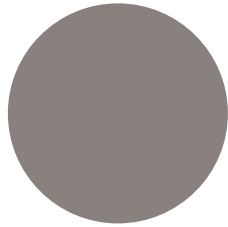


SUSTAINABLE

DEVELOPMENT

in the consulting engineering industry



INTERNATIONAL FEDERATION OF CONSULTING ENGINEERS

a strategy paper

The principle of sustainable development integrates the environmental, economic and social dimensions of human endeavour into a single, comprehensive concept. Consulting engineers are challenged by the concept, and must exhibit “out the box” thinking to accommodate the sometimes conflicting requirements.

This strategy paper, therefore, aims to precipitate a new approach that still ensures technical excellence but at the same time does so in an harmonious way, with due consideration given to the environmental, economic and social forces in our society. The consultant is forced to consider not only the best use of materials but also the maintenance and ultimate recycling or disposal of the products. The consultant must also consider the environmental, economic and social context of a project.

On a global scale, there is the question of the equitable use of resources for sustainable development, and in particular, the access to these resources by the less-developed nations. The fostering and promotion of the concept of equity among nations in sustainable development also represents a challenge that will test the ingenuity and ethics of all involved.

It is vital that clients and decision makers are kept fully informed and assisted in making sound decisions based on sustainability concepts. Who is better equipped than the modern consulting engineer with an expanded scope of services to provide this advice? Consideration should also be given to the changing role of government. Deregulation and the shifting of responsibilities to the private sector offers new opportunities. Consulting engineers should work closely with government and the private sector in developing and implementing instruments that support the consulting engineering industry's capacity to provide new types of professional services suited to the complex requirements of today's society.

FIDIC renewed its commitment to sustainable development at its annual conference in 1990 with the introduction of a policy statement on the environment. This was followed by the publication of guidelines and tools for environmental management. Detailed consideration of the economic and social dimensions of sustainable development was taken up in the 1997 FIDIC strategy paper *Engineering Our Future* that led to the creation of a task force charged with formulating the present strategy paper together with an action plan.

R. Wayne Bowes, FIDIC President, 1999 - 2001

sustainable development in the consulting engineering industry

FIDIC and its Member Associations are acutely aware of the magnitude and rate of change that is occurring in the technology-based consulting industry. FIDIC's vision, mission and objectives developed in the report *Engineering our Future* urge the Federation to adapt to these changes, and to position the industry as a major contributor to a sustainable future.

One of the Federation's objectives is to promote the industry's commitment to sustainable development. For this, FIDIC needs a strategy involving action at four levels:

FIDIC
member associations
consulting engineering firms
individual professionals

a world-wide shift

Today's standard

The Club of Rome's first report on *Limits to Growth* in 1972 brought widespread awareness of threats to the environment in much of the world. Environmental legislation was introduced in most countries. Monitoring techniques to analyse air, water and soil were developed to high standards. Engineering techniques and management tools for environmentally sound planning, such as environmental impact assessment and environmental management systems, were developed. They are standard today.

A broad scope

FIDIC, the international federation representing the consulting engineering industry world-wide, has had for many years a strong commitment to be among the leaders in proposing sound solutions for the environment. It will continue with this tradition by taking steps to promote sustainable development. FIDIC aims to broaden the scope of its involvement, where necessary, and to adjust to new conditions in the world-wide business arena.

Sustainable development

Overpopulation, cultural differences, the revolution in information technology, and changing economic patterns as a consequence of the globalisation and privatisation of production and services, have raised doubts about current approaches to environmental protection. The concept of sustainability made its breakthrough at the Rio de Janeiro Conference in 1992. It represented a new approach in conceptual thinking, where the social and economic domains have to be taken into account in addition to ecological considerations. Of course, one of the keys to a solution will remain the same, namely, a change in the management of natural resources, including energy. The approaches, however, will be much broader, and more complex, accepting the needs of lesser developed countries and different cultures.

With this world-wide shift in politics and society, sustainable development is a further step away from environmental protection taken in isolation. FIDIC must therefore reexamine its own activities.

FIDIC's commitment

In being aware that sustainability will increasingly become the most important criteria for project acceptability, the FIDIC report *Engineering Our Future* included among five main objectives the commitment to, and promotion of, sustainable development. Faced with the major and rapid changes in the role of the consulting engineer in society, FIDIC commissioned a Task Force to develop a strategic action plan to guide FIDIC. This action plan calls for changes to FIDIC's Statutes that will allow FIDIC to better represent both traditional and new participants in its industry. The Federation will identify ways in which sensitivity to environmental, socio-economic and risk issues can be incorporated into projects and consulting practice, leading to better solutions.

From FIDIC to the individual

The consulting engineering industry can act at several levels through individual professionals, companies, member associations and its international Federation. The challenge for the Task Force has been to identify the key potential fields for action, thereby assuring the development of a meaningful FIDIC policy. Some

objectives will be addressed at the project and company levels by consulting firms, or possibly at the public relations and political levels by FIDIC or its member associations. However, this strategy paper does not aim to give complete action plans for each level. Instead, it acknowledges the importance of member associations in creating national action plans adapted to national legislation and the cultural milieu.

A long-term perspective

From a long-term perspective, terms of reference should be defined for each area of action. These might yield different outputs: for instance, guidebooks and recommendations, or new terms of reference for FIDIC committees. In drafting guides, checklists and the like, the principles of environmental management tools incorporated in the International Standard Organisation's documents must be adopted by including features such as transparency and continuous improvement.

A precondition for any successful action is good governance at both the national and international levels.

the FIDIC strategy

Consulting engineers are aware that sustainable development has fundamental implications for their work and professional activity. Fulfilling basic needs must be tackled in such a way that today's solutions should not limit the capacity of future generations to meet their own needs. This underlying principle is founded on the need for long-term planning and on the concept of equity that was developed in the *Brundtland Report* of 1987.

FIDIC recognises that in adopting sustainable development, all aspects, including wealth and poverty, become inextricably linked. Although unable to meet all the challenges which arise, the Federation can make important contributions through its members.

The FIDIC strategy for sustainable development focuses on two main aspects, namely professional policy, comprising professional attitudes, public relations and co-operation, and professional services, comprising the services delivered by FIDIC members. Overall objectives and detailed strategies and action plans for each aspect need to be formulated.

Professional attitudes define the role consulting engineers should play in society, as reviewed in the report *Engineering Our Future*. In addition to providing technical solutions, the industry must:

- be alert to those issues in society that impact on the industry;
- prepare public statements reflecting FIDIC policy and strategies;
- encourage consulting engineers to participate in local affairs.

These objectives are in line with the trend towards increased participation during project development, where all parties and disciplines are integrated at the earliest stage. This active inducement of enhanced communication between stakeholders represents a new role for consulting engineers.

The professional services aspect includes a technology-based component that strives for eco-efficiency by supporting and adopting appropriate technologies. Equally important are management aspects leading to sustainable resource management and to the adoption of life-cycle oriented conceptual approaches.

overall objectives

professional policies and professional services

encompassing the three dimensions of sustainable development
- the environment, economic and social dimensions

Professional policies

To provide counsel and advice to ensure that sustainable development is achieved by balancing economic growth, protection of the environment and social progress.

To promote the development of sustainability impact assessment as a standard service provided by the industry.

To cooperate with the various actors in the processes of sustainability so as to provide the framework for implementing the sustainability approach that provides the basis for this type of service.

To safeguard the sustainable development approach by applying the FIDIC strategy in the early stages of project and programme development.

To build in-house capacity by adopting, providing and using methods, tools and technologies which enable firms to act flexibly.

To contribute to public policy by exploiting the unique abilities, experience and responsibilities of consulting engineers in liability, project management, risk management, and quality management.

Professional services

To maximise the use of, and develop technology for, methods to improve eco-efficiency and socio-economic development. In particular, to enable reductions in energy demand and greenhouse gas emissions.

To ensure acceptance of these technologies.

To support and promote policies, methods and tools that internalise external costs.

To foster relevant management tools, methods and processes.

To plan, implement and promote sustainable water, air and land management.

eco-efficiency

Eco-efficiency and sustainable resource management aim to achieve the optimum added value with the minimum input of energy and natural resources, while producing little waste, especially pollution, and securing society's acceptance.

objectives and activities

Detailed objectives and activities for professional policies need to be defined at various levels, ranging from FIDIC as the umbrella organisation for the consulting engineering industry, through to national associations and firms, and to clients and decision makers. Initiatives are then distributed between the various parties at each level.

environment	economic	social
PROFESSIONAL POLICIES		
professional attitudes	co-operation	public relations
PROFESSIONAL SERVICES		
technology	management	

professional policies

FIDIC

To promote international guidelines on ethics and the concept of sustainable development.

To promote at the various levels FIDIC's strategy for sustainable development in services supplied to government, local authorities, clients, and other decision-makers.

To ensure that sustainable development is a continual focus for national bodies in industry, commerce and infrastructure development.

To redefine the role of the consulting engineering industry and promote the industry's skills to private and public bodies that influence infrastructure development and the economy at large.

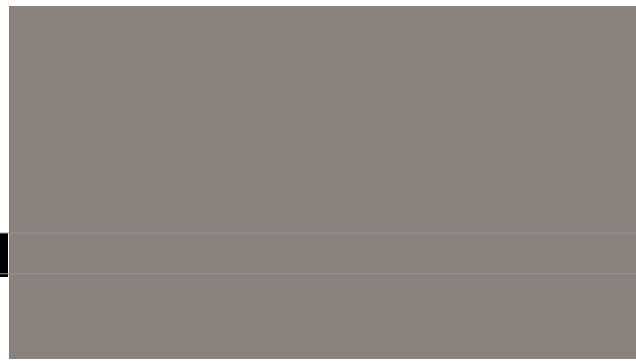
To liaise with and support other international organisations that subscribe to the common goal of sustainable development.

To promote co-operation with financial institutions, with sectorial and business organisations, and with international organisations, notably those responsible for social welfare.

To aim to achieve demonstrable progress in reducing energy demand and greenhouse gas emissions by supporting the instruments and commitments of international conventions and protocols on climate change.

To support Member Associations and member firms in adopting sustainability, encouraging them to take up FIDIC's goals.

To advance technical development and high standards of qualifications, performance and co-operation in the industry so as to achieve a more sustainable outcome.



Member Associations

To promote the FIDIC policies on sustainability to governments, national financial institutions, decision makers, non-governmental organizations, other industry sectors, and firms.

To encourage member firms and individual consulting engineers to promote the policy within their countries and among colleagues in the industry.

To undertake education, training and lobbying to promote sustainable projects at the national level and in countries with which there exist agreements on bilateral cooperation.

To encourage government and private enterprise to adopt the same goals.

To advance technical development and high standards of performance and co-operation in the industry to achieve a more sustainable outcome.

To promote the adoption of an environmental management system in all firms in their countries.

To require member firms to adopt FIDIC strategies wherever possible.

Member firms

To emphasise the interdisciplinary approach to providing services.

To develop a policy for sustainable development, stating the degree of involvement of upper management.

To involve employees in promoting procedures and state this in the company policy.

To establish training aimed at sustainable development.

To undertake planning in collaboration with the various stakeholders.

professional services

Having defined the system boundaries, detailed objectives and action plans for developing professional services can be drawn up for each of the sustainability dimensions.

Environmental dimension

Increase material efficiency by reducing the material demand of non-renewable goods

Reduce the material intensity via substitution technologies

Enhance material recyclability

Reduce and control the use and dispersion of toxic materials

Reduce the energy required for transforming goods and supplying services

Support the instruments of international conventions and agreements

Maximise the sustainable use of biological and renewable resources

Consider the impact of planned projects on air, soil, water, flora, and fauna.

Economic dimension

Consider life-cycle costs

Internalise external costs

Consider alternative financing mechanisms

Develop appropriate economic instruments to promote sustainable consumption

Consider the economic impact on local structures.

Social dimension

Enhance a participatory approach by involving stakeholders

Promote public participation

Promote the development of appropriate institutional frameworks

Consider the influence on the existing social framework

Assess the impact on health and the quality of life.

Feasibility studies and reviews

Feasibility studies of projects should incorporate the issues raised in this strategy paper, as well as the technical, economic, managerial, institutional, and social feasibility and the public acceptability.

This thorough feasibility review, followed by additional reviews based on sustainability concepts, will lead to more appropriate projects which are better able to meet tomorrow's demands than is usually the case today.

Generally speaking, comprehensive and proven methodologies for undertaking these reviews do not exist: they will be difficult - maybe impossible - to develop. However, an interdisciplinary approach involving the relevant spectrum of expertise will often be sufficient, provided the main issues are addressed.

Environmental dimension

Materials

Available resources do not allow the consumption of materials to continue to increase rapidly for ever. The rate of increase must be reduced and eventually brought to the steady-state level. However, economic growth and production are expected to continue to increase sharply in the foreseeable future. In order to achieve stability, we must therefore reduce the net consumption of virgin materials per unit produced very significantly over the next few decades. This will demand many different measures, such as a large increase in recycling, techniques to reduce the materials' input for each unit of product or service generated, the development of new products and materials, and the development of ways to increase or optimise the durability of products.

Toxic materials

The dispersion of toxic materials is generally believed to pose a major and increasing threat to nature and to human health. Focussing on the type and quantity of chemicals used in various materials is therefore very important for many types of projects. Mitigating measures include abandoning highly toxic chemicals by substituting less toxic substances, and the identification of alternative technological concepts that do not involve toxic chemicals.

Energy requirements

Virtually all processes in today's industrialised society involve energy consumption. The global increase in energy consumption is one of the major challenges for sustainability. The most important energy consuming components of projects must be reviewed to see if there exists the potential to reduce energy requirements. There are two basic strategies for enhancing this potential: one involves increasing energy efficiency in every possible way; the other aims to introduce energy sources which have a reduced environmental impact.

Renewable resources

It is generally believed that renewable resources, for example, biological resources, are more sustainable than non-renewable resources. However, this is only the case provided a resource is not over-exploited. If over-exploitation takes place, the entire production system (ecosystem) may be destroyed - which may be a much worse than the consequences of over-exploiting a non-renewable resource. So the careful management of all renewable resources is of the utmost importance.

Greenhouse gases

The impact of human activity on the global climate is no longer questioned. Fossil fuel combustion resulting in carbon dioxide emissions is the main cause of the enhanced greenhouse effect leading to an increase in the global annual mean temperature. Contributing factors are agriculture and changes in land use, including deforestation, as well as certain industrial processes.

The Kyoto Protocol of 1997 established overall emission targets for the six principal greenhouse gases. So-called Kyoto mechanisms are being developed so that companies can trade the emission allowances which are allocated by countries in accordance with the Protocol. Other Kyoto mechanisms are based on credits earned for emission abatement. Recent assessments show that the secondary benefits of reducing greenhouse gas emissions (for instance, reduced air pollution) may also be extremely important. However, conventions on climate policy are coming into conflict with the increasingly deregulated power supply and gas industries.

Economic dimension

Life-cycle costs

Costs as well as environmental issues must be considered from a life-cycle perspective. The reasons are clear-cut: a cost-saving measure in design and construction may increase significantly the cost of operation and maintenance, or reduce significantly the project lifetime. A realistic overall cost assessment for the client's benefit can only be made from a project life-cycle perspective. This approach is used infrequently today: it is also difficult to undertake in a precise and accurate way. However, there are no other alternatives for developing a sound basis for decisions.

Internalising costs

All major projects give rise to a large number and a broad variety of consequences for society, some of which will not affect the economic interests of owners or users while today's economic policies are in place. They may, however, affect the economic interests of other parties or stakeholders, as well as the environment. Such costs are termed external costs to the project. Generally speaking, they should be assessed since they can have major influence on the future of a project and on the return on investment. For example, they may increase stakeholder pressure for changing both the project design and local, regional or national policies, thus resulting in external costs being internalised in the project budget. Consequently, external costs, and the likely development of such costs, may have a major or even crucial influence on the long-term feasibility of a project.

Alternative financing

Identifying alternative financing mechanisms is always an option for engineering projects. Life-cycle cost assessments and the incorporation of external costs will make such considerations even more important in the future. This is because these life-cycle assess-

ments, in addition to external costs, provide a broader picture of the overall project budget and its implications.

Alternative financing models may then be viable, especially in a long-term perspective. For instance, assessments could result in a risk profile for a given project implying that public financing may be necessary because private investors could be reluctant to intervene.

Economic instruments

A variety of economic policy instruments may integrate a sustainability dimension into the economic decision making process. However, at the present time they mostly refer to the environmental dimension:

- environmental taxation (there is a trend towards comprehensive tax reform);
- ecological tax reform (revenues from environmental taxes are being used to reduce taxes on labour);
- sustainability asset management;
- subsidy reform (subsidies may have both damaging and beneficial impacts on sustainability);
- extended cost-benefit analyses;
- tradeable permits/joint implementation;
- "green" procurement and "green" accounting;
- voluntary and negotiated agreements.

In the long term, there may be a more radical shift away from taxing "goods" such as labour towards taxing "bads" such as environmental damage. The result of this shift to a combination of environmental taxes with a reduction in distortionary taxes may not only improve the environment but also yield positive economic benefits (the so-called "double dividend"). Although there is doubt that this dividend will materialise, it still makes sense to take advantage of the environmental and sustainability benefits of alternative tax structures, without counting on supposed economic benefits.

Social dimension

Stakeholder participation

A participatory approach is based on the premise that social issues and social acceptance cannot be analysed and agreed upon in the traditional setting. Therefore, the only path to acceptance and consensus in controversial situations is the active involvement of the relevant stakeholders in the development, planning and implementation of a project. The involvement must be credible to the stakeholders so the process must be very proactive, transparent and fair. Such features will ensure that stakeholders do not feel they are being manipulated. The working procedures for a participatory approach may be complicated, and demand a very professional methodology. However, the approach usually avoids conflicts and delays in the latter stages of a project. It also often leads to the introduction of new ideas for the design, development and implementation of a project.

Public participation

In many cases, all the relevant key stakeholders cannot be identified at the start of a project. A selective participatory approach is inadequate, and the participation of a large audience is needed. For large, complex infrastructure projects, a dialogue with the general public is

often necessary. This process involves general communication and information activities, contacts with the media, and the management of large public meetings. Once again, the dialogue must be proactive, transparent and fair, thus providing opportunities for genuinely interested parties to influence the outcome.

Institutional framework

Addressing the long-term social changes in local or regional communities brought about by projects often calls for institutional development, either in the form of new institutions or via changes in existing institutions. For example, it is frequently necessary to train public administrators in the handling of participatory processes. In other cases, the creation of well-functioning non-governmental organizations may be a precondition for a "public opinion" to be articulated, and thus hopefully dealt with. Establishing institutions to support vulnerable groups of people may play an important role in preserving social stability.

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Information of FIDIC's sustainability initiatives is available at FIDIC.org/sustainability

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