Watercolour 8
Dubrovnik: A Cultural Marvel by the Adriatic Sea

Chapter 8
Sustainable Regeneration of Coastal Cities

Abstract Urban renaissance usually tends towards an ideal nurtured with the ideas of all citizens. Better co-designed policies should help citizens to live more fulfilling lives. They should start with a shared vision for the future of the place they live in and the planet. Strategic, holistic, transparent, ecosystem-based planning and management should strive to make the vision come true. Spatial planning in search of the sustainable regeneration of coastal cities, of their physical parts and of their extraordinary diversity, should not stop at the edge of the water but also consider marine resources. Urban sustainability agendas have to address many spatio-temporal patterns, both on land and the sea. Time is a scarce and precious resource and can serve as the litmus test of the well-being of societies. Local time plans can enhance the capacities of cities and improve resource allocation and quality of life for inhabitants and visitors. Urban observatories and sustainability indicators should take the pulse of coastal cities and their citizens and serve as compasses in the journey towards sustainable development.

This chapter sheds light into the dynamics of coastal renaissance for optimisation of urban functions on land and the sea, in the context of multiple pressures such as climate changes, natural hazards, erosion, and increased maritime activity. Citizens can play a decisive role in shaping vital urban spaces and forging bonds out of degraded spaces, including harbour infrastructures and disused seafronts that turn their back to the sea and the world. Distressed peri-harbour areas should be transformed into vibrant inclusive communities which can withstand shocks and attract sustainable activities. Symbolic and public and cultural projects on the waterfronts can promote collective life and local democracy and bring more value to places.

8.1 Urban Renaissance and Healthy Coastal Ecosystems

In the path to sustainable development, coastal cities hold a high potential to reinvent themselves. Each city is a living organism with infinite possibilities of regeneration. The factors of renewal multiply in coastal maritime and deltaic cities where the highest number and variety of land and sea ecosystems interact. Coastal cities are

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not simply concentrations of people and activities on land and the sea, but hives of intense relationships and synergies, in which the whole can much exceed the sum of the parts and enhance the conditions for renewal. The balance among co-evolving policy objectives, including for maritime development, is very dynamic and impacts cyclical ecological processes.

Urban renaissance provides a framework for the harmonious and synergetic renewal of urban functions, in the context of multiple global and local, natural and human pressures, such as climate change and extreme phenomena, shoreline dynamics, and increased maritime activities. Inadequate coordination can lead to competition for space and pressure on valuable resources. Shipping, fishing and aquaculture, offshore wind energy, submarine cable and pipeline routes, can have severe impacts on coastal economic development and growth, as well as on coastal and marine ecosystems, leading to often irreversible deterioration of environmental status, loss of biodiversity and degradation of ecosystem services. On the other hand, healthy coastal and marine ecosystems are essential to continue deliver substantial services, in terms of food security, recreation, well-being and tourism, climate change mitigation and adaptation, erosion control and disaster prevention (Elmqvist et al. 2013).

The concentration of activities also leads to competition among sectoral interests, related to development, shipping lines and pipelines, wind energy operators, tidal and ocean energy infrastructures, fisheries and aquaculture sites, emerging marine biotechnology and seabed mining activities, and raises multiple environmental concerns. Ensuring the optimal distribution of space among relevant functions and stakeholders is essential to enable concurrent activities not simply to coexist but to achieve their full potential and generate synergies that can be captured for the benefit of all.

The sustainability paradigm helped cities liberate themselves from rigid concepts, models and practices inherited from the functionalist era and Le Corbusier's Charter of Athens adopted in 1933. A fundamentally interdisciplinary perspective and a multi-stakeholder approach are needed to question concepts, methods and policies towards systemic urban change in balance with nature and with active citizen participation. Cities and innovations have to be open to benefits from other world experiences, to create bridges, and to co-invent new concepts or ways of interaction.

The vision of a blue, and inevitably green, city is one of the last concepts in a chain of concepts for the possible and desirable sustainable city of the future (Beatley 2011). Visions had already embraced many interrelated concepts like the green city, the liveable city, the viable city, the affordable city and the ecological city. Blue cities join the eco-cities and eco-societies league, including cities which provide simultaneously ecological, social and economical models. Integrated urban planning and policy are instrumental for reducing the ecological footprint and improving urban performance towards a blue green city that can strike a sustainable balance with the seas.

Already in the 1990s, the OECD project on the "Ecological city" advocated for strengthening and integrating ecological concerns in all urban policies. The process proposed essential bridges between the macro-level concept of sustainable development and the micro-level of local activities (OECD 1996). Special attention

has to be given to all urban infrastructures which have been long lasting and have influenced resource consumption for several decades. Public decisions on the future of infrastructures can foster a city's prospects. Urban planning can enhance opportunities for terrestrial and marine resource-efficient lifestyles.

For a vision to come true, discussion and mediation of multi-stakeholder approaches at the earliest possible stage are most important as the range of stakeholders progressively opens to include all of society. The Tokyo government proposed the concept of an eco-society towards a clean, sound and citizen-friendly metropolis. Comprehensive actions focused on resource and water management, transport, consumption patterns and promotion of environmental education and awareness (UN/Tokyo Metropolitan Government 1998).

Urban coastal planning evolved quickly and had to adapt and embrace already existing sustainability ethics and principles. The New Charter of Athens, issued by the European Council of Spatial Planners (ECSP), signalled a clear shift in planning values and objectives in accordance with post-war functionalistic principles and segregation of spaces for work, living, leisure and communication. The charter for the new millennium advocated for sustainable human settlements for all, based on true involvement, and responsible planning, which would promote socio-economic and environmental enhancement and safeguard traditional values. The 2013 Barcelona ECSP General Assembly approved the "Charter of European Planning", which promoted a more pro-active role for planners in shaping public debate. The Charter allowed development of an Action Plan and triggered discussions for an update of the Code of Conduct (ECSP 2013).

Strategic urban coastal planning has to be comprehensive and integrated and must involve the complete spectrum of urban and maritime actors and activities. In order to ensure the sustainability and environmental health of all urban functions, it has to embrace an ecosystem-based approach for the protection of natural resources and habitats that provide the basis for urban activities. It has to include a public and transparent process for analysing, planning, monitoring and reviewing the spatial and temporal distribution of human activities to achieve economic, social and environmental objectives. The ultimate aim is the optimal use of terrestrial and maritime space for different public, residential, industrial, economic and cultural activities. Transport infrastructure is vital and should be addressed in an integrated way for all modes, including maritime transport.

Sustainable development asks for healthy ecosystems on land and the sea. On land, sustainable cities opt for consolidation and renewal rather than expansion and urbanisation of greenfields. Concentrated and intensified use of space in a well-defined urban territory provides multiple advantages for the integration of urban structures that minimise flows of strategic resources and transport, local pollution and greenhouse emissions, which ultimately also benefits the bordering sea. New visions for synergies stemming from the mix of compatible urban uses affected the evolution of many ports and their articulation to the city, like at the port of Barcelona.

Until recently, cities have rarely accepted responsibility for marine resources, often because of the apparent immensity of the seas and the difficulties of visualising or quantifying the offshore effects of urban life. Urban maps stop at the water's edge, even though the activities that support urban systems extend further into the sea. To

enhance vision, the Urban Whale, the New England Aquarium, produced a fascinating map of terrestrial watersheds and offshore waters on the US Atlantic Coast, showing areas of urban activity, including high boat traffic, shipping, fishing and dredging (Beatley 2011).

Cities have jurisdiction over near-shore habitats and can extend zones of planning and management to offshore areas. The Cape Cod Commission created an Ocean Management Planning District in order to extend its regional planning powers towards the open ocean. It also evaluated the scale, location and impact of offshore wind turbines. According to the EU maritime spatial planning system, coastal zones include the geomorphologic area on both sides of the seashore area. The seaward edge is the external limit of the national territorial seas and the landward border is the limit defined by the Member States in their integrated coastal management strategies (EC 2014).

Coastal cities can modify port operations and shipping practices to reduce environmental impacts. In the US Great Lakes and St. Lawrence Seaway, the maritime industry and port cities have formed a partnership to tackle problems including aquatic invasive species, greenhouse gas, air pollution and particulate matter emissions from ships and trucks, residues from local disturbances such as solid bulk cargoes, oil discharges, and noise, dust, odour and light pollution. Green maritime labels can help exemplary efforts to reverberate throughout the maritime economy.

Stronger international cooperation and regulations can also be instrumental for coastal cities as their sea waters unite them with many world regions. In 2009, the International Maritime Organization modified North–South shipping channels near Boston Harbour to reduce collisions with endangered North Atlantic whales. The US National Oceanic and Atmospheric Association also imposed mandatory speed reductions for ships over a certain size in “seasonal management areas”. Blue cities have to reinvent the art of negotiation and compromise for the brokerage between diverse industrial and organisational interests, including for the benefit of marine populations.

Sustainable development ethics would hold cities responsible for the solid and chemical wastes that they produce and the wastewaters that should never impact coastal water quality. Coastal cities can take the lead in mitigating waste streams and supporting efforts to clean up existing waste. San Francisco, for example, through its Zero Waste policy, has been a pioneer in banning plastic shopping bags at large supermarkets and chain drugstores and has dramatically reduced the use of chemical pesticides in managing parks and urban infrastructures. Many more cities in the developing world followed the example.

Industrial alliances have already introduced many innovations. The California non-profit organisation Project Kaisei, in partnership with the New Jersey company Covanta Energy, produced energy from waste, to test a new catalytic technology for converting Pacific Ocean garbage into diesel fuel. Blue cities could be important partners in recovery projects by committing to power their buses and municipal vehicles with alternative fuels generated from ocean waste (Sesini 2011).

Sustainable coastal cities are responsible for promoting ethical and sustainable fishing practices. The world’s rapidly growing and increasingly urbanised population

will put severe pressure on fisheries, many of which are already depleted. Cities can shift fish consumption patterns, which concentrate on a small number of species through sustainable seafood education efforts, such as the Monterey Bay Aquarium's Seafood Watch Programme, and by preventing unethical practice. Urban plans can identify specific places for aquaculture and help develop synergies with non-conflicting land uses and actors.

Coastal cities investing in an ecological urban renaissance take special care of their urban and marine environment, their functions and their balance with human activities. Coastal and marine protected areas should be well integrated with urban and regional plans. The renaissance of Copenhagen, described as the largest on-going recycling project in Denmark, is founded on principles of quality and equality and aims at ensuring that sustainable development enhances all natural, marine, and human resources. Already in 1989, the regional plan for Greater Copenhagen tried to promote a "better city instead of a larger city". New principles can be injected into old plans and thus ensure change within continuity. The Copenhagen "Five Finger Plan" has been a prime example of post-war planning directions for future expansion of the city into the countryside surrounding the coast. Sustainability principles can preserve the green wedges and the marine environment, consolidate the fingers and equip them with highly performing public transport. The organic integration of urban structures, natural spaces and social life played a most critical role.

In Amsterdam, urban renaissance has been linked to the vision of a diverse and compact city optimising scarce and fragile land and hydraulic resources and their capacities to host housing and economic activities. Until the Second World War, Amsterdam had developed a series of concentric rings, embracing the central port area. The 1950 General Extension Plan added lobes like the fingers of a hand spread out into the Dutch green heart. During the reign of the private car, concentric canals started being filled in to provide more space for car traffic. Ecological demands led to reopening of canal rings and intensification of the land use and the promotion of public transport. The marine environment has been rediscovered and enhanced. Many Dutch cities created mixed-use and citizen-friendly environments, including pedestrian and bicycle bridges spanning urban spaces and canals (Pistor et al. 1994).

Under the denominator "Port-City", the Port of Amsterdam and the municipal Spatial Planning Department have explored a future perspective for the Western Dockland, a busy port area within the city centre of Amsterdam. Both the city and the port had expressed in the past conflicting needs for more space and, after a period of divergence, they tried to work on synergies. They called for reorientation of the relationship between the city and the port towards a better urban-maritime symbiosis along the river. A key question was whether the existing port activities can coexist with housing, or that relocation or restructuring of port activities would be required for new housing over the longer term (Port of Amsterdam 2009).

Large sustainability waterfront projects demand foresight, long-term planning, flexibility, and ex-ante impact assessment, citizen participation and communication. The success of the projects depends on public support and a constant and affirmed political determination, capable of withstanding changes in elected representation. Flexibility is imperative for adapting high-scale projects to market fluctuations,

whereas continuity is linked to a shared vision for the future of the infrastructures. Citizen consultation and partnership with major stakeholders are extremely important. Outstanding examples include the Tokyo Waterfront, part of the Japanese National Policy for introducing private capital to public high-level projects (Metropolis 1996).

Coastal beacons projects can offer significant landmarks to the city, structure urban territories, and enhance magnificent skylines and shorelines. They can act as strong catalysts for the future of cities and regions. They range from ambitious government plans or unique international events, such as Olympic Games, Universal Exhibitions and high-level fairs, to local maritime and vessel museums. Their planning and construction with respect to sustainability principles are fundamental given their emblematic role and manifold effects.

Resource-conscious architecture has made great strides over the last decades and has created outstanding examples of marine urban conceptions from floating sites to amphibious housing anchored to the land as the structures rise with water levels. The 2014 sixth edition of the International Architecture Biennale in Rotterdam focused on "Urban by Nature" included a lively debate on Delta cities. Jakarta, Alexandria, New Orleans or the cities of the Dutch green heart can all look forward to effectively address major challenges.

8.2 From Vision to Strategic Ecosystem-Based Planning and Management

Since Hippodamus and the first grid plans, the collective search for optimal urban forms for the desired future has produced many interesting visions and concepts. Strategic integrated planning is an important instrument towards the preferred future of sustainable cities and impacts the flows of energy towards programming the various actions. It defines the location and distribution of various diverse activities and infrastructures in place and time. It has to be an open, transparent and inclusive process and involve all stakeholders. For sustainable coastal cities, the ecosystem-based approach to planning is a major fundamental principle.

Coastal cities should undertake lifecycle resource assessments, appraise investments and opportunities, risks and threats, respect geophysical and cultural local limits, seek a symbiosis with the bioregion and mobilise all visible and invisible societal hands. Strategic urban planning for sustainability requires a comprehensive interdisciplinary assessment of urban assets, a natural resource information system and an identification and analysis of policy distortions and bottlenecks. Prevention of pollution in marine ecosystems is a major investment.

Vision building is the first mobilising element for creating sustainable cities of the future. It has to be compelling and it is increasingly subject to consensus and participative governance. The discussion of many possible alternative futures, envisioned by all stakeholders, is a key element in this dialogue, in order for the future not to result as an unwelcomed or linear continuation of the past. Multi- and interdisciplinary, scientific, technical and social approaches are crucial, as many challenges are global, multi-faceted and inter-dependent.

Increased macro-complexity and uncertainty create a space for participatory innovation and cooperative processes. Paradigm shifts and quantum leaps are possible if integrated in a coherent vision for the desired future. Strategic foresight, which has always to be accompanied by hindsight, deliberately cuts across the traditional boundaries of sustainability science disciplines and policy areas. It can act as a driver of social interactions that stimulate the generation of common public visions.

Strategic anticipation includes the exploration of future possible prospects through the early identification of emerging challenges, opportunities and threats and horizon scanning for unforeseen turbulences and weak signals and "black swans", low-probability/high-impact events. Setting the strategic questions, identifying driving forces of change, determining main issues and trends, clarifying levels of impact and risks and degree of uncertainty, creating probable scenario narratives, assessing policy options and identifying inflection points are important elements of the process. Ex-ante impact assessment of possible, probable and preferred futures, exploration of alternative scenarios and consensus building can lead to an ambitious, collective and engaging vision.

Some governments and cities have integrated futures thinking and strategic foresight in their decision-making process and developed policy portfolios to achieve the desired visions according to sustainability criteria and financial constraints. Scenario planning is often complemented by risk assessment approaches, especially for cities facing important storm surge and sea level rising. The process, well integrated in the heart of governments, could help strike a balance between bureaucratic effectiveness and creative thinking and lead to forceful goals backed by all stakeholders.

Cities striving to reach their various intended destinations need to be well aware of their starting positions, their strengths and weaknesses. They have to decide together with their citizens where they want to be in the future and understand the significant trends that may influence the direction in which the future unfolds. Striving in the global knowledge economy for a sustainable future requires a dynamic local balance among economic, social and environmental objectives and demands that the appropriate people, skills and capabilities be developed, and that city leaders demonstrate their abilities to appreciate these assets and invest in the ways that they can be enhanced and allowed to prosper.

Integrated approaches to the management of marine and coastal resources increasingly incorporate systems-oriented approaches based on precautionary and ecosystem management principles. Implementation of Integrated Marine and Coastal Area Management (IMCAM) is gaining ground for the sustainable use of marine and coastal ecosystems and habitats.

Community-based and ecosystem management approaches have proven particularly important. IMCAM is a participatory transparent process for decision making to prevent, control, and mitigate adverse impacts from human activities in marine and coastal environments, and to contribute to the restoration of degraded areas. It involves all stakeholders, including policy makers, the business community, advocacy groups, civil society and the general public. A series of best practices

bear witness of the efforts of cities to achieve a balanced approach to preserving, yet enhancing, marine and coastal biological diversity.

Marine spatial planning and integrated coastal management create a most suitable framework for addressing human impacts on marine and coastal biological diversity and for promoting sustainable use. Crucial components include industrial activities such as construction and mining in coastal areas, mariculture, mangrove management, tourism, recreation, fishing practices and watershed management. Destruction and degradation of vital habitats should be prevented and deteriorated habitats, including spawning areas and nurseries of stocks of living marine resources, should be restored.

Urban strategic plans have to reconcile thematic and territorial policy objectives and be analysed and discussed, co-decided, co-implemented and co-evaluated. Integrated urban coastal management should empower, enable and invite all stakeholders to have more control over the natural resources upon which their livelihoods depend. Improved understanding of the various marine ecosystems surrounding a city, their functions and the ways that human activities impact them is a first critical step. The participation of all individuals involved helps develop multiple management approaches to the use of coastal ecosystems and resources, and the broader identification of the actions which allow meeting of objectives without adversely affecting the natural ecosystems sustaining their activities. The process can incorporate a framework for arbitration and conflict resolution and shared vision building and develop awareness on the threats and opportunities. Every coastal city should invest in developing the ability of those with responsibility for urban policy to manage natural, including marine, resources in a sustainable way.

Many cities envision ambitious agendas for 2030. The PlaNYC was released in 2007 as an unprecedented effort to prepare the city for welcoming one million more residents, strengthen the economy, address climate change, and enhance the quality of life for all present and future New Yorkers. The Plan brought together over 25 City agencies to work toward the vision of a "Greener, Greater New York". The updated plan included 132 initiatives and more than 400 specific milestones (New York City Mayor's Office of Long-Term Planning and Sustainability 2011).

By 2030, the population of New York City is expected to increase to more than nine million, including newcomers and present citizens along with the next generations. This intergenerational multicultural city can offer tremendous opportunities, enrich communities, enhance green environments and optimise well-being for all. Urban planning processes have to enhance the capacity of public infrastructures to improve quality of life.

Accountability is a sine qua non condition in the journey to sustainability. Progress against goals should always be closely monitored and publicly disclosed. In New York City, 64,000 units of housing have been created and 20 new neighbourhoods became accessible by public transport, during the years 2007–2011. The city's first bus rapid transit system has been launched and $1.5 billion was committed for green and blue infrastructures. Nearly half a million trees are being planted and investments focus on the drinking water supply network. Over 30 % of the yellow

taxi fleet is already green and regulations are expected to phase out polluting fuels. The process to remediate and revitalise brownfields is being streamlined and the clean-up of the most degraded lands is progressing. Last but not least, public plazas have been created for pedestrians, including on Times Square, the "crossroads of the world", attracting residents and visitors.

In Singapore, the Concept Plan, initiated in 1971 and regularly updated, is a strategic land use and transportation plan to direct development in the longer term. The Concept Plan focuses on spatial resources and dynamics to meet long-term population needs and aspirations. The first Concept Plan laid the foundation for Singapore's growth for a better quality of life with new towns, transport infrastructure and access to recreation. The Concept Plan was subsequently reviewed in 1991, in 2001 and 2011 to factor in changes in local and global trends, and ensure that plans remain relevant to address challenges and meet future needs. The plan has played a vital role in helping balance the diverse land use needs, such as port, industry, commerce, housing, parks and recreation, transport, culture and community facilities.

Singapore could have a population of between 6.5 and 6.9 million by 2030. The plan outlines the strategies to support population and economic growth, with the strategic intent of ensuring a high quality living environment for all Singaporeans. The reviews benefited much from extensive public consultations carried out through various channels, such as surveys, focus group discussions, and public forums. Through engaging all stakeholders and the public at large, the city can better understand the concerns and aspirations of the various communities. The most recent 2011 review took into account the opinions gathered by the National Population and Talent Division (Urban Redevelopment Authority of Singapore 2011).

Tokyo, a labyrinth of cities, enjoys limited atmospheric pollution, low unemployment, an efficient public transport system and high healthy life expectancy for its citizens. Super-ageing is a key challenge for the future of the city, which has also to address many natural threats. Risk governance has often been the source for new concepts and processes. The Kobé earthquake in 1995 provoked a whole range of innovative managerial responses. The plans reconstruction includes cardinal innovations for the disaster-proof city, born out of the eternal urge to create something eternal.

The WBCSD Urban Infrastructure Initiative proposed several solutions that will help Kobe to address economic, environmental and social challenges, including an ageing population, and achieve its sustainability ambitions. The current 5-year master plan emphasises creativity and innovation, local economic and sustainable community development, population and livelihoods. Major companies and the WBCSD worked with officials from several city departments to identify key sustainability issues and propose policy options. They identified priorities for action, including energy efficiency and renewable energy production, sustainable mobility, knowledge networks and leadership in disaster resilience.

A transformation study led to the formulation of 14 practical solutions including energy efficiency improvements, sustainable mobility measures and knowledge-based economic development. The process demonstrated the value of providing

multi-sector input early in the city's strategic development. This enabled city officials to consider a variety of ideas and engage with the private sector collectively, rather than only in relation to specific projects. Such holistic thinking is increasingly important for inclusive and sustainable urban development and of special value for coastal cities (WBCSD 2013).

The population of London is expected to rise as the city's capacity to attract people from all over the world, from wealthy expats to asylum seekers, is expected to continue. This could be reflected on all plans. In 2030, London could be a city that is over 40 % overseas-born communities and may be constituted 40 % from non-white population. The city could be more cosmopolitan and tolerant, and more attractive to talented creative mobile citizens of the world.

Integrated management programmes have already demonstrated their potential as an effective tool in developed and emerging countries around the world. Xiamen, one of the world's top 20 ports, has sustained one of the fastest rates of economic growth in China. The rapid growth and the increased intensity of sea use, coupled with the lack of adequate regulations, coordination and enforcement, led to conflicts among various marine and maritime activities and provoked the degradation of native species and natural habitats. Largely sector-oriented legislation and operational mechanisms to harmonise development across sectors were in general weak. In 1994, the Prevention and Management of Marine Pollution in the East Asian Sea introduced integrated coastal management. The aim was the integration of various coastal and marine activities and coastal environmental management for holistic and sustainable development. The cornerstones of this approach included an inter-agency coordinating mechanism, a multi-disciplinary experts group, an integrated profile of the coastal sectors and a strategic management plan. The results included reduced conflicts among various sea operators, better enforced marine protected areas, rehabilitation of threatened species and degraded habitats and a better environment for all to enjoy.

Sustainability debates insist on density and intensity and call for limiting urban sprawl. Urban sprawl can disproportionately increase the ecological footprint of cities and aesthetically deform their peripheries, the "lost cities", as thay are called in Latin America. The threats are very high for cities that are surrounded by trademark landscapes or very fragile water and marine ecosystems. The benefits of maritime spatial planning include generation and enhancement of synergies between different activities, encouragement of investment, by instilling predictability, transparency and clearer rules, reduced conflicts and a better ownership of the plan by local stakeholders.

Strategic plans can provide legitimacy for activities to support sustainable development, such as development of renewable energy sources and grids, and establishment of Marine Protected Areas. They should also increase coordination and help balance the development of a range of marine and maritime activities. The early identification of impacts and opportunities for multiple use of space and the coordination of land-sea interactions of coastal activities is a major advantage. A holistic approach and multi-stakeholder dialogue are always the most critical parts of the process.

Climate change, in particular the rise of sea levels, acidification, increasing water temperatures, and frequency of extreme weather events, is likely to cause a shift in economic activities in maritime areas and alter marine ecosystems. Strategic planning can play an important role in prevention and mitigation, by promoting the efficient use of maritime space and renewable energy, and a cost-efficient adaptation to the impact of climate change. Strategic plans for sustainability focus upon bringing abandoned urban land into mixed-use development and seek to restrain peripheral growth to key nodes near public transport stations. Cooperation beyond administrative and sectoral borders is a major issue and has often to overcome local divisions and invest in bridging territories, people and opinions. Integrated risk management has to take into account the perception of risks and the tolerable levels by all stakeholders.

As all cities, coastal cities are chronotopes, with interconnected spatial and temporal dimensions and interrelated historical and geographical aspects. Port cities and cities which support large flows of passing passengers and goods are particular chronotopes. Like space and water, time is a scarce resource for cities. The time dimension does greatly matter in advancing towards sustainable development. It introduces concerns about inter-generation distribution of capital and serves as a litmus test for the well-being of individuals and societies. Time management has a potential for extending the possibilities of spatial planning. Some governments and cities have been pioneers in promoting time plans that strengthen places (INU-Politecnico di Milano 1997). Special 4 seasons or 24 h plans for territories like harbours could be very beneficial for all actors spending a significant part of their life on the coast.

Seasonal planning can integrate temporary structures for cultural or emergency reasons. London has commissioned the world's most renowned architects to design temporary structures to host summer events. The concepts of seasonal planning and policy could also be most interesting for tourist resorts or coastal cities which serve as gateways for important tourism flows or host different populations during various seasons. The ecosystem-based principle could be extended to embrace place and time-based approaches to resource management. Sound understanding and strong citizen participation to address time management issues are crucial for managing human uses and impacts for the well-being of all.

Strong sustainability actions ask for the enhancement of every possible space or resource and especially the ones traditionally seen as waste which should be seen just as a by-product or as another product. A combined rubbish incinerator and power plant with a ski slope on its roof by the architect B. Ingels is an inspiring example in Copenhagen. A mountain created on a multi-storey garage can help achieve functional, aesthetic and health objectives and address Denmark's lack of mountains. The same architect is also the creator of the "8" house on the edge of Copenhagen, an apartment complex that wraps around itself. The rising and falling roof creates a continuous platform and park and cycle track and inhabitants can bike to their elevated front door.

Crowd-sourcing urban design and crowd funding can lead to joint ownership of urban commons to be collectively enjoyed. In Copenhagen, the Superkilen, an

extraordinary one-mile long urban corridor that runs through the cosmopolitan waterfront Nørrebro quarter, reflects the diverse cultures of its residents originating from 50 different countries. The creation of the park, also by architect B. Ingels, has been a laboratory of ideas and ideals with the participation of all foreign citizens expressing the wish to find in Superkilen some essential elements of their original culture. The urban corridor was enriched with a Moroccan fountain, Chinese palm trees and benches, cutting down barriers and creating bridges with the origins of the inhabitants.

Increasing population and employment density in metropolitan areas could reduce vehicle travel, energy use, air pollution and CO_2 emissions. Urban sprawl, largely made possible due to private cars and extensive highways, still reflects the preferences of many citizens for living in single-family homes. Dispersed, car-dependent development patterns, however, involve high economic and ecological costs, including the use of vast quantities of land, increased reliance on private cars and greenhouse gas emissions. In the US, compact development is focused on new housing, as converting existing housing to higher densities could be prohibitively expensive. Compact, mixed-use neighbourhoods could reduce trip lengths, and make walking, biking, and public transit more viable alternatives to driving. The key precondition is for jobs, schools and shops to be equitably integrated in the urban fabric (TRB 2009a, b).

Compact coastal cities manage resources at remarkably lower levels of material and energy consumption, compared to diffuse settlements and dispersed populations and tentacle-shaped low-rise suburbs across the coastline. The interrelated issues of density and compactness are critical indicators for sustainability. Compact settlements encourage functional diversification and integration of land uses at the neighbourhood level and prevent urban sprawl and resource overconsumption. The Danish model of decentralised concentration highlights the importance of all these components, while the Dutch compact city policy is based on the principle of spatial multi-functionality. Creating multi-purpose urban cells is a guiding principle for many city plans (World Bank 1995; OECD 2012a).

Amsterdam considers functional mix as a valuable attribute of an inner city heritage and tries to strike a balance among spaces for housing, offices, commerce, services, tourism and leisure. The compact city policy, introduced already in 1985, aimed at enhancing scarce space as efficiently as possible, introducing more scrupulous resource management which created multi-functional residential environments and curbed the overall ecological burden. Diversity and mixed-land uses are linked to enhance the city's unrivalled character as a cultural melting pot.

Sustainable coastal cities must reflect a true urban, marine and social intermixture. The integration of urban functions should reinforce identity, but also improve communication and openness to the world. Many cities experience a need for functional mix, a community desire for "a real urban gene, an organic part of the city, everywhere in the city". The "open block" proposed by the architect Ch. de Portzamparc advocates for urban blocks which open citizens to the city and the world. The concept could favour the interactions and social life at the scale of each neighbourhood in the world of the city (De Portzamparc 2007).

Sustainable regeneration and consolidation of urban areas in decaying waterfronts has been a key instrument by many cities in their efforts to attract new business and residents. Sustainable renewal has to address the unrealised potential of land-sea interactions and involve all stakeholders willing to invest and promote life and work in healthy marine environments. Revitalising an urban area entails recreating its economic diversification, its social heterogeneity and cultural diversity of the city. Successful schemes address both the hardware and software of the areas and try to reconcile environmentally sound revival of physical structures with socio-economic and cultural enhancement.

Some harbours went a long way from mono-functional areas towards multi-purpose mixed-use neighbourhoods with integrated housing, employment and educational infrastructures. Previously deserted and dangerous in the evening harbour and commercial streets have become the thoroughfares of vibrant neighbourhoods. Further inspiration could be offered from the "Living above the Shop" project in Dublin, a prime example encouraging and assisting shop owners to convert their upper floors into residential spaces. Similar concepts were developed for many port areas recreated as lively neighbourhoods, providing for instance housing for immigrant workers.

Managing the dual space port-city is of the highest importance. The port of Antwerp invested much in reviewing its sustainability performance in the context of the city. With this benchmarking exercise, the Antwerp port community gave form to its ambition of being a sustainability leader. It was the first time that the many interlinked sustainability aspects, of both of the port and of the hinterland and foreland, were reviewed by the entire array of port community. Transparent, open and systematic consultation was seen by the various stakeholders as particularly useful and concluded with recommendations for improvement.

Particular attention has been paid to safety, with the emphasis on accident prevention. The modern port is a very busy environment with many risks, and safety is a priority for the port community. Much attention was given to local nuisances affecting either the environment or people, or both. But the scientific data collected to monitor and prevent the nuisances does not always match citizen's perception of the negative aspects of living near a port. A comprehensive survey of the perceptions of nuisances in and around the Antwerp port provided particularly useful complementary information about the negative effects of port activities and the ways that are experienced by the local population (Port of Antwerp 2010).

As regards energy, the first concern is to make more rational use of energy and increase efficiency. In an industrial environment such as the port of Antwerp with one of the world's largest chemical clusters, there is a huge demand for energy. The port community therefore strives to maximise the use of green energy. The port authority tries to lead by example through purchasing 100 % green electricity. Significant expansion of the wind power capacity within the port is also planned, and the possibilities of bio-based energy sources are being examined. Further research in energy efficiency is continuing, including on a heat distribution network.

The study of the feasibility and desirability of urban-maritime combinations along a river paid particular attention to multiple factors such as maritime value,

housing demands, metropolitan accessibility, landscaping, investment costs and overall sustainability prospects. From the viewpoint of sustainability, the growth potential and land demand of both city and port are in balance and an impulse is given to better connectivity through urban public transport.

The future of blue urbanism may include floating cities or other forms of permanent or semi-permanent habitation of the ocean environments, either on the surface or underwater. The American designer J. Fresco, already before the second war, invented the trend home, one of the first glass aluminium structures, and proposed model ocean cities. These cities are unique to their regions. By maximising efficiency with space and context they also can be interlocked and formed into constellations. French visionary architect J. Rougerie proposed many concepts to realise the tremendous potential of inhabiting the oceans, thus raising awareness about the beauty and the fundamental role of the sea in humanity. He proposed underwater laboratories, a subaquatic archaeological museum for a journey to sunken cities, a floating scientific city and an underwater habitat-observatory.

Many more urban utopias have been proposed such as self-contained cities in the shape of a lily pad or a lotus flower and fertile cities such as the "Recycled City", of half a million residents, that would be created from recycled plastic from the North Pacific Garbage Patch. Other concepts include amphibious tourist resorts, as included in the Greek pavilion during the 2014 biennale of Architecture in Venice (Aesopos 2014) and the extension and expansion of cities in vertical and submarine spaces. Human populations already living on ships and multi-purpose marine platforms, in a close connection to oceans, could be the precursors of the citizens of the floating cities of the future (Beatley 2011).

8.3 The Hallmarks of Urban Ports and Noble Waterfronts

Advantageous port conditions, adequate defence infrastructure and good inland connections are the principal factors that have guided the evolution of harbours and their complex relationships with the rest of the world. Ancient harbours were usually more exposed to the sea than the treasured agoras, at the very heart of the city. Many ancient port cities still host civil and military harbours protected by towers and fortifications. Gates ensured the entrance into the town and the ancient agoras. Many harbours throughout history were later turned into commercial ports enhancing valuable port conditions, defensive infrastructure and inland connections.

Security from the sea has always been extremely important for coastal cities. In Dubrovnik, the city walls are considered to be one of the most grandiose fortification monuments in Europe and a fine example of fort architecture. The first fortifications were built already in the eighth century, but the most intense construction took place from the mid-fifteenth to the end of the sixteenth century. The ramparts encompass the city in an irregularly shaped polygon form, with Fort Minčeta at the highest Northwestern landward corner of the city and with Fort St. Johns on the South-eastern seaside. Other strong forts are also part of this defensive urban infra-

structure, even though they are separated from the ramparts. The ramparts are 22 m high in places, and from 4 to 6 m thick on the landward side and from 1 to 3 m thick on the seaside. In front of the central wall on the mainland side is an outer wall with 10 semi-circular bastions, in front of which used to be a moat. The main wall has 14 quadrangular and 2 circular towers, 2 angular fortifications and 4 bastions. This imposing structure has become a precious legacy.

Much of the monumental historic parts of harbours can be shared and enjoyed by all. Noble public spaces on the seaside or with specific sea views may foster citizen participation and promote exchanges and interactions. Open-air infrastructures, like ancient fortifications, but also cultural places like theatres can play an important role as shared civic spaces. Urban leaders and citizen associations should always take care for public places to be accessible to all and include everybody.

The Agora, the focus of civic life in the archetypal City-State, constitutes a powerful public model place embracing cultural and commercial spaces and orchestrating all urban functions. Citizenship, justice, culture, and exchanges were well anchored in these spaces, where the assembly, the theatre, the stadium, the market place and the sanctuaries had the noble aim of promoting the physical and mental well-being of citizens. Environmental and cultural landscaping of public spaces can help to forge urban identity. Qualitative recommendations for the functional and aesthetic character of squares, waterfronts, seaside plantations and public lighting have been developed and implemented in many cities.

Historic public spaces can invite travellers to endless journeys into ancient times. The Sacred Street in Athens goes deep into place and time. The city which invented theatre, philosophy and democracy reorganised its ancient heritage surrounding the Acropolis, crowned by the Parthenon, into an urban archaeological park to be best enjoyed by citizens and visitors as a backdrop of everyday environments. The park incorporates also green spaces and micro-squares and pedestrian paths and bicycle routes providing a particular essence distilled from the magic of the ages.

Amphitheatric planning of coastal cities provides visual access to the sea for everyone. Often the built environment skilfully couples with the physical landscape. Some Mediterranean cities provide extraordinary lessons. Taormina occupies the site of an ancient town, on a lofty hill. The site is about 250 m above the sea, while a very steep isolated rock, crowned by a castle, rises about 150 m higher, indicating the place of the ancient citadel, the inaccessible position of which is mentioned by ancient writers. Numerous fragments of ancient constructions are scattered in the landscape, including extensive reservoirs of water, sepulchres, and pavements.

The most remarkable monument in Taormina is the ancient theatre, one of the most celebrated in Sicily, due to both its outstanding location and preservation state. Rebuilt upon the foundations of an older theatre of the Greek period, this theatre is still used for theatrical performances and music concerts. The greater part of the original seats have disappeared, but the wall which surrounded the amphitheatre and the proscenium with the back wall of the scene are preserved in singular integrity, and contribute much to the majesty of the site. Parts of a temple are also visible, converted into the church of San Pancrazio.

Catania offers tangible and intangible assets which bear witness of a stunning relationship between the city, the nature and the sea. Founded in the eighth century BC, colony of the Greek metropolis Chalcis, the city counts with three theatres which couple with the landscape. They include the Teatro Romano, built on the site of a Greek theatre in the second century AD, the Odeon, a smaller theatre used for more intimate occasions, such as musical performances, and the Amphitheatre dating from the Greco-Roman period. The city lies on the Ionian Sea, under the shadow of ever-present Mount Etna. On several occasions, volcanic eruptions destroyed the city. In 1669, an eruption covered the city with lava and, in 1693 an earthquake shook it down to its foundations. The entire old urban part was rebuilt in Baroque style, with large, wide open squares and avenues. The most amazing aspect was the building material, lava, which gave the city its particular colour!

Catania is also a lively city with a colourful and bustling fish market and an atmosphere that has remained virtually unchanged for hundreds of years. The old fortress of Castello Ursino is an imposing structure on a rocky cliff overlooking the sea. However, the massive lava spill of the 1669 eruption pushed the sea back, creating a new coastline and stripping Castello Ursino of its strategic position.

Many modern cities try to enhance elements of their coexistence with the sea. Contemporary cultural spaces often draw vigour from their connection to the sea and endow citizens with the legacies of the future. The Kursaal auditorium and congress hall in San Sebastian, conceived as two gigantic rocks stranded at the mouth of the Urumea River, has been conceived as an organic part of the landscape. All other facilities, including the exhibition and music halls, meeting rooms, offices, and supporting spaces are located in the platform at the base of these cubes, where the cultural centre meets the city, and ensure an open public access.

The auditorium celebrates its character of almost a geographical accident with a slight inclination towards the sea. Its volume, integrated asymmetrically inside the glass prism, seems to float within it. The glass surfaces protect against sea winds, making the volume a dense, opaque mass by day and a source of light by night. The orientation makes every visitor entering the foyer to unconsciously walk towards the highest level where Mount Urgull and the sea can be contemplated in all their splendour from a singular window. Similar design and structural criteria have been used in planning the smaller congress hall, also conceived as an inclined prism. The rectangular congress hall adheres to the best acoustical and functional requirements. The asymmetry is less evident, but the view from the foyer of Mount Ulía and the sea in the background is just as almighty.

Architecture inspired by the sea and the forms of waves have provided many outstanding examples. The hegemony of the sea is often reflected on public spaces and exceptional buildings designed in coastal cities and strengthening visual and spatial connections between the ocean and the city. The Oslo Opera House features a dramatic granite roof sloping into the city's fjord and creates an awe-inspiring public plaza, a symbolic springboard of a coastal city to the world.

The project has been designed as the first element in the transformative urban agenda of the Norwegian capital. The marble-clad roof forms a large public space in the urban landscape and the fjord. Endowed with an imposing size and compelling

aesthetics, it powers a dynamic osmosis among three elements, the wave wall, the factory and the carpet. The wave wall divides but also unites a dynamic surface, represented as an awakening wave. The factory is a symbol for the production facilities of the opera house, organised as a self-contained, functional and flexible space. Finally, the carpet epitomises the horizontal monumentality of the city, the web of shared ownership, providing access for all to the sea of art and culture.

Reykjavik, the world's Northernmost capital of a sovereign state, has a unique relationship with the sea. The whole city is turned to the sea, with its multicolour houses and its lake surrounded by green spaces in the city centre. Sustainable architecture by the sea endowed Reykjavik with Harpa, the Concert Hall and Conference Centre also inspired by the boreal light. Situated on the waterfront, Harpa stands out as a radiant construction with a clear view of the enormous sea and the surrounding mountains reflecting both sky and sea space, as well as the vibrant life of the city. Harpa features a welcome foyer area in the front of the building, four halls in the core space and a backstage area with offices, administration, rehearsal hall and supporting services. At the heart of the rock, the largest main concert hall reveals a powerful interior. Seen from the foyer, the halls form a mountain-like massif, similar to the basalt rock on the coast, in a stark contrast to the impressive facade.

Waterfronts are spaces of expectation and wonder for a very diverse range of populations. Being there is already being somewhere else. They play a cardinal role in the integrated management of the dual city-harbour resource. The recreation of the Belfast waterfront has been driven by the strong will to create a new face for the city with spaces of hope superseding places marked by violence. In Galway, the renewal of a derelict central area, past hub of economic activities, led to a harmonious marriage of rehabilitated buildings and new constructions. The regeneration respected Galway's unique character and atmosphere and promoted a functional mix, essential for the vitality of the city centre. A balance has been struck among residential, commercial, cultural and tourism functions (BURA 1997).

In Boston harbour, a symbol of the city's birth right, civic activism triggered a dramatic regeneration and an outstanding new waterfront. The Boston vision for 2030 charts the way to a resilient city reinventing the innovation economy and promoting a civic agenda. Disused dock infrastructures have been transformed into exhibition halls, shops, craft workshops and centres for ecological, leisure, civic and cultural activities. Business incubators bring new capital into the areas and help create local enterprises and services. Functional diversity is increasingly important and public access to the waterfront is considered to be decisive. Waterside promenades gradually replace industrial docks and welcome citizens.

The Eastern Dock Island at the east of Amsterdam's Central Station is a component of the large-scale project to develop the South bank of the bay. The move of harbour functions has presented new opportunities to transform the area into an intensive mixed urban neighbourhood with residential, commercial, recreational and cultural functions, including the new Public Library and the Conservatorium. The Library, designed by architect J. Coenen, after an exploratory complex quest, includes a central underground system for long term energy storage delivering air conditioning and heat.

In Estonia, the waterfront of Tallinn has been enriched with the Seaplane Harbour, a maritime museum inaugurated in 2012, in a building originally constructed as a hangar for seaplanes. The hall, in the historical seaplane hangar, out of service during the Soviet era, has been thoroughly renovated to host the exhibition bearing witness of the maritime past. The museum presents the history of the old maritime Estonia in a modern visual language. The exhibits are located in the air, on the sea and below the sea. The museum has submarine and flight simulators, and a pool to sail aquatic animals and miniature ships. A 1936 submarine has been renovated to its original state. The museum also displays a yellow submarine and a full-scale replica of a World War I seaplane, the wreck of the wooden ship Maasilinn, and the icebreaker Suur Tõll, conquered from the Russians near Helsinki in 1918 and finally donated to Estonia.

Genoa's harbour, the most important in Italy and one of the most eminent in the Mediterranean, has become the centre of cultural, political, tourist and commercial activities. In 1992, on the occasion of the Columbian Celebrations, the waterfront was thoroughly redeveloped and the ancient harbour zone rehabilitated and opened to the sea. Native architect R. Piano restored the historical buildings, including the cotton warehouses, and created new landmarks like the Aquarium, the Bigo trademark of the port activity, and a Sphere made of metal and glass, installed in the water, and unveiled in 2001 at the occasion of a decisive G8 Summit.

In Thessaloniki, the creation of the new seafront has been an ambitious project involving the development of 80,000 square metres, pedestrian and green areas, athletic and recreational facilities, public sculptures, an outdoor amphitheatre and playgrounds, next to water commons. Almost 1000 trees were planted and cycling paths have been expanded. Upgrading the relationship between the city and the sea has been a major goal of the project, which also provided a green lung and 1 km pedestrian walkway along the seafront.

In Finland, Turku addressed creatively the decline of the harbour industry and infrastructure on the river Aurajoki. The majority of Finnish maritime industry companies are based in the region. In 1987, the municipal council organised an architectural competition for a new master plan and its phantom spaces of closed down factories and warehouses. The winning entry "Sigyn" introduced a resplendent mix of old and new structures in brick, steel and glass, and proposed magnificent functional spaces for educational, economic and cultural purposes. Two massive former shipbuilding halls and a former rope factory, once voted as the ugliest building in town, composed a major fine arts complex, including a conservatory, the Turku School of Art and Communication and the School of Fine Arts.

Shaping the places to anchor a sustainable future is a critical issue for most cities. The Rotterdam innovation dock campus, at the very heart of the Rotterdam City Ports area, has been established on the former premises of the Rotterdam Dry Dock Company. Founded in 1902, the former booming shipyard closed down in 1983 and started a new trajectory in 2007. Building on the ideas of the Rotterdam Climate Initiative, bringing together all stakeholders to achieve decisive reduction in CO_2 emissions, the area was redeveloped into a low-carbon place and an incubator for creative and innovative businesses. Educational institutions and companies work

together on sustainable options in the fields of building, mobility and energy. Far more cities have initiated beacon initiatives for the transformation of former naval and industrial infrastructures into campuses for educational activities, research institutes, and innovation businesses.

Many urban waterfront regeneration projects focus on areas which are far larger than the immediate waterfront and often have the ambition to improve the whole city and its access to the sea. The renewal of the London docklands is more than emblematic of transformative waterside projects. During the nineteenth century, London's harbour was one of the busiest in the world, but, by the end of the 1950s, decline of the port industries and manufacturing, containerisation asking for docks equipped with large cranes and an increase in ship size made many docks derelict. These developments led to a spiral of decline, marked by decrease of population and employment, inadequate services, lack of open space and recreation facilities, and poor access to the rest of London with heavily congested narrow roads and a lack of public transport.

The London Docklands Development Corporation, set up in 1981 to lead the project, has worked for 17 years to bring a new face and significance to the place in quest of a new future. Other organisations involved in the redevelopment process included the national government offering incentives to encourage private investment, property developers, responsible for building large office blocks like the Canary Wharf, local housing associations which obtained home improvement grants and civil society organisations and advocacy groups (Hall 1998).

Ecological improvements included a network of pedestrian and cycle routes through the area with access to the river, the creation of bridges and new open public spaces, a water ecological park and London's first bird sanctuary at East India Dock Basin, and the planting of 200,000 trees. The economic regeneration led to the doubling in employment and numbers of businesses, the conversion of old warehouses into new homes, the opening of the Docklands Light Railway and the City Airport in the former Royal Docks, attraction of high-tech firms, and media headquarters.

The rapid rail connection to central London which greatly improved the accessibility of the docklands has been decisive for local businesses. Benefits included a wide range of economic, environmental and social advances, including thousands of new housing units and quality jobs. Most of the criticisms related to the lack of benefits for the local population, as the original "East enders" including many old dockers were unable to afford the high costs of the new expensive houses and had not the skills required by the new economy. The community spirit of the area has also been altered as the newcomers did not truly mix with the previous local society.

Creating a true Porto Maravilha is a great plan for Rio de Janeiro. Its waterfront, one of the city's oldest strategic assets, played a fundamental part in the past economic and social development but declined during the last decades. The revitalisation of the waterfront is expected to reintegrate it with the city centre, respecting principles of integrity, sustainable urban development and social inclusion. Enhancing the sustainable value of the place and the creation of new cultural facilities will make it one of the most attractive areas of the city. The municipal government also initiated the construction of the Rio Museum of Art.

The Porto Maravilha Urban Operation aims at providing Rio with a vibrant city centre, a sustainable urbanised area and a multimodal transportation system blending with the region's historical and architectural heritage. The project is also based on real estate development with emphasis on socio-economic development and inclusion, in order to mitigate the gentrification process. The infrastructure improvements in the city would enable the creation of an innovative and high technology area, the High Technology Park of the Rio de Janeiro Federal University. The Porto Maravilha Operation also established an innovative financial model of Public-Private Partnership to ensure the project's implementation in partnership with the private sector.

The project covers a total area of five million square metres and hosts 32,000 people. It plans to host 100,000 citizens in 10 years. The first phase focused on infrastructure works, such as renewed sewage, drinking-water networks, telecommunications and street lighting public networks. In order to solve flooding problems, new water galleries were installed taking into account rising sea levels in the near future. The second phase focused on a new urban mobility model that prioritizes pedestrians, cyclists and sustainable urban transport. Ecological restructuring measures are expected to increase the green spaces from 2.5 % to 11 % of the city's surface, improving the soil permeability. Furthermore, water, air and noise pollution are expected to drastically diminish.

Outstanding waterfronts have often been the dynamic legacies of unique events bringing special opportunities for cities, regions and nations. They address the twofold multi-challenge of creating an infrastructure and an environment with the occasion of a short-term event but planning it to serve long-term purposes. Global attractions based on once-a-lifetime events, can put a city on the map and a sporting or cultural event can act as a magnet to draw public attention and propel the city on the world stage. However a city should rely on more sustainable assets and attractions or use once-a lifetime events as milestones in a much longer journey.

As F. Pessoa had put it "the ways of change also change". Lisbon seized the opportunity offered by two catalysing major events, the Cultural Capital of Europe in 1994 and the Universal Exhibition in 1998 on "The Oceans" to re-invent and transform itself. The public works related to this exceptional event redesigned the map of Lisbon and helped emerge a new quarter to the East, the Oriente. Oceanic vocation, one of the city's essential attributes has offered a vital thread. Expo 1998 invested in an abandoned former industrial area transformed into a vibrant innovation and creativity site. The project was not confined to the exhibition precinct of 50 ha but created a whole new resourceful city of 330 ha. Investments in bioclimatic architecture, quality design and advanced energy concepts have led to the aesthetic and functional metamorphosis of the area. An eco-efficient distribution network for thermal energy, heat and cold air, was set up, together with an observation and monitoring system. The adopted standards were higher than the ones required by the national regulations and the performance of the area has been exemplary. The Vasco de Gama Tower is among the emblematic buildings which form the legacy of Expo 1998.

The 1992 Olympics was a key catalyst for the renaissance of Barcelona. The city, which had long lived with its back to the Mediterranean, invented a new waterfront and was definitely reconciled with the sea. Enriched with new and better places and functions, including a public beach, and integrating the Olympic village, the city was enhanced with thorough restoration projects and noble public places. The rehabilitation of the Ciutat Vella has been an unparalleled event, in terms of investment, effort and civic spirit.

Ciutat Vella is nestled between the sea and the Eixample district, a strict grid pattern crossed by wide avenues designed by the visionary urban planner I. Cerdà. Running down the heart of the district, Las Ramblas offer the delights of a vibrant public artery and seal the link to the sea. The four historic quarters of Ciutat Vella, including the gothic quarter, have been thoroughly transformed through selective renovation, rehabilitation, eco-retrofitting and eco-constructions, civic centres, pedestrian precincts and green public spaces. Thoroughly designed small interventions acted as stem cells that injected in the body of the city led to a positive metastasis and overall renewal. The strong neighbourhood groups cooperated with the authorities and played a pioneering role in the allocation of housing and services and the enhancement of public life (Ajuntament de Barcelona 1995).

The Sydney 2000 Olympics, promoted as the first "Green Olympics", endowed the city with a sustainable new organic part by the sea. A 640-ha industrial wasteland in Homebush Bay, previously intended for an urban renewal project after 100 years of industrial and military uses, was fully reinvented for the Games and transformed into the Sydney Olympic Park. After the end of the 2000 Olympics, the Park was converted to a multi-purpose facility which continues to host sporting events. The Sydney Olympic Park Master Plan encourages a broad range of residential, commercial, recreational and cultural activities that attract new assets. Urban design and landscaping principles adopted in the Master Plan emphasise excellence and efficiency (Mega 2010).

The 2004 Olympic Games have endowed Athens with an integrated Olympic Public Transport System, after the radical restructuring of the network throughout the greater Athens region. The legacy of the Olympics to the Greek capital includes 120 km of new roads, 90 km of upgraded arteries, 40 km of suburban railway, 7.7 km new metro lines, a 23.7 km tram network, modern train stations and a new state-of-the-art traffic management centre. The Olympic village has been transformed into high quality homes for low-income working families, which have been selected by draw.

The city of Cape Town owes much to the organisation of the 2010 World Cup. Improvements to the city centre, the downtown area known as the city bowl, and the public transport system attracted citizens and visitors. Concerns about safety and the haunting legacy of apartheid have been successfully addressed and sports were used as a means to overcome racial fears and tensions. The short distance to the Cape of Good Hope was truly filled with hope. This coastal city can hope a better future.

A triple Olympic city, London has long been a multi-faceted city and a great commercial and financial centre in its way to become a global centre for the arts,

culture and entertainment. The city has been enriched with new landmarks. The new iconic tallest building in Europe, the Shard, has been praised for its creative and bold design and criticised for disrupting the historic views of the London skyline. Already competing on the London skyline with the Gherkin, it is entering the world emulation of the tallest world marvels. Since the San Gimignano towers, this competition never stopped and leaves the Shard far behind the Burj Khalifa in Dubai, 828 m high.

Sustainability was a prominent criterion in the organisation of the 2012 London Olympics. The 2012 Olympics brought a revival to London's East End and in particular on a brownfield site, previously isolated from the city centre. Adjacent districts with warehouses have also benefitted and transformed into artist homes and workplaces. The Olympic stadium, hosting up to 80,000 participants, features flooring made from recycled tennis balls, while the wave-shaped Aquatics centre designed by Z. Hadid demonstrates sea-inspired design. The 115 m tall Orbit, a unique fusion of art, architecture and engineering, by A. Kapoor, is the landmark of the Olympic park which initiated its new life in the aftermaths of the Olympics. The Games acted as a catalyst for growth through the legacy of world-class infrastructures, business hubs and new vibrant neighbourhoods.

Functionality and aesthetics of the waterfronts are critical for quality of life, work and travel. Harbours, airports and railway and bus stations are gateways to cities, temples of welcome and farewell. The design of the Kansai International Airport illustrates human ingenuity and cooperative effort. Created in a typhoon zone three miles offshore, it is a good example of the integration of structure, function and environment with a sense of purpose. Protection of its coastal and marine environments was extensively studied and carefully addressed. The construction and administration of the airport were conducted by a special corporation established through joint investment by the national government, local authorities, and the private sector. The airport, inaugurated in 1994 as Japan's first international airport to be operational round-the-clock, serves the entire Kansai region, the historical, economic and political heart of the country.

8.4 Composing Better Policies for Better Lives by the Sea

Better strategies and policies should lead to even better policies and ultimately better lives in all cities and regions. Many organisations and think tanks have tried to measure and appraise the quality of life with the use of various quantitative and qualitative indicators. These issues raised questions about the inability of traditional measures of national and urban welfare built around macro-economic statistics to capture the reality of citizens' lives in a complex world and serve as significant yardsticks and compasses towards sustainable development.

Gross domestic product, a measure of the past, served to encapsulate as fully as possible the state of national welfare during the twentieth century. Already in 1962, Nobel Prize winner S. Kuznets suggested that "Distinctions must be kept in mind

between quantity and quality of growth, between costs and returns, and between the short and long run. Goals for more growth should specify more growth of what and for what". In 1968, R. Kennedy suggested ,with reference to the GDP, that "…it measures everything in short, except that which makes life worthwhile". These considerations are more valid than ever in search of sustainability metrics and become more complex in intense spaces like coastal cities (EC 2009).

Through indicators, cities try to measure and represent in concise form what they most value. Efforts for developing sustainability indicators were often linked to the greening of national accounts, aggregating and comparing data in monetary forms. Genuine saving indicators or Gross welfare indices attempt to broaden the usual measure of saving to account for the cost of environmental depletion and degradation and investment in human capital or social welfare.

Indicators should capture critical features of a city, such as the quality of coastal and marine environments, and contribute to making them more visible and transparent, help structure and harmonise data banks, enrich decision-making with relevant and timely information, assist appraisals, comparison and prediction, stimulate communication and promote citizen empowerment and participation. They should embrace all sectors and neighbourhoods contributing to the co-evolutionary process of sustainable development. An indicators assessment board should validate the set of indicators, and ensure that the framework is regularly updated and assessed.

A holistic policy framework has to be accompanied by a number of urban thematic indicators monitoring a city's performance in all fields contributing to sustainable development and according to its specific policy objectives. Aggregate indexes, like the human development indicator, the genuine savings or the ecological footprint and happy planet index, can shed light on the overall performance of coastal cities. The development of a sustainability index after thematic policy indicators is a complex task, since indicators have to be weighted according to their contribution to sustainability levels and all the levels of aggregation have to be taken into due account. Finally, it is important to highlight that no indicator can inform if a city integrates socio-economic and environmental policy objectives which however is at the heart of sustainable development practices (OECD 1996; EFILWC 1998).

Many cities have tested and introduced frameworks of indicators during the recent years. Seattle is often quoted as a classic example of a dynamic city, breeding ground of successful businesses such as Boeing and Microsoft, with a coherent set of award-winning indicators. The Seattle framework demonstrates that indicators can enhance local attributes like the health of the marine environment, reinforce communication processes and promote common understanding and political accountability (Sustainable Seattle 2008).

Qualitative indicators and state of the city and the environment reports are also very important. The City of Amsterdam initiated biannual "State of the City" reports, which proved to be inspiring monitoring tools. The reports draw information from municipal statistics and data banks, and other sources, including a survey after a questionnaire sent to residents. Results are compared to the national situation as well as to other Dutch cities. Such "State of the City" reports could offer an assessment of policies and a compass for the future in an accessible citizen-friendly form.

The "State of the City of Amsterdam" report offers a broad understanding of the city and its residents. The first 2000 edition focused on public participation. It then developed into a monitor to take the pulse of the economy, quality of life, education and culture, minorities and safety. The monitor highlighted the strong connection between education, employment and participation, provided insights into spatial and ethnic patterns and shed light on the city's congested housing market (City of Amsterdam 2004).

Boston is a city in constant transformation. The Boston Indicators Project, initiated in 2000 with the goal of assessing and presenting progress through 2030, Boston's 400th anniversary, offered new ways to understand the city and its neighbourhoods in a broader context. Simple yet fine-grained benchmarks help democratise access to information, foster insightful public debate, evaluate progress on shared civic goals, and report on achievements in the essential sectors of Civic Vitality, Cultural Life and the Arts, Economy, Education, Environment, Health, and Housing, and the cross-cutting topics of Children and Youth, Competitive edge, Fiscal Health, Race / Ethnicity and Sustainable development.

On the basis of these indicators, for more than 10 years, a series of imaginative biannual reports underlined the dynamics and identified emerging prospects for Boston. A first report on "The Wisdom of Our Choices: Measures of Progress, Change and Sustainability" introduced the framework of indicators through a rigorous process involving more than 300 experts and stakeholders. The report noted that the booming knowledge economy had creating an "education divide". A second report highlighted Boston's institutional, physical and cultural assets, but remarked a worrying brain drain, due to the move of young people away from Boston and Massachusetts, mainly because of the high cost of living (Boston Foundation 2001, 2003).

True progress should be widely shared and also problems should be jointly addressed. All following reports revealed particular aspects of the city and the region. The third report "Thinking Globally, Acting Locally: A Regional Wake Up-Call" noted that the region was suddenly competing for jobs and talent not only with other US regions, but with China, India and other emerging economies. It called for a coherent, collaborative response and a civic agenda. The fourth biennial report suggested remarkable civic progress during the years in which the local and regional economy strengthened considerably (Boston Foundation 2005, 2007).

Boston could be described as a resilient twenty-first century city striving to develop a more robust, sustainable local economy. The vibrant Innovation District tries to capture synergies and embrace collaboration. The city wants to reach up, and, in order to achieve it, tries to reach out. Greater Boston has ridden out the economic downturn better than most US cities. The 2012 report, celebrating a city of ideas, suggests that engagement is the key to prosperity and to sustainability. It signals that equality is a major issue, as the region's economic sectors create new wealth, but leave poorer parts of the city lagging behind (Boston Foundation 2009, 2012).

Boston has been among the top cities of the SustainLane US City Rankings of the 50 largest cities, an inspiring benchmark exercise on the unfolding efforts of

cities towards sustainable development. A San Francisco green media company, SustainLane, went through an examination of sustainability initiatives in US cities, including indicators of quality of life, such as local food availability, air and water quality, pedestrian and park space and road congestion. SustainLane also recognised the growth of clean technologies, developments in renewable energy, waste management, advanced transport services, alternative fuels and green buildings. Since the first SustainLane rankings in 2005, hurricanes and crises underlined vulnerability and the need to foster urban resilience.

Coastal US cities topped the SustainLane City Rankings focusing on urban practices which differ across the country and can reveal their distinctive figures. The US winner of the 2005 and 2008 ranking exercises was Portland, recognised as the most sustainable city, followed by San Francisco, Seattle, Chicago, New York, and Boston. Portland particularly excelled in clean technology and green building development, overall quality of life, and sustainability planning and management. Citizens pinpointed their high quality of life and engaged involvement in urban policy-making, boards, projects and practices that impact sustainability.

The vision of Portland promises a sustainable future that meets today's needs without compromising the ability of future generations to meet their needs. The city accepts responsibility to support a stable, diverse and equitable economy, protect the quality of the air, water, land and other natural resources, preserve native vegetation, fish, wildlife habitat and other ecosystems, and minimise human impacts on local and worldwide ecosystems.

International comparative analyses are usually constrained by culturally-dependent definitions and statistics. Until recently, there was no harmonised definition of what is a city for the European Union and OECD countries. This weakened the comparability of cross-country analysis of cities. To improve the situation, the OECD and the European Commission developed a new definition of a city and its commuting zone in 2011. This new definition identified 828 cities with an urban core of at least 50,000 inhabitants in the EU, Switzerland, Iceland and Norway. Half of these European cities are relatively small with a centre between 50,000 and 100,000 inhabitants. Each city is part of its own commuting zone or a polycentric commuting zone covering multiple cities. These cities host about 40 % of the EU population without their suburbs, which together with other towns cover another 30 % of the EU population. In addition, this methodology identified a further 492 cities in Canada, Mexico, Japan, Korea and the United States. The cities and commuting zones together, called Larger Urban Zones, account for 60 % of the EU population (OECD 2012b).

Cities use indicators to measure their performance in service delivery and sustainable development, but there has not been a comparable standard for use by local authorities. Existing indicators are often not standardised, consistent, or comparable over time or across cities. Indicators are traditionally limited by national differences in data definitions and collection and composition methods. Systematic territorial indicators are necessary complements to national indicators serving for international comparisons. Regularly reporting on territorial progress towards international targets and commitments can promote policy coherence and accountability of national decision-makers at the local and international level.

In 2014, the first ISO standard for city indicators was launched, providing city managers, politicians and planners with the opportunity to objectively evaluate their progress and compare their achievements against other cities. The ISO 37120:2014 has been developed as part of an integrated suite of standards for sustainable development in communities. It covers numerous themes, including education, energy, transportation, governance, finance, shelter, safety, sanitation and recreation. The standard is designed for use by any city, municipality or local government irrespective of size and location or level of development. Recognising that urban conditions are very diverse in terms of resources and capacity, the indicators have been divided into core measures, which must be followed, and supporting measures, which should be followed.

Profile indicators also provide basic statistics and information to help comparison purposes. This first edition is based on the Global Cities Indicators, supported, amongst others, by the World Bank, UNEP and UN-HABITAT. The Global Cities Indicators Programme suggested that indicators should be standardised, consistent and comparable over time or across cities. A single comprehensive system for measuring and monitoring city performance and urban quality of life should facilitate programme monitoring over time and enhance governance accountability.

Further experiences with indicators for sustainable urban development include the EU Reference Framework for Sustainable Cities (RFSC). The RFSC is an online toolkit for the integrated approach of all urban issues contributing to smart, sustainable and inclusive cities. Designed for European local authorities, the RFSC provides a common space for very diverse cities to share their experiences and enrich their approaches. The initiative helped many local authorities to shape their sustainability policies and set up the monitoring frameworks. By joining the RFSC community, cities get access to various services, including peer learning, dedicated training sessions and advice from urban governance experts.

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