



RETHINK CITIES

A FIDIC/EFCA White Paper for a holistic approach to urban development through cooperation, systems and synergies

FIDIC SUSTAINABILITY PACK



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”

Ecological

Social

Economical functions

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- Urban functions – a holistic approach.
 - Traffic and transports
 - Landscape and biodiversity
 - Building design
 - Energy production, distribution and use
 - Water and sewage treatment
 - Waste treatment
 - ICT Infrastructure
 - Administrative methodologies
 - Life style/Smart living

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.