



RETHINK CITIES

A FIDIC/EFCA White Paper on sustainable urban development through a holistic approach
- cooperation, systems and synergies



Solutions for Unsustainable Development

The International Federation of Consulting Engineers (FIDIC) is implementing the consulting engineering industry's strategic sustainability message. Our world has been seriously weakened by unsustainable development and far-reaching consumption. Humanity faces serious environmental challenges including declining biodiversity, degraded land and soil, depleting natural resources, polluted air and water, and now severe climate risks.

The consulting engineering industry will commit to increase its contribution to society dealing with sustainability challenges. The International Federation of Consulting Engineers' (FIDIC's) '2013 pack for sustainability' will be used by the industry and its partners, and focus will be directed at urban environments, where some 75 % of the global environmental constraints are located.

A new approach to Sustainable Infrastructure is vital to our future qualities of life. The engineering industry has to and is formulating a holistic approach on the role of cities in addressing sustainability challenges. Consulting Engineers and Architects have a crucial role and unique possibility to play in this process, contributing to an environmentally sustainable society through research and development, knowledge sharing, planning, design, procurement, construction, operation, maintenance and recycling.

During the first decade of the 21st century, sustainability requirements progressively replaced environmental requirements, and considerable reference material emerged (laws and regulations, rating systems, standards, etc). In the meantime, more and more sophisticated technologies have been developed to tackle innovative solutions to energy, water and transport use in better coordinated ways.

The International Federation of Consulting Engineers (FIDIC) is promoting and implementing the consulting engineering industry's strategic goals on behalf of its Member Associations. Today, FIDIC membership covers more than 100 countries worldwide. The European Federation of Engineering Consultancy Associations (EFCA) is the European representative of the consulting engineering industry that designs a major part of the Europe's infrastructure and building construction. EFCA has member associations in 24 countries. Svenska Teknik&Designföretagen - The Swedish Federation of Consulting Engineers and Architects is the common trade and employers' association for Sweden's architects, building and engineering consultancies.



A “sustainability pack”

In 2004, **The International Federation of Consulting Engineers (FIDIC)** published the Project Sustainability Management Guideline (**PSM I**) to provide the industry with an approach in developing project specific indicators. In March 2012, a policy statement was issued on climate change, and in September 2012 a report on sustainable infrastructure, with a focus on decision making, was published. This report included a world overview of existing sustainability tools for infrastructure.

The consulting industry is well placed to deal with these developments and clarify the issues, in order for engineering consultants to offer the best services that fit with present and future demands from owners and from society.

Building on this previous experience, including partnerships with some international institutions (World Bank, UNEP, ISO, EU) a new “Sustainable Pack”, comprising three complementary publications, is to be published by FIDIC and EFCA the European Federation of Engineering Consultancy Associations. This ‘pack’ comprises; **“Rethink Cities”**- a white paper on societal challenges; **PSL@2013** - a tool to support owners and their partners with collaborative work on sustainability; and **PSM II** - a guideline for consulting engineers implementing major sustainability issues in projects.

An outline follows:

- **“RETHINK CITIES”** - EFCA/FIDIC 2013 WHITE PAPER presents the back ground resulting from major trends of societal development, in which projects or programs have to be developed within the next years. It clarifies that the increasing demands on sustainability are very often concentrated to cities. It demonstrates with many examples from engineering consultancy firms, the benefits that can be gained when considering interrelationships between urban functions and advocates for a systemic approach to cities.
- **PSL@2013, THE PROJECT PROGRAMME SUSTAINABILITY LOGBOOK**, proposes a common language on sustainability, to be shared by stakeholders, for selecting objectives and issues for specific projects /programmes and monitoring tables for collaborative works, and for their follow up all along the life cycle of the project. PSL, the Project Sustainability Logbook, published by FIDIC in 2012, in line with the PSM1 methodology, proposes tables for the selection of objectives and issues for specific projects and their monitoring all along their life cycle.
- Project Sustainability Management guidelines - **PSM II** is first and foremost, a list of core issues that engineers should consider when carrying out projects in a sustainable way, backed up by a number of processes for broad inclusion of stakeholder input. Each item in the list brings with it a set of perspectives, which are the sustainability considerations that affect the way these issues should be considered on the project. A good part of this manual consists of descriptions of these perspectives and an indication of possible project responses as well as logical links between the perspectives of different issues.



Sustainability considerations

Facing the facts - critical boundaries and ecological footprint

Alarming examples show us an environmentally disorientated world, in which global annual CO₂ emissions are increasing rapidly as the international community fails to come up with a functional plan to achieve meaningful emissions reductions.

Global emissions of carbon dioxide (CO₂) – the main cause of global warming – increased by 3% in 2011, reaching an all-time high of 34 billion tonnes in 2011. The past decade saw an average annual increase of 2.7%. The world's population has tripled since the Second World War and the global economy has grown ten-fold - humanity's biggest challenge in history might be minimizing threats posed by climate change. Cities have dominant effects on climate, the whole global environment and on their close regions, and thereby constituting key factors in our future development.

Today, over half of the world's population lives in cities covering roughly 2 % of the Earth's land area but using 75% of all energy and emitting 80% of all carbon dioxide. Infrastructure investments in many Western countries and cities are not at a desirable level compared to GDP, or they are steered in the wrong direction while many cities are growing faster geographically than population-wise. And the world's energy supply is still more than 80% dependent on fossil fuels. Energy use overall increases, and 95% of the energy use in the transport sector is used by fossil fuel-powered vehicles. Society has to "**rethink cities**" through evolving resource efficiency in cities with increased focus on planning and making social and economically attractive areas, well-functioning spatial structures and energy efficient systems.



The International Federation of Consulting Engineers (FIDIC) is promoting and implementing the consulting engineering industry's strategic sustainability message and consideration, where The Rethink Cities White paper strongly emphasizes the close relationship between:

Climate Risks – Infrastructure and Cities - Society's Economic Development

and stresses the following critical points:

- **climate risks** - the magnitude and scope of the sustainability challenges we face are much more serious and comprehensive than current policies and/or actions are addressing,
- **fight poverty**,
- improved **efficiency in the use of limited resources**,
- **reduction of fossil dependency**,
- **increased education, and enlarged cooperation** between developed countries, emerging economies and lesser developed areas,
- **end of systematic under investment in resource efficient and environmentally friendly infrastructure**,
- **resource efficient cities** through turning urban challenges into opportunities; optimize and integrate **environmentally friendly, climate resilient and resource efficient systems** for energy production, distribution and use; building and city structures, increased mobility and accessibility; water use and sewage; waste recycling etc, and
- **improved holistic and integrated approach to sustainability**; climate risks are global issues that necessitate shared responsibility.

Rethink Cities White Paper proposes an “urban toolbox approach” – through a holistic approach en route for over synergies for urban functions; optimize and integrate systems for energy production, distribution and use; water use and sewage; waste recycling; building and city structures, resource efficient mobility and accessibility, social inclusiveness etc.

“An Urban toolbox”



Turning urban challenges into opportunities

Climate risks and Sustainable growth is a shared responsibility - engineers, architects, planners and developers are uniquely placed to improve the built environment owing to deep experience and precedent.

Cities with their higher density also offer economically and geographically scale and basis for efficient public transport, recycling of water, waste and materials as well as for efficient energy production, distribution and use. However, the city's opportunities are irregularly realised. There are major benefits with creating cities with substantial efficient use of resources and where transportation and use of infrastructure is both effective and attractive, where land is used optimally and where the impact on water and the natural environment is limited. An environmentally friendly city has a sustainable energy system based on efficient and renewable energy end use in buildings, transportation and infrastructure, district-heating, closed cycles that utilize waste heat, waste, waste water etc. The city must also enclose green spaces that protect biological diversity and ecosystems. This requires increased investments, careful planning and improved infrastructure. Buildings must be designed to ensure that energy usage is limited through low heat losses, low cooling load, and the efficient use of heating, cooling and electricity.

Many energy and climate solutions are to be found in improved technology, synergies in system solutions, further expansion of environmental friendly infrastructure, efficient transport systems and properly constructed buildings and attractive, functional, well-planned cities. The total built environment (not just the individual buildings) requires sustainable overall solutions – that form synergies in solutions for society, buildings, infrastructure, and technical systems. This is necessary to facilitate their full potential in terms of efficiency and productivity, saving natural resources and reducing maintenance costs. Cooperation and synergies require more coordinated solutions, as well as new construction with better environmental performance, more energy efficient transport vehicles etc. By creating synergies between different solutions we can achieve a comprehensive approach. Sustainable development can both reduce emissions and cities' vulnerability to climate change and many impacts can be avoided, reduced or delayed.

Cities have a key role to play for addressing the challenge of climate change.

Urban functions

- the city as a whole (not just its buildings) well-functioning structure with sense of aesthetic values, land use, social and economic environment, energy efficiency, density and variation, adaptation to the local context etc.

Traffic and transportations

- attractive, environmentally friendly and energy efficient public resources of communication, a safe traffic environment for pedestrians and cyclists, accessibility for everyone, avoidance of traffic barriers etc.

Landscape, public space and biodiversity

- attractive areas for public life, play, green spaces and parks, biological diversity, protection of sensitive habitats and species, plantations, trees and water environments in the public sphere, protected residential yards, shaded locations, local management of storm water, the opportunity for public life and meetings, secure and energy efficient lighting.

Building design and construction

- energy efficient buildings – both new and existing - passive heating and cooling, sound, recyclable material and minimum quantities, maximum use of non-polluting/non-toxic materials and substances, environmentally-conscious building sites, optimisation of construction in relation to local conditions etc.

Energy production, distribution and use

- efficient energy end use, renewable energy generation, efficient distribution, storage and use, district heating and district cooling, combined production of power, heat and cooling, passive energy systems etc.

Water and sewage

- protecting water resources, minimising use of fresh water, reusing grey water; utilizing waste water energy for production of heat, biogas and nutritive substances; recirculation of nutrients, local management of storm water etc.

Waste

- infrastructure for recycling and energy production; reduction, replacement, recovery, composting, biogas production, incineration for energy production and, as a last resort, landfill.

ICT

- Information and Communications Technologies have the possibility to make energy use more efficient and encompass any communication device or application, including smart power grids, radio, television, cellular phones, computer and network hardware and software, satellite systems and etc.

Integrated planning methodologies

- integrated planning methodology that comprises physical planning, infrastructure planning, and environmental programming; but also public-private partnership, dialogue with users, purchasers, authorities and the public procurement; laws, ordinances and standards; participatory processes, certification, life cycle analyses and life cycle costs.

Smart living

- among other things, involves knowledge, information and communication; it must be easy to act correctly. Technical solutions facilitate changes when individuals take responsibility and make a contribution. For it to be of interest, the individual must be able to "interpret" and receive clear feedback on value creation.