation of Engineering Organizations and the American engineering community in conjunction and cooperation with the Basic and Engineering Sciences Division of UNESCO.

See: - <http://www.wfeo-cee.org/news/v23n4.htm>

Engineering for Sustainable Development

This report details the contributions that engineers' can make to sustainable development and outlines the contributions that engineers have made towards sustainability since the [Rio Summit in 1992](#). The report summarises the ways that engineers can more effectively meet the goals of the Rio Summit's action document, [Agenda 21](#). You can download the report or request a CD at:

<http://avel.library.uq.edu.au/rio.html>

Finance, Privatisation and Development

The International Finance Corporation (IFC) promotes sustainable private sector investment in developing countries as a way to reduce poverty and improve people's lives. <http://www.ifc.org/about>

Development NGOs: Research into Privatisation and Poverty: Does PSP Benefit the Poor? WaterAid and Tearfund 2003
http://www.wateraid.org.uk/in_depth/policy_and_research/private_sector_participation/default.asp

War on Want have worked with other bodies to produce a series of reports on privatisation and poverty. To see their work and reports use <http://www.waronwant.org/?lid=6533>

Global Sustainability

World Watch Institute: <http://www.worldwatch.org/>
The Worldwatch Institute is an independent research organization that works for an environmentally sustainable and socially just society, in which the needs of all people are met without threatening the health of the natural environment or the well-being of future generations.

AVEL: <http://avel.library.uq.edu.au/about.html>
AVEL Sustainability Knowledge Network is an Australasian-based portal and brokerage service for engineers, other professionals and researchers concerned with sustainable systems. It is also a resource for students in senior secondary and tertiary education. The Sustainability Knowledge Network is the logical development of the award winning Australasian Virtual Engineering Library (AVEL).

Engineering and Sustainability in UK

ICE, RIBA, CABE have all written extensively in this area. Examples include:

Whither Civil Engineering? The Institution of Civil Engineers, 1996

For information on current relevant ICE projects and reports go to: -
http://www.ice.org.uk/knowledge/specialist_community.asp
http://www.ice.org.uk/knowledge/specialist_environment.asp

Sustainable Communities: Quality with Quantity: RIBA, September 2004
CABE: Housing Audit: Assessing the Design Quality of New Homes, October 2004. Copies of the report are available to download at - www.thehomebuyersguide.org
The Egan Review: Skills for Sustainable Communities, April 2004. Available to download at:
http://www.odpm.gov.uk/stellent/groups/odpm_urbanpolicy/documents/page/odpm_urbpol_028549_hcsp

8.3 Annex Three: Survey of the ICE Members on EwF issues

Just short of 700 ICE Members completed the survey, with expertise in a wide range of different specialisms, varying from coastal engineering through to waste management.

Current Problems

How serious are the issues affecting civil engineering at present?

Civil engineers regarded all these issues as serious. The top three-four were:

- Failure by public and politicians to understand the importance of infrastructure
- Lack of basic infrastructure in developing countries
- Public claims compensation culture
- Short termism

	Not at all serious	Marginally serious	Serious	Very serious	Extremely serious	Response Average
Globalisation of engineering design - international design offices	39% (190)	34% (166)	17% (86)	9% (42)	2% (8)	2.01
Lack of investment funding	3% (14)	18% (91)	39% (197)	32% (163)	9% (46)	3.27
Public perception that engineering is ugly and environmentally damaging	6% (33)	29% (149)	32% (166)	24% (124)	9% (46)	3
Skills shortage – lack of people	5% (23)	21% (108)	30% (153)	31% (156)	14% (71)	3.28
Skills shortage – lack of breadth or depth of skills	4% (19)	17% (90)	35% (181)	29% (152)	15% (75)	3.34
Lack of maintenance funding	1% (6)	14% (73)	38% (200)	32% (166)	14% (75)	3.44
Short termism	1% (4)	12% (60)	31% (159)	39% (196)	17% (86)	3.59
Public Claims / Compensation culture	4% (20)	19% (97)	25% (129)	34% (177)	18% (93)	3.44
Developing countries: lack of basic infrastructure	3% (13)	11% (54)	28% (143)	35% (178)	24% (122)	3.67
Failure by public/politicians to understand importance of infrastructure	1% (3)	5% (28)	20% (103)	44% (228)	30% (156)	3.98

Future Challenges

How serious are the future challenges facing civil engineering in the 21st Century?

Engineers were tending to focus on the shorter-term problems

- Access to safe drinking water and sanitation in the developing world
- Energy crisis – where there has been much debate in the both professional and public media about growing dependence on oil supplies from politically unstable nations.
- Poverty reduction in the developing world through appropriate engineering.

One might have expected problems such as climate change to have figured more highly given the level of press coverage. However the rankings appear to give weight to the more immediate problems that are capable of disrupting societies.

The under 25 age group were significantly more concerned about the challenges than engineers as a whole

	Not at all serious	Marginally serious	Serious	Very serious	Extremely serious	Response Average
Developing world: access to safe drinking water and sanitation	0% (0)	3% (18)	23% (119)	36% (187)	37% (194)	4.08
Energy crisis / security of supplies	0% (2)	8% (40)	29% (150)	37% (193)	25% (131)	3.8
Developing world: poverty reduction through appropriate engineering	0% (2)	9% (48)	37% (191)	34% (175)	19% (95)	3.61
Transport: congestion	1% (7)	13% (67)	37% (192)	34% (178)	15% (76)	3.48
Waste: inadequate treatment and disposal capacity	1% (7)	17% (86)	40% (207)	28% (147)	13% (69)	3.36
Climate change: drought	2% (8)	18% (91)	39% (203)	27% (140)	14% (74)	3.35
Transport: obesity – decline in walking & cycling	6% (31)	19% (96)	30% (153)	31% (158)	15% (79)	3.31
Water: persistent biochemical pollutants in rivers and water supplies	2% (8)	20% (102)	38% (194)	28% (145)	13% (67)	3.31
Water: supply shortages	2% (9)	19% (98)	38% (197)	30% (154)	11% (59)	3.3
Climate change: rising sea levels	3% (16)	26% (136)	38% (197)	22% (114)	10% (53)	3.1
Lifestyles: poor quality urban environments	3% (15)	25% (126)	42% (213)	24% (123)	7% (35)	3.07
Climate change: in-land flooding	4% (19)	27% (138)	40% (208)	21% (106)	8% (43)	3.03
Transport: road deaths and injuries	4% (19)	28% (144)	39% (199)	21% (106)	9% (46)	3.03
Infrastructure : fair provision for rich and poor	8% (39)	25% (128)	37% (192)	22% (114)	8% (43)	2.99

What do you think is the likelihood these same challenges will be tackled successfully?

Engineers are pessimistic about problems being anticipated. The experience of history is that society tends to wait for a crisis to develop before taking action. Currently a majority of Civil Engineers expect there to be crises in:

- Safe drinking water and sanitation in the developing world
- Poverty reduction in the developing world
- Energy
- Drought
- Rising sea levels.
- In land flooding

It is interesting to note that the over 56 age group tend to be more pessimistic than average about action being taken to avoid problems.

	Not a concern - No action needed	Effective and timely action	Some anticipatory action	Action following crisis	No action until major irretrievable disaster	Response Total
Developing world: access to safe drinking water and sanitation	0% (0)	6% (32)	40% (204)	42% (216)	11% (57)	509
Developing world: poverty reduction through appropriate engineering	1% (7)	6% (30)	35% (177)	40% (201)	18% (91)	506
Energy crisis / security of supplies	1% (3)	8% (39)	30% (154)	49% (249)	12% (63)	508
Climate change: drought	1% (7)	4% (20)	29% (147)	48% (244)	18% (91)	509
Climate change: rising sea levels	2% (12)	6% (28)	35% (177)	36% (183)	21% (106)	506
Climate change: in-land flooding	3% (14)	8% (38)	36% (180)	40% (200)	14% (72)	504
Infrastructure : fair provision for rich and poor	10% (52)	8% (38)	34% (167)	28% (140)	20% (99)	496
Lifestyles: poor quality urban environments	5% (24)	8% (41)	50% (251)	29% (147)	8% (39)	502
Transport: congestion	1% (3)	8% (41)	53% (267)	33% (165)	6% (31)	507
Transport: obesity - decline in walking & cycling	6% (32)	7% (37)	41% (206)	34% (173)	11% (56)	504
Transport: road deaths and injuries	5% (25)	17% (87)	47% (237)	24% (121)	7% (34)	504
Water: supply shortages	1% (6)	9% (45)	45% (226)	38% (191)	7% (35)	503
Water: persistent biochemical pollutants in rivers and water supplies	2% (10)	10% (53)	34% (173)	37% (188)	16% (81)	505
Waste: inadequate treatment and disposal capacity	1% (4)	12% (59)	42% (212)	36% (180)	9% (45)	500

What are the most important technological developments that are needed to address these challenges?

Comparing different age ranges showed that younger people tended to be more concerned about the challenges, but more optimistic about the remedy.

	Least Important			Most Important			
Resource Management: whole life approach to design, recycling, re-use of materials & structures	1% (3)	4% (21)	20% (101)	41% (207)	35% (175)		4.05
Energy: Energy efficiency	0% (1)	3% (13)	27% (137)	36% (183)	34% (175)		4.02
Energy: Renewable energy technologies eg solar, wave, wind	1% (4)	8% (40)	21% (107)	35% (180)	35% (179)		3.96
Appropriate Technology and Design : Buildings and infrastructure fit for purpose	0% (2)	6% (28)	29% (146)	41% (208)	25% (125)		3.84
Water Supply: minimum water usage technologies	1% (3)	9% (45)	26% (133)	44% (222)	20% (102)		3.74
Transport: Low emission vehicular transport	0% (2)	11% (57)	31% (159)	37% (187)	20% (102)		3.65
Energy: nuclear fission or fusion	7% (33)	20% (98)	34% (171)	26% (128)	14% (71)		3.21
Climate Change: carbon dioxide storage technology	6% (30)	21% (102)	41% (201)	24% (120)	8% (39)		3.07
Flooding: SUDS	3% (16)	24% (115)	45% (216)	23% (112)	4% (20)		3.01
Emergencies: Terror-resistant infrastructure	8% (40)	25% (125)	39% (195)	21% (104)	8% (38)		2.95
Transport: ITS (Intelligent Transport Systems)	6% (28)	30% (149)	39% (197)	21% (105)	5% (23)		2.89
Design: advanced software	8% (39)	33% (165)	39% (196)	16% (80)	4% (22)		2.76
GIS systems	9% (41)	34% (157)	40% (181)	14% (65)	3% (12)		2.67
Construction: Offsite fabrication techniques	11% (55)	39% (195)	35% (176)	12% (60)	3% (13)		2.56

Policy Changes

What main policy changes are needed to ensure we get the most out of engineering in the 21st Century?

Here civil engineers held strong views about the policy changes needed including:

- strong global and national government that anticipates long term costs and benefits
- infrastructure planned and managed for the benefit of the whole community
- managing demand rather than always increasing supply

	Irrelevant	Marginally Important	Important	Very important	Vital	Response Average
Government: infrastructure planned and managed for the benefit of the whole community ?	0% (1)	2% (11)	20% (104)	44% (222)	33% (170)	4.08
Government: effective inclusion and involvement of communities in decisions ?	1% (7)	15% (74)	42% (214)	29% (146)	13% (67)	3.38
Government: strong global and national government that anticipates long term costs and benefits ?	1% (3)	4% (19)	20% (102)	44% (222)	32% (160)	4.02
Government: managing demand rather than always increasing supply ?	2% (9)	6% (30)	27% (139)	42% (212)	23% (119)	3.79
Government: sustainable procurement policy by government for buildings and infrastructure ?	2% (8)	13% (64)	34% (170)	36% (181)	16% (79)	3.52
Chief Engineer in government ?	7% (38)	15% (77)	24% (123)	30% (151)	23% (118)	3.46
Infrastructure regulator?	12% (58)	23% (112)	34% (170)	24% (120)	7% (36)	2.93
Royal commission on sustainable infrastructure ?	13% (66)	30% (149)	29% (145)	20% (101)	7% (35)	2.78
Engineering profession: development of appropriate engineering standards that enable sustainable construction ?	1% (3)	9% (47)	30% (154)	36% (181)	24% (120)	3.73

Skills

Sustainable Community Skills - how do you rate yourself?

In the final question of the survey, respondents were invited to rate themselves against the generic skills identified in the Report - Skills for Sustainable Communities.

	1 Awareness	2 Knowledge	3 Experience	4 Expertise	Response Average
Ability to create a vision.	14% (68)	35% (171)	44% (215)	8% (38)	2.45
Leadership to achieve buy-in to the vision	15% (74)	33% (163)	43% (213)	9% (43)	2.46
Communication	2% (9)	13% (65)	60% (298)	25% (123)	3.08
Teamworking	2% (8)	7% (32)	58% (283)	34% (168)	3.24
Project management	4% (20)	16% (81)	49% (241)	30% (149)	3.06
Process re-engineering	38% (183)	34% (160)	22% (103)	6% (30)	1.96
Understanding sustainable development	15% (72)	45% (224)	32% (158)	8% (41)	2.34
Effective financial management	12% (57)	27% (131)	46% (228)	16% (77)	2.66
Understanding the economics of development.	21% (102)	43% (215)	28% (140)	8% (38)	2.23
Understanding the processes of local democracy	21% (103)	40% (198)	28% (140)	10% (51)	2.28
Customer awareness	8% (38)	20% (98)	52% (259)	20% (99)	2.85
International issues and protocols such as the Millennium Development Goals, the Kyoto protocol, etc.	42% (206)	42% (207)	12% (59)	3% (16)	1.76

8.4 Annex Four EwF: Evidentiary Hearing

Improving the Contribution of Engineering to Millennium Development Goals

Friday 21 May 2004, 9.30am – 3.30pm
The Royal Academy of Engineering, 29 Great Peter Street, London, SW1P

An ICE Presidential Commission, “Engineering without Frontiers” is examining how engineers and engineering can best contribute to the delivery of the 8 UN Millennium Development Goals concerning poverty, education, gender, child mortality, maternal health, HIV/Aids, environment and global partnership.

To help the Commission develop its recommendations, key stakeholders have agreed to appear at a House of Commons select committee style inquiry to examine the following issues:

- **Education and CPD for Contribution to Development and Leadership:** What changes are needed in education and in CPD to better equip engineers to help contribute to development, and to have the potential for leadership?
- **Appropriate Structures in Industry:** What changes are needed to enable industry to support engineers who wish to contribute to development in some way
- **Appropriate Standards and Primary Engineering:** Are standards required to attract project funding creating a barrier to development and what are the alternatives? What are the merits of promoting and practising the concept of Primary or Local Resource Based Engineering?
- High Level Delivery Issues: **Examining project financing and procurement issues, politics and business issues**
-

Audience numbers for this free event are strictly limited and entry will be by ticket only.

Improving the Contribution of Engineering to Millennium Development Goals

21 May 2004, 9.30am-3.30pm Royal Academy of Engineering

Panel One: Education and CPD for Contribution to Development and Leadership

Witnesses:

Jon Prichard	Director of Membership, ICE
Andrew Lamb	Undergraduate, University of Cambridge
Sara Parkin	Programme Director, Forum for the Future

Interrogators: Bobby Lambert (Director RedR), Paul Jowitt (Chair Engineering without Frontiers ICE Presidential Commission), Linda Colman, Scott Wilson & ICE Graduates and Students National Committee

Panel Two: Appropriate Structures in Industry

Witnesses:

Gavin English	Managing Director, WSP International Management Consultancy
Liz Bridge	Tax Advisor, Construction Confederation
Celia Morris	HR Manager, Black and Veitch
Nicola McChlery	Engineer, Hyder Consulting

Interrogators: Bobby Lambert, Paul Jowitt, Linda Colman, Ian Bensted (Ex Thames Water)

Panel Three: Appropriate Standards and Primary Engineering

Witnesses:

Petter Matthews	Director, Engineers against Poverty
Theo Schilderman	International Team Leader, Intermediate Technology Development Group
Cryus Njiru	Research Manager, Water Engineering and Development Centre, Loughborough University
Peter O'Neil	Head of Knowledge and Research Programme, DFID

Interrogators: Bobby Lambert, Peter Cameron (Chair ICE Appropriate Development Panel), Jonathan Essex (WSP Group), Paul Jowitt

Panel Four: High Level Delivery Issues

Petter Matthews	Director, Engineers against Poverty
Tony Ridley	President of the Commonwealth Engineers Council, Former ICE President,

Interrogators: Bobby Lambert, Paul Jowitt, Haro Bedelian (ICE Vice President International)