

## GUIDELINES ON SMART, GREEN SOLUTIONS

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## The framework of liveability

Sustainability has for many years been the reigning planning regime – the best practice. But working with and developing sustainable solutions for more than 25 years, it is clear that upgrading of the methodologies for urban development and planning is needed.

Working with urban development and infrastructure as well is working in the very long horizon. Cities and the main infrastructure such as roads, rail, bridges, power plants, pipelines etc., will exist for 50–100 years or even more and will for this period set the baseline for future development. In this perspective, we cannot at all times be content with best practice as this is a conservative approach – the best that has been. But as we are planning and building for the next 100 years we need to adopt a “prospective” approach rather than “retrospective”.

## Sustainability as a tool

As described above, important tools for achieving liveability are sustainable and smart solutions, where the sustainable solutions include a large number of integrated parameters included in the adjacent figure. Any sub-solution has to be developed in the holistic context and appraised for compliance to the visions and objectives. A systematic set of KPI's have to be set up and an appraisal tool developed in order to follow and communicate the performance of each solution and the district as a whole. For example, the German-based DGNB district and buildings certification system is a recommended potential paradigm for the appraisal tool.

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Best practice solutions do not always take into consideration emerging or future conditions like e-trade, autonomous cars, 3D printing, enhanced PV utilization ...etc. The tenderer has to approach urban development from a perspective of investigating the future marked situation, the stakeholders, etc. to create a “**next practice**” for the actual project.

In this “next practice” for urban planning, liveability is the core as all development efforts in the end are related to creating a better life for people. People have consequently to be the core of the main objectives.



*Liveable city context within the DGNB certification system*

## Innovation as driver for “next practice” sustainable solutions

In most urban development and building projects, the aspiration is to identify best practice solutions. But in the case of the KHBP master plan, best practice will not comply with the ambitions. Therefore best practice has in any case to be considered as a foundation for developing next practice solutions. For example, how will the urban plan and land use accommodate a situation where on the short term transportation is serviced by cars and public transportation as we know it

today, but in the medium to long term perspective is dominated by autonomous and shared modes of transportation. Some time during the lifetime of KHBP, autonomous cars WILL be a reality and thus have to be included in the urban plan and building solutions. To accommodate for this the master plan has to be based on flexibility, coherence and resilience and innovation must be the prime driver in development of solutions.

## 5 innovation strategies

*Accredited GXN architects, Denmark*

Working with Five Innovation Strategies it will be possible to push the limits of research, design, and commercial application in the quest for Better Buildings and Better Environments for People.

### 1: **Green** design

Green Design Strategy is a mindset, where we are particularly sensitive to building design as it affects people, nature, and context. A regenerative approach will result in a positive impact on the local social, ecological, and economic spheres.

### 2: **Informed** design

Having the right information at the right time is essential for optimizing the design of districts and buildings with regards to liveability, sustainability and cost-effectiveness. Informed Design Strategies demands a structured development process identifying and engaging all stakeholders internal and external at the right time.

*“A regenerative approach will result in a positive impact on the local social, ecological, and economic spheres.”*

### 3: **Behavior** design

Evidence shows that the physical design of our surroundings have a significant impact on our lives. This obliges us to create cities tailored to human behavior. Behavior Design is integrating psychology and technology into the design of urban districts and buildings. This is an approach to optimize the district and building performance.

### 4: **Technology** design

Knowledge sharing and innovation between designers, consultants and industries, can create entirely new and competitive designs and products for the urban design. Technology Design Strategies include processes where learning from one technology and transferring specific qualities or characteristics into another, will result in new practices, new products or completely new use of existing technologies.

### 5: **Innovative and experimental** design

Setting the limits of imagination very high, creation of green and innovative development and design is imperative in all solutions. The engine behind Innovation and Experimental Design Strategies is the stretching of our imagination, taking design to the very edge of what is possible and still viable through the use of new holistic work processes, new materials and design technologies.

## Environmental green

Assessment and documentation of the environmental sustainability in the master plan will ensure that the total and local impact on the environment meets the vision and the required standards in terms of project specific KPI's. This includes the following criteria:

- a lifecycle impact assessment – buildings, infrastructure and energy,
- assessment of local environmental impact,
- land use assessment,
- water management and
- responsible procurement.

It is imperative that the assessment of the environmental green performance is followed through the urban development process. It is also imperative that the solutions are holistically assessed to ensure that sub-optimization of specific solutions



*Tanner Springs Park, Portland, USA. Design by Ramboll Studio Dreiseitl*

are not compromising solutions in another segment. For example that reduction of green field land use does not contradict with water management measures or urban green.



*Masdar City public realm and landscape design. Abu Dhabi Design by Ramboll*

## Technological green

Technological green solutions span from district level to the individual building and urban civil works and from the society level to the individual person. Technological green solutions must focus on the physical structures defining the frame around the good and daily life. These solutions are **smart** and **environmentally** friendly complying with the objectives of the project.

**Smart** city solutions must convey green technological, architectural and governance innovations. They must interconnect across sectors, citizens, businesses and organizations. And they must support social, cultural, economic and political development and behavior.

**Environmentally** green solutions must be holistically based covering the personal needs as well as the district/society's needs. Coherency is a key planning principle in this respect. Technological innovations must aim at developing the local industry, knowledge and employment.

Smart and environmental green solutions include:

- Urban quality and utilization
- Architectural and technical design
- Cultural and social facilities
- Energy solutions and consumption behaviour
- Waste handling and behaviour
- Water management
- Mobility management and systems
- Communication and safety
- Lifecycle, adaptive capacity and maintenance



## Local site – green innovation

The local district can face many different environment issues from the local vulnerability to climatic issues to the impact on the surrounding area and infrastructure. The new master plan must be perceived as a world class park and a showcase for the capability of the Jordanian business environment. The location is thus very exposed not only from a local point of view but also from an international perspective. The site and the mere appearance of the site and the buildings must convey high ambitions and high quality, both with respect to the buildings and urban civil works as well as the composition of the site and the built form.

The masterplan must address the issues of climate change and how the site plan, the site specific solutions and the built form contribute positively to the mitigation of climate change impacts. In particular, the site preparation plans and schemes are important in order to secure a coherent process and that the different components of the city are integrated in an optimized fashion.

Emphasis must be put on how the site preparation and optional stakeholder engagement can contribute to add value and salability of the building rights.

Special attention must be placed on innovative water management measures on a site basis. Water is a scarce resource and all precipitation must be harvested, stored and used for the most beneficial purposes.

Also attention must be directed at the prevention of heat island effects. Built-up areas can be significantly hotter than adjacent vegetated areas and can influence the energy consumption, peak energy demands, greenhouse gasses (GHG), air pollution, heat-related illness ...etc. Strategies preventing heat island effects must be developed and must serve multi purposes for example adding to the urban quality, water harvesting ...etc.



*Hans Tausens Park, Copenhagen, Denmark. Design by Ramboll*

## Socio-cultural and functional green

The socio cultural environment in an urban district is immensely important for the quality of life for the individuals populating the district. But it also impacts the business environment and the ability to attract high value enterprises as well as the ability to attract professional talents.

The socio-cultural quality amenities include the local culture and tradition, the ability to attract diverse cultural activities such as music, theater, art, knowledge building, networking events and simple social engagement.

To accommodate socio-cultural amenities events the urban district must integrate a diversity of social qualities and a functional infrastructure and architecture that together can be the natural venue for social interaction among people, businesses and the interaction between these. This socio-cultural interaction and engagement is the fertilizer for innovation and development.

*"This socio-cultural interaction and engagement is the fertilizer for innovation and development."*

Silicon Valley in California is one of the most significant examples of a successful socio-cultural and functional green district mixing knowledge, science, vibrant living, human scale into the world's most successful area of innovation and business development.

Important design elements to include, develop and document are:

- Aligning urban function and urban space
- Integrated urban design
- Functional coherence and connectedness
- Convey a mix of socio-cultural activities
- Temporal nature of design to accommodate for flexible use
- Urban space amenity
- Inclusive design
- Flexibility in use of urban spaces, streets and buildings
- Safety and security

*"As we are planning and building for the future 100 years we need to be 'prospective' rather than 'retrospective' and not be content with best practice"*



University Avenue, Silicon Valley, California

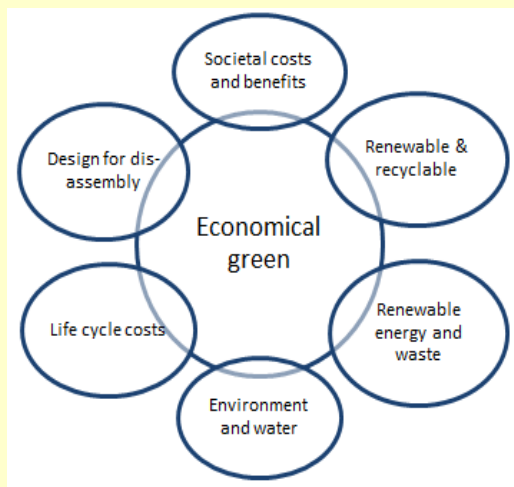


King Abdullah Financial District, Riyadh, Saudi-Arabia  
Design: Henning Larsen Architects, Denmark

## Economically green

Economic viability is one of the strongest drivers for development. Without investments and financial capital the project will not commence. Therefore, the economic viability and assessment must be an integrated part of all developments from the first ideas, through the implementation, further to the service and maintenance and finally to the regeneration of the building components.

But the economic viability cannot stand alone. The societal, environmental and economic performance combined with the physical structures are the key elements that create a sustainable society, and such a society should be fair, viable, liveable and coherent. Decisions regarding priorities, investments and future changes should be made in this context.



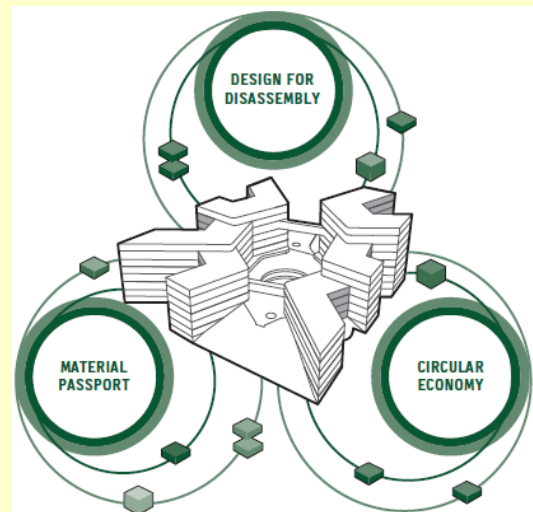
*Elements of "economical green" assessment*

Hence economic viability cannot be subject to sub-optimization neither in a fiscal nor in a temporal sense.

The full life cycle costs and benefits of the urban district and its buildings and other civil works must be documented and must be one of the convincing sales parameters.

The fiscal effects for the society, the investors and the tenants must be positive. This must be documented and communicated at least with respect to:

- The life cycle costs and benefits
- The societal fiscal costs and benefits
- The designed life expectancy of the civil works
- The risk profile for the investors and tenants
- Maintenance and service
- Dis-assembly and reuse



*Model for a circular future  
Design: GXN Architects, Denmark*



## Process

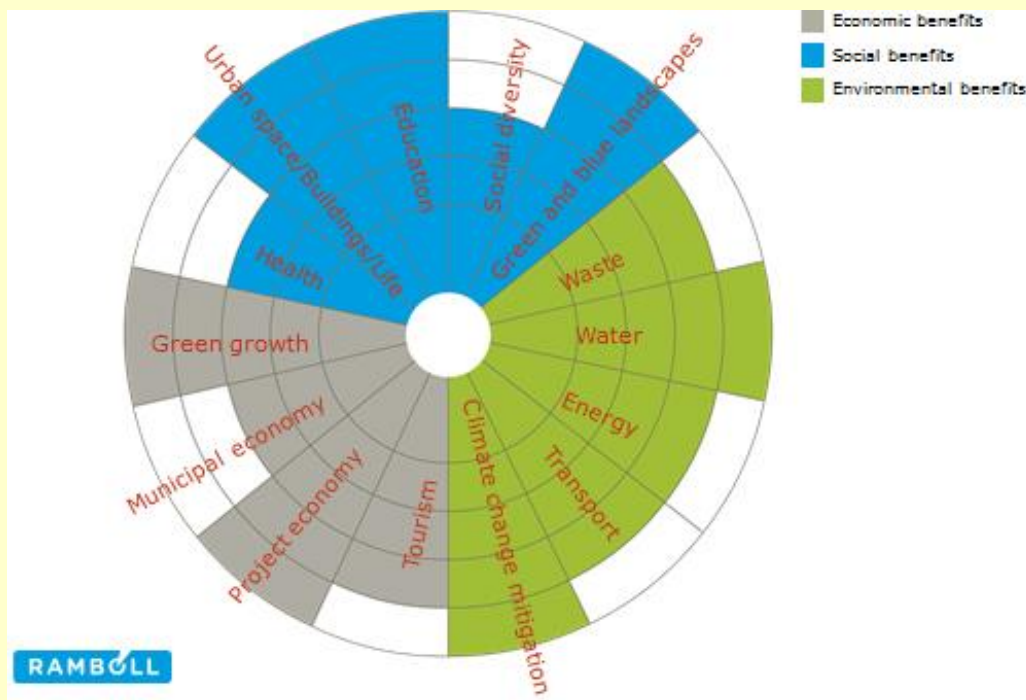
The master plan process must be regarded as an integrated part of the branding, communication and eventually sale of the project – to the authorities, to the public, to the investors and to the future residents and users.

Thus an important part of the process development is, apart from the necessary production and quality assurance process that is a natural request to a project, to establish a communication and branding plan including:

- Stakeholder mapping
- Stakeholder engagement and inclusion
- Public information and communication through traditional and social medias
- Public hearings and participation
- Municipal authority involvement

The process must be established on the basis of an overall operational vision and with the aim of integrating all sub-tasks of the project. Thus the process plan is the engine of the project and must be monitored, documented and reported between the sub-task operators, the project owner, the public stakeholders and the approving authorities.

An integrated part of the process management is to report the current sustainability performance of each sub element and the district as a whole. It is recommended to use a graphical representation of the assessment, but based on a solid and documentable calculation method.



*Example of an appraisal communication tool*

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