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European and Asian Sustainable Towns

New Towns and Satellite Cities in Their Metropolises
Pascaline Gaborit (ed.)

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Forewords

Johannes HAHN

Member of the European Commission in charge of Regional Policy
February 2010 – February 2014

We all know the importance of cities in Europe and in the rest of the world. Given the right conditions, cities are where most innovation takes place, where the economy grows, where jobs are created, where we can best fight climate change, where scarce resources can be used with greatest efficiency. Cities are where the opportunities lie for a more sustainable future. Without them we will not reach our European goals in terms of smart sustainable and inclusive growth. This goes for all cities, in Europe as in Asia.

The European Union’s Cohesion Policy has played a crucial role over the past 25 years in helping regions and cities to compete in the European Single Market and to catch up with more prosperous areas or to restructure their economies away from declining activities and develop new opportunities. This will be reinforced as we head towards the year 2020 with a new Cohesion framework that includes a greatly strengthened urban policy dimension. While this will be the foundation, we can do even more for our cities: by ensuring that the various EU policies that have an impact on our cities, for instance in research, transport, energy or culture, are well coordinated in order to provide a joined-up, integrated approach and by encouraging the European, national, regional and local authorities to work with and support each other in an effective multi-level governance system.

Developing an integrated, place-based policy is not simple. But the EU has gained considerable experience in this matter, which has increasingly attracted the attention of key actors in countries outside Europe, notably in India as well as in China where the Commission established a regional and urban policy dialogue in 2006.

The sharing of good practice and success stories between one region of the world and another is an effective way to promote better and more
effective policy. Cities in Europe and in Asia are a laboratory in which much of our future will be designed. This is why the EAST project is so important. It shows that experience from European cities is transferable to Asian cities and vice versa for the benefit of all.

I hope that you will find this work inspiring and I look forward to enlarging the dialogue with cities outside Europe in the future.

*

Gerhard Stahl

Secretary General, Committee of the Regions
April 2004 – April 2014

Urbanization and sustainable development are inextricably linked. In both Europe and Asia cities are the places which bring together the major opportunities and challenges for a more sustainable development path.

Today over half the world’s population lives in urban areas. In Europe the urbanization rate is 72% and still growing. By the year 2050 the world’s urban population is expected to increase by 2.6 billion. Most of this growth will be concentrated in Asia and Africa. Asia, in particular, is projected to see its urban population increase by 1.4 billion.

Cities are generators of innovation and economic growth and, thanks to agglomeration effects and positive externalities, capital cities and larger metropolitan regions generally have superior economic performance. Metropolitan regions account for 59% of Europe’s population but generate 67% of its GDP. However, cities also have the highest rates of unemployment and poverty and many are characterised by growing levels of social exclusion, segregation and marginalisation. And while cities have major potential to contribute to the reduction of energy consumption and CO₂ emissions (because compactness and population density permit more energy efficient forms of housing and transport), uncontrolled urban sprawl has hugely negative implications for the environment and resource efficiency.
Europe needs its cities to reach its Europe 2020 strategy objectives of smart, sustainable and inclusive growth. In particular, Europe’s global competitiveness depends on its cities. The task of realising their economic and job-creation potential and confronting the complex societal challenges they face demands that Europe’s cities work in close cooperation with other levels of government, the private sector and civil society. Developing a well-articulated multi-level governance framework is therefore crucial. So also is a more integrated territorial approach in which sectoral policies are developed and adapted taking account of cities’ needs and potentialities. And cities cannot be successfully developed in isolation or solely within the confines of administrative boundaries; policy must recognise the interdependence of cities and their surrounding areas and address the needs of functional urban regions. Above all what is important is good local governance, based on the key principles of democracy, transparency, accountability and citizen participation.

Principles such as multi-level governance, policy integration, functional orientation and local democracy are equally relevant for urban development in Asia. Cities have much to gain by sharing their experiences and good practices and EU policy provides important supports to help them do so, including also with their counterparts in Asia. The dynamic pace of urbanization in Asia is driving profound socio-economic change and creating more prosperity as well as huge environmental challenges. The European approach to sustainable urban development can be shared to the advantage of Asia’s cities.

As the representative political assembly for Europe’s regions and cities, the Committee of the Regions has contributed actively to political debate at EU level on urban policy issues, including in the context of the most recent reform of cohesion policy which introduces a number of important new features concerning cities. The Committee of the Regions is also an active participant in the EU-China Urbanization Partnership Forum. I was personally very pleased to be part of the CoR delegation to the most recent forum in Beijing in November 2013. On that occasion, and during other conferences in which I have participated in recent years, I witnessed at first hand the breathtaking pace of China’s urbanization. I am convinced that Europe’s rich experience of urban development has much to offer and that closer decentralized cooperation between Asia and Europe, building on initiatives such as the EU-China Mayors’ Forum, can be very beneficial for the sustainable development of Asia’s cities.

Together let us make progress towards a more harmonious society and build our common future.
Introduction

Faced with urbanization needs and growing urbanization problems, the sustainable development of cities does not only lay in technics, research and innovation... It results from the combination and mixture of different ingredients related to social cohesion, local economy, environment, culture, but also the autonomy of local authorities and the adoption of the most appropriate system of governance.

The urgent need to create better and liveable places is now essentially linked with the integration of environmental principles to prevent the waste of resources and to mitigate climate change by restricting CO₂ emissions. This concern for environment is now immediate and existing in all areas linked to cities planning, management, as well as within local public policies that try to integrate the different elements for the creation of better and more sustainable places.

The development of new districts or satellite cities in metropolises is perceived as an attempted solution to provide better homes, answer to housing needs and to solve urban traffic congestion. In the creation of new areas or towns however, the pace of construction and decision making is quicker than elsewhere. As pilot experiments occur, in order to find solutions for the difficult challenges of creating a more liveable place, the problems are also concentrated (quick construction of housing areas without always taking into account architectural, environmental, and user friendly elements). The difficulties are also reflected in the different challenges in terms of service provision, financing of operations, possible zoning of areas to urbanize, as well as image and identity of the place.

Indeed new urban developments are not only paradise islands for urban planners and engineers to work on new models, these areas also question all aspects of sustainable development: resources and location, communities and social cohesion, culture and local employment. Moreover, once they are designed following a master plan approach, it is eventually difficult to modify, update and change the plans to integrate for instance better environment friendly principles... In new developed areas, the risks of failure are also gigantic and need to be taken into account...the failure of new districts and towns may result in the creation of ghost towns and empty cities where the inhabitants would not live...
These questions of new districts and satellite cities are now immediate in China and India where the urbanization is extraordinary due to rural migrations and the pressure on cities to expand and provide housing as well as facilities for inhabitants and citizens without raising too many inequities in terms of health, employment and access to local services.

This is why the EAST project, a project co-financed by the European Commission, tries to develop exchanges and create bridges among local authorities in Europe (Basildon), India (city of Naya Raipur) and in China (Lake Dianshan or Qingpu and Baoshan) in the surrounding areas of Shanghai, with the coordination of the ENTP (European New Towns and Pilot Cities Platform) as lead partner.

The project’s activities were reflected in the organization of several panels of experts, regular exchanges among the partners, studies, the development of expertise, reports and guides of good practices. In general, it included different forums of exchanges on sustainable development like forums on sustainable urbanization occurring especially in Europe and China but also in India.

There were different key points, remarks and findings illustrated in the different project's exchanges:

1. Cities operation (operation of renewal but also designing cities) should not be done for the sake of success of financial or real estate operations but for the people and inhabitants. Indeed, behind the technics lies a foundation: the current population and the population to come.

2. In the new districts' development there needs to be a balance between the different stakeholders: the public sector, the people (remaining at the central place) and the private sector in combination with the respect of environment and the post Millennium Development Goals. The public sector needs an articulation between the national, provincial and local levels (the latter being the closest from the citizens). The public has targets and needs funds (this is why there are actions on land sales and development, but acts in a context of scarcity of resources). The private sector needs profit, return on investment and to face the risks of failure, with a balance between the short and long term.

The articulation and balance between the stakeholders is therefore neither obvious nor easy to achieve. The main challenge is how to find a balance between these interests in creating rules and space for negotiation, while minimizing conflicts and respecting higher goals (environment, people, culture, health, etc.).
3. The autonomy of local authorities is important: indeed local authorities are at the crossroads between national interests and peoples’ needs.

4. Environment is key but should not overshadow people’s needs. In the example of slums and informal housing, CO₂ emissions per inhabitant are very low but other indicators such as people’s health, education, access to employment and drinkable water show that this is no future for what we call “sustainable development” in very general terms. On the contrary, when environment is a common concern among the different stakeholders, it reaches better chances of success (for instance in the energy sector: the public, private, and civil society sector can join forces as there is a common interest compatible with profit).

5. The question of city metabolism can seem abstract, except if you look at food supply chains, but also waste management. As mentioned in the article by Maximilian Rech, China’s municipal waste management is equivalent to 0.98 Kg/day (versus 1.64 in Germany), but incineration and recycling can also produce energy (as well as pollution and food intoxication with dioxins). Research shows that there is a need to reduce waste, improve recycling and source separation. Another suggestion is to integrate better climate into urban planning strategy (for instance planning in a Monsoon climate environment should integrate a better system of water collection as developed by Alpa Nawre later in this publication).

6. Sustainable urbanization is linked to health (air, water, food pollutions) but also provision of healthcare facilities, access for all population including vulnerable groups to drinkable water and health services.

7. There is a need to reduce the car dependency. This is necessary in a context of environmental protection but also traffic congestion.

8. Links with the local economy need to be taken into account for a balanced local development (increase the housing/job ratio at neighborhood level). This is difficult however, to encourage people to live close to their home.

9. In large scale investment, find a balance between economy, cultural heritage and between old and new; balance culture, industry, as well as heritage and community investment. At the same time, there is a need to build trust and credibility for investments.

10. The risk of ghost cities (empty cities, created but that remain without population) is an important topic. In this framework, it is necessary to take into account parameters such as the lifespan of buildings, connections, local economy, and marketing.
11. Integrated approach: cities cannot be built only by engineers; planners, architects, sociologists, economists, people without qualifications. Artists, and creative people also need to be involved as innovation would not occur without creativity. This is why all city departments (among others) need to work together.

The literature on sustainable urban development describes it as an emerging concept and a mirror of the diversities within cities. It first referred to the concept of sustainable development as described by the Brundtland report *Our common future* in 1987: “A development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” Some authors have adapted this definition to the urban sphere by adding several conditions or pillars necessary to achieve sustainable urban development such as the sustainability of physical infrastructure, the local economy, and the sustainability of the governance: institutions, civil society.

Others have proposed another methodology based on the analysis of case studies. Finally other works have questioned the application of the concept of sustainable development to international cooperation.

The book goes a step further than the content that had been elaborated for the book *New Medinas: Towards sustainable New Towns*. It reflects different theories, approaches, disciplines on how to approach sustainable urban development in different cities, as well as in different countries. For that it contributes to the literature on sustainable urban development as well as on the international cooperation of cities.

There is no recipe for livable cities. The EAST project has opened space for further dialogue. It confirmed that the cooperation is not easy but rather remains as a collective challenge for the different stakeholders.

throughout the project and who originate from different countries (India, China, Switzerland, Germany, the Netherlands, the United States and France). It proposes analyses, interconnected thoughts and experiences spanning from different places and representing different backgrounds and disciplines (researchers, urban planners, architects, political scientists, practitioners), which makes the richness of this book.

While some authors like Yogesh Agashe and Isabelle Milbert concentrate on the urban reality in India with historic and contemporary perspectives, others like Leon Yu and Harry den Hartog describe the situation of the New Towns around Shanghai with their challenges and perspectives.

General contributions include the approach of Jeffrey Raven on the resilience of cities to answer to climate change, and a comparative perspective on sustainable urban development by Pascaline Gaborit.

The question of innovation in urban design is developed by Honoré van Rijswijck whereas Jean-Pierre Marchetti developed a chapter on public consultation.

Professor Alpa Nawre calls for the development of an urban planning system that is more respectful to the location. She takes the example of the urban planning in India which takes into account the Monsoon climate. A highlight on waste management’s good practices in China and Europe, written by researcher Maximilian Rech, also shows the potential building blocks for cooperation between East and West.
A sustainable and resilient low-carbon future demands that today’s obsolete development patterns be reconfigured. Mitigating global climate change involves developing efficient neighborhoods, protecting farmland and open space, building low-energy affordable housing and providing efficient transportation choices. Progressive communities can meet carbon-reduction goals and sustain their populations through challenging times and changing conditions. Their compact urban form reduces Greenhouse Gas emissions through spatial efficiencies, pedestrian access to public transportation and preservation of open space and habitat.

In their search for future urban models, forward-thinking cities around the world are becoming laboratories of visionary urban design ideas and solutions. Useful lessons are emerging from countries all around the world. A task of global significance, this period of intense applied research will influence how cities and regions are designed in the century ahead – from retrofitting existing cities in the United States and Europe to challenges facing rapidly-growing urban districts in Asia, Africa and Latin America.

Among the top emitters of greenhouse gases, the United States, India and China offer compelling case studies in this regard. Certain overlapping themes are emerging from these three large countries as they integrate sustainable and resilient policies into their built environment. These three nations are shaping “green city” guidelines relevant to an extraordinary diversity of communities within each nation’s borders. The wide variety of urban settlements within each country challenges policymakers attempting to develop “apples to apples” sustainable urban planning and design guidelines across
varied urban scales, climate, socio-economic conditions and spatial configuration.

Project EAST (Euro-Asia Sustainable Towns) has provided an important forum for exchange of expertise and experiences between European, Indian and Chinese urban experts and policymakers related to sustainable and resilient urban development, planning and design. The Project EAST forums in Raipur/Naya Raipur (India); Baoshan and Qingpu (China), among others, reveal the decision-making process involved in designing and planning these aspirational communities with limited capacity and few tested references. During these forums and exchanges, the United States’ experience in this field was often cited, and it is an important reference in this paper’s focus on sustainable and resilient urban design.

I. Sustainable Resilience: Developing the Capacity for Constant Change

Sustainable and resilient urban design leverages integrated systems and strategies across spatial scales to strengthen communities, achieve reduced energy loads, healthy environment and enhanced civic life. Resilience can be defined as the ability of a body to “bounce back” following a catastrophic event. Resilient communities or buildings are increasingly evaluated for their ability to “fail safely” or their capacity for “passive survivability”. However, resilient planning and design should be more than a defensive posture; it must be consistently forward-looking to embrace new paradigms to achieve a high quality of life for urban workers and residents. Resilient cities exist as part of a dynamic continuum, and so they must develop physical and institutional capacity for constant change, rather than responding to specific, anticipated events. Rather than “bounce back”, resilient communities must instead “bounce forward” by adapting and thriving in constant change; sustaining their population in energy-efficient settings through desirable amenities. These planning and urban design amenities require interdisciplinary skill sets including Urban Design, Transportation, Architecture, Landscape Architecture, Climate Science and Public Policy:

- Compact, efficient settlements
- Low-energy, passive systems
- Pedestrian-friendly streets
- Community access to public space and services
- Resource conservation / recycling / re-use
- Mixed housing and incomes
II. The Value Proposition: Management and Governance

When world leaders return to their countries after signing international environment and climate change accords, there is a question of whether they can actually deliver on their promises. Lofty agreements to transform their cities into examples of low-carbon, sustainable settlements often meet hard realities back home. As leaders’ airplanes fly low over their cities in preparation for landing, the view out of the window can be unnerving.

From the air, is the view of compact and well-connected urban settlements, or is it of chaotic mega-regions whose crumbling traffic-choked arteries are barely discernible through the haze of pollution? Can green natural zones be identified, weaving through a densely built environment, or is the view of homogenous impermeable pavement baking under the heat of the sun or flooded from recent rainfall? This aerial perspective reveals that challenges posed by current development patterns are not just transportation challenges, or just housing challenges, or environmental challenges. Challenges are intertwined across these sectors.
These climate/ GHG mandates signed by national governments bring compliance pressure holistically across sectors on communities and regions. These laws impact jurisdictions holistically, as they face cross-cutting requirements to bring transportation, zoning, building code and economic development policies into alignment. Among the greatest constraints to this holistic approach to sustainable development are misaligned management and governance capacity; parochial jurisdictional boundaries and short electoral or accountability cycles. Mandating collaboration between independent, competing towns and regions so that they do what is best for the region or planet (and not necessarily in their own short-term interests) is difficult. Agency departments within government administrations are often insufficiently coordinated to capitalize on cross-disciplinary synergies. Ad hoc, disconnected approaches fail to exploit synergies between professional practitioners. Silos of expertise are difficult to integrate over the long-term due to different departmental missions. A central stumbling block to responding to this need remains the poor interdisciplinary connections between the various policy experts, technical specialists and integrators.

Urban-scale Sustainable-Resilience Designation Systems are created to build capacity, provide prescriptive measures and performance standards to achieve sustainable, resilient communities, and respond to the questions: How and where do we begin? Which process to adopt? How to develop indicators to measure success? How to gain support for controversial sustainability measures? Which sectors will be affected? How to define success? Where will we obtain the funds? Will jobs be
created? How is a “sustainable planning” process different from the current “planning process? How to prevent sustainability investments from disappearing into an opaque “black box” of public expenditures?

Sustainable rating systems have been developed or are currently in development at the municipal scale to provide resources for the development of sustainable communities. A recent UN Habitat study estimates that more than 80 tools or instruments address urban sustainability and environment worldwide. Major international organizations such as Asian Development Bank (ADB) and the World Bank are working to build capacity and provide benchmarking tools to policymakers and technical experts. Green Cities, an ADB Urban Development Series publication (2012) describes spatial development and green technologies for Asian cities.

For communities intending to launch sustainable and resilient urban design initiatives, sustainability-resilience rating tools or specific methodologies are useful if there is demand for it within this context; if it addresses a clear user group and if it is accompanied by a capacity training process. In addition, chances of successful tool applications are higher if methodologies are embedded in existing planning and design processes, and in overall supportive institutional settings, including access to funds. From a regulatory standpoint, they also provide a degree of certainty around risk mitigation which underlies public/private investment. Numerous American cities are realizing that alignment with aspects of the leading municipal sustainability frameworks may help leverage valuable staffing resources and align their policies to capture public and private investment.

The decision-making process engages multi-sector actors, providing wide-ranging expertise in green transportation, greenhouse gas reduction strategies, green buildings, eco-restoration, energy technologies and urban design. A sustainable planning process should be implemented across spatial scales and systems. From the original sustainability principles through practical operations, this approach implements sustainable actions through an integrated process overlaying desired outcomes onto sectors and physical networks. Success in this process can be measured from the perspective of a community’s quality of life, where integrated sustainable strategies create synergies across sectors encouraging positive social and economic development while mitigating the effects of climate change.

III. Toward Sustainability and Resilience

In the march toward greater urbanization, the United States, India and China find themselves in different phases of population migration.
to cities. The US post-industrial cities are in varying states of expansion and contraction, reflecting shifting demographics and population. Controlling “suburban sprawl”, configuring “edge cities”, attracting and accommodating “knowledge workers”, the “creative class”, and even managing “contracting cities” have become part of the American planning/urban design lexicon and agenda. From young cities that are facing rapid growth to older industrial ones that have lost population and jobs, forward-thinking local communities and regions have often been at the forefront of sustainable approaches to development.

Recent federal government initiatives in the United States have attempted to provide more robust national leadership to configure sustainable and resilient communities, backed by federal funding. But in the absence of umbrella agreements between administration, policymakers, industry, advocacy groups around climate change, carbon “cap and trade”, resilience, and sustainable cities, some federal initiatives are attempting to circumvent the legislature by using federal agency regulations to make progress. For example, US Environmental Protection Agency (EPA) regulations have codified CO\textsubscript{2} as a pollutant, which provides the basis for muscular federal regulatory action. These ad hoc measures push an agenda that must be navigated through a series of reactive lawsuits.

In 2009, the U.S. Environmental Protection Agency (EPA) joined with the U.S. Department of Housing and Urban Development (HUD) and the U.S. Department of Transportation (DOT) to help improve access to affordable housing, more transportation options, and lower transportation costs while protecting the environment in communities nationwide. The intent of this cross-sector, inter-agency Partnership for Sustainable Communities between federal agencies is to

- Enhance integrated planning and investment
- Provide a vision for sustainable growth
- Redefine housing affordability and make it transparent
- Redevelop underutilized sites
- Develop livability measures and tools
- Align HUD, DOT, and EPA programs
- Undertake joint research, data collection, and outreach

Through a set of livability principles and a partnership agreement that will guide the agencies’ efforts, this partnership coordinates federal housing, transportation, and other infrastructure investments to protect the environment, promote equitable development, and help to address the challenges of climate change. Other agency initiatives include the US EPA’s Global Change Research Program (GCRP) for Urban Resilience.
The purpose of this initiative is to develop benchmarks that communities can use to assess their resilience to climate change and contribute to a greater understanding at the national scale of the resilience of cities across the United States. US Office of Housing and Urban Development (HUD) Global Sustainable Urbanization Development Indicators Working Group is providing metrics of global best practices.

China and India share an unprecedented rural to urban population migration, with all the tension and opportunities that this represents. The trajectories of their development vary widely as a function of regional investment toward first-tier and second-tier cities. Some estimates claim that at the current rate of migration from rural to urban areas, India will need five hundred new cities in the next decade (IBM/DMIC, 2013).1 According to World Bank President Robert Zoellick at the 2012 Bao Forum (Xinhuanet, 2012), 70% of China’s population is expected live in urban areas by 2035.2 In response to these trends, Chinese policymakers and experts at the China International Urbanization Forum in 2012 called for a focus on quality, rather than quantity of urbanization.

Infrastructure investment in China is currently more robust than in India, but the Indian government is redoubling its efforts, spurred on by

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the promise of payoff from these investments. The 2010 McKinsey and Company Report *India’s Urban Awakening* calculated that infrastructure investment in India could generate up to 1.5% to annual GDP growth. The Delhi-Mumbai Industrial Corridor project is a big push to strengthen India’s low-carbon infrastructure capacity and create new green cities. According to Vibhav Kant Upadhyay (*India-Japan Global Partnership*) in his October 2013 presentation in New York, the Indian government is estimating a $100 billion trunk investment for DMIC. For the 1,450 km belt between Delhi and Mumbai, Indian policymakers are seeking inspiration from the Japanese model, particularly the Tokyo/Hiroshima industrial zone, and have formed the India-Japan partnership (IJGP) to develop DMIC. According to Mr. Upadhyay, the high-speed rail corridor will boast speeds of up to 200 km/hr, relieving pressure on roadway freight and passenger traffic and encouraging compact, transit-oriented settlements.

Local and regional government initiatives are playing an increasingly important role as laboratories for innovation to drive the national urban agendas in the United States, India and China. City-led networks, research institutes and non-governmental organizations (NGO’s) are working directly with city leadership to meet expertise needs of the private-sector and local municipalities. These entities are directly or indirectly affiliated with the public or private sector and play important advisory roles in shaping the urban agenda. ICLEI (Local Governments for Sustainability), the US Green Building Council (USGBC) and C40 Cities have developed sustainability frameworks, tools and knowledge-management capabilities targeted to municipalities worldwide. The USGBC’s *LEED for Neighborhood Development* (LEED ND)’s project-driven mandate ranges from storm water capture to traffic-calming and urban density incentives. The New York region-based Regional Plan Association has a venture with Siemens and Arup on a *Toolkit for Resilient Cities* (2013); and McKinsey and Company is working with experts on the value proposition for developing green districts. The Brookings Institute is providing the city of Washington DC research-based standards for walkable urban places. The Shanghai Institute for Science of Science (SISS) within the Shanghai Municipality and Shanghai Academy of Science and Technology, provides research and guidance to local government and private sector on forward-thinking urban technologies and policies. In India, NGO’s such as the Mumbai-based Urban Vision is among the emerging think-do tanks working with real estate entities, designers and policymakers to strengthen sustainable urban design operations. The cities of Raipur/Naya Raipur (India); Baoshan and
Qingpu (China), Basildon (UK) among others are partners in Project EAST, to promote “best practice” exchanges of city policy, planning and design expertise.

A coalition of American cities and experts developed STAR Communities (Sustainability Tools for Assessing and Rating Communities), a national, consensus-based framework for gauging the sustainability and livability of U.S. communities. Under the guidance of the not-for-profit organizations ICLEI-USA, USGBC and the National League of Cities, STAR technical advisors have developed sustainable goals, indicators and metrics for entire cities in the United States since 2008; and the resulting STAR Community Rating System was launched in autumn 2012. This strategic planning and performance management system offers local governments in the United States a road map for improving community sustainability and helps communities address their interconnected concerns – economic, environmental and social. STAR’s urban design goals, scope and measures range from Green Infrastructure, Resilience and Climate Adaptation, Comprehensive Planning, Transportation and Mobility, Compact and Complete Communities and Natural Systems.

Regional cooperation between jurisdictions and cross-sector collaboration between local, regional and national government agencies is necessary to break down barriers to achieving compact development, resource conservation, spatial efficiencies, and pedestrian access to public transportation, open space and habitat preservation. The governance and jurisdiction over urban and regional systems and networks is complex. From waste processing to transportation networks, regional authorities often operate important infrastructure systems that serve municipalities. Since ecological systems such as watersheds rarely follow local government jurisdictional boundaries, a high level of intergovernmental collaboration is often a critical success factor for effective ecological management.

Through a set of “Livability Principles”, the US federal Partnership for Sustainable Communities is shaping the urban planning and design approaches at the local level by encouraging American communities to:

- Provide more transportation choices
- Promote equitable, affordable housing
- Enhance economic competitiveness
- Support existing communities
- Coordinate and leverage federal policies and investment
- Value communities and neighborhoods
<table>
<thead>
<tr>
<th>City</th>
<th>Population</th>
<th>Climate</th>
<th>US Urban Sustainability and Resilience: Policies Under Implementation</th>
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</thead>
</table>
| New York, NY                 | 8.2 million; | Humid – Continental | Alternative transportation: 200 miles of bicycle lanes; bus-rapid-transit (BRT)\(^3\)  
Carbon reduction: GHG reduction by 30% below 2005 levels by 2030\(^4\)  
Green building code\(^5\)  
Watershed protection: Over 13,500 acres of land acquired to protect water supply from upstate New York\(^6\)  
Stormwater retention projects\(^7\)  
Tree canopy, permeable surfaces: The Million Trees Plan\(^8\)  
Commonwealth of Transportation (DOT) has completed the City’s ambitious goal of building 200 bike-lane miles in all five boroughs in just three years, nearly doubling the citywide on-street bike network while reshaping the city’s streets to make them safer for everyone who uses them.  
The new comprehensive green infrastructure proposal, which has yet to achieve EPA or Philadelphia city council approvals, would call for $1.6 billion in investment in these natural systems over a 20 year period.  
Stormwater Charge = (Gross Area Rate * Gross Area of Property) + (Impervious Area Rate * Impervious Area of Property).  
| Philadelphia, PA             | 1.5 million; | Humid – Continental | $1.6 billion in investment in green infrastructure over 20 years\(^9\)  
New buildings required to capture the first inch of stormwater on site\(^10\)  
Stormwater fees calculated based on impervious surfaces\(^11\)  
\(^3\) Department of Transportation (DOT) has completed the City’s ambitious goal of building 200 bike-lane miles in all five boroughs in just three years, nearly doubling the citywide on-street bike network while reshaping the city’s streets to make them safer for everyone who uses them.  
\(^7\) http://www.dec.ny.gov/lands/58930.html#Project.  
\(^9\) The new comprehensive green infrastructure proposal, which has yet to achieve EPA or Philadelphia city council approvals, would call for $1.6 billion in investment in these natural systems over a 20 year period.  
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</thead>
</table>
| San Diego, CA    | 1,266,000; Arid-Mediterranean | Tie-in with “Waterwise”: Southern California consumption mitigation strategies<sup>14</sup>  
Construction of two treatment centers for recycling harvested grey water for industrial and landscaping purposes (and ultimately at potable levels)<sup>15</sup> |
| Seattle, WA      | 594,000; Marine Coast     | 90% of the city’s energy supply comes from renewable sources – primarily hydro-electric<sup>16</sup>  
Tiered rate structure, sewer charges tied to water consumption<sup>17</sup>  
Seasonal rates fluctuate in dry summer and wet winter<sup>18</sup>  
Coordinated regional and local-scale strategies: Seattle Public Utility (SPU) undertaking dynamic downscaling studies related to water supply, urban drainage and Global Climate Model (GCM) outputs<sup>19</sup> |
| Portland, OR     | 550,000; Marine           | “Green Belt” surrounding compact city<sup>20</sup>  
Carbon mitigation: Reduction of carbon emissions by 40 percent by 2030, and 80 percent by 2050, despite rapid population growth<sup>21</sup>  
Water Bureau conducts an annual estimation of the bureau’s “carbon footprint”<sup>22</sup>  
Alternative transportation: City-wide network of rail, trolley, non-motorized transport<sup>23</sup>  
Water Annual Portland Sustainability Plan: integrated strategies and performance indicators for water supply and stormwater drainage<sup>24</sup>  
Portland Water Bureau Sustainability Action Plan, updated annually – from the city Climate Action Plan<sup>25</sup> |

<sup>16</sup> http://www.seattle.gov/light/fuelmix/.
<sup>17</sup> http://www.seattle.gov/util/MyServices/Rates/SewerRates/index.htm.
<sup>18</sup> http://en.wikipedia.org/wiki/Seattle#Climate.
## IV. Configuring Sustainable and Resilient Communities

A sustainable and resilient community is more than a checklist of performance indicators, and urban design is more than a collection of buildings. If urban design is the art and science of configuring neighborhoods, communities and systems to enhance livability then successful sustainable and resilient urban design should be measured from a civic building perspective, when program and physical form provide the integrated resilience necessary for positive economic, social and ecological elements to flourish over time.

The recent Project East sessions in Raipur/Naya Raipur (India); Baoshan and Qingpu (China), have reinforced the importance of protecting each community’s unique spirit, its genius loci in the face of rapid transformation caused by redevelopment... This intangible spirit is woven from the fabric of human relationships revealed in its public spaces. The interaction of urban form and its inhabitants reveal powerful social, environmental and economic factors.

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26 (This report is intended to update the information in the 2003 document and to incorporate the use of water budgets as a tool in drought response actions) https://www-static.bouldercolorado.gov/docs/drought-plan-volume-1-1-201303281118.pdf.


29 http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheadername1=Content-Disposition&blobheadername2=Content-Type&blobheadervalue1=inline;&filename=%3D%22Smart+Grid.pdf%22&blobheadervalue2=application/pdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1251769834847&ssbinary=true.
From street patterns, hierarchy, scale, streetscapes, vistas, blight and land use, the city’s built environment acts as a generator of social, economic and ecological life. Physical infrastructure and social infrastructure systems operate in a symbiotic relationship, where physically disconnected districts often reinforce poor social and environmental conditions.

To reinforce neighborhood livability and community spirit, the configuration of new development zones should favor a rich and multi-layered public realm geared to people rather than the automobile. Pedestrian-friendly public spaces reinforced by local shops and services are threatened by single-use zoning and on-grade parking lots surrounding buildings. Narrow “stellplatzfrei” local streets in some new German cities require vehicles to be driven at walking pace, giving priority to other users. This contemporary “best practice” would align with traditional street geometry in Qingpu and Raipur, where children can be seen playing unattended in the street.

Silos that narrowly define Energy, Transportation, Waste, Water, and Green Infrastructure/Natural Systems undermine inherent synergies between these systems. Instead, “cascading” initiatives for one system, positively impact other systems, reinforcing the concept of integrated strategies across systems and sectors to create efficiencies and financial savings.
Successful planning and design practitioners must broaden their scope of services to engage stakeholders and implement desired ecological outcomes across spatial scales, sectors, jurisdictions and urban systems. Through a multidisciplinary team of energy specialists, economists, architects and urban designers, land use and transportation planners, policy researchers, environmental scientists, civil, waste, water and environmental engineers, integration across sectors and disciplines exploits opportunities and synergies for sustainable and resilient development across spatial scales.
Building layout and site strategies to capture stormwater, increase comfort, and reduce energy loads are crucial components of sustainable and resilient settlements. These passive strategies include configuring green infrastructure; urban ventilation; and passive solar design.
Silo-breaking benefits between these systems encourage urban and regional stakeholders to implement desired sustainability outcomes across spatial scales, technical systems and jurisdictions:

- **Energy** – Public Space to support microclimates-comfort, moderate urban heat island effect, integrate Green Infrastructure and Open Space into urban areas, reinforcing low-carbon building emissions;
- **Water** – Maximize public space potential, create / preserve habitat, wildlife adaptation to climate change, and mitigate flood risk;
- **Waste** – Eliminate “waste” as a concept through cyclical capture and use of nutrients;
- **Transportation** – Reduce fossil fuel emissions by integrating alternative transportation greenways into urban core.
- **Green Infrastructure-Natural Systems** – mitigate stormwater impacts, enhance neighborhood micro-climates and encourage access to healthy recreation.

These infrastructure systems are part of a physical network, much like a theater of operations. The systems’ physical networks fall within the jurisdiction and responsibility of actors and stakeholders at each spatial scale, and this shapes how integrated sustainable and resilient urban design strategies are implemented at a project level by planning and design practitioners.
For example, a robust system of green infrastructure in urban areas mitigates heat waves and limits stormwater flooding while enhancing the public realm. Overlapping this hazard mitigation with desired outcomes is a prudent allocation of scarce resources while yielding multiple benefits.

**Urban Strategy cards: Interdependent Strategies: STAR Communities**

The image shows urban strategy cards under overall categories of Environment, Economics and Equity, with one card for each strategy. Clustered cards illustrate interdependent strategies. In this image, the “Green Infrastructure” card is in the center, illustrating its integrated, cross-disciplinary relationship to other strategies across sectors. Green infrastructure brings together liveability, habitat, water quality, among other benefits under one umbrella and seeking solutions that provide multiple benefits. Related strategies include water and air quality, flooding, fragmented and lost habitat and access to green space for recreational and non-motorized transportation.

Humid-zone cities like Qingpu and Raipur/Naya Raipur must: confront energy-efficiency challenges to respond simultaneously to strong winds, flood risks and high temperature and humidity. A strategy configuring “green fingers” of permeable surfaces through dense, energy-efficient,
pedestrian-friendly neighborhoods will enhance liveability while cooling the streets, and lowering building cooling loads. In Raipur/Naya Raipur, the natural drainage channels that flow across the city can shape the image of the new capital city of Naya Raipur by celebrating the rich heritage of these water-bodies and providing space for water-related festivals. Low-lying and groundwater recharge areas are natural sites for this to occur.

Preserving this open space can achieve multiple benefits through regional spatial efficiencies and compact settlements. Strategically-placed compact development should include easy access to public transportation which means access to services, training and jobs. Investing in these transportation networks can serve an important economic development and equity role for underserved communities, and foster long-term regional viability, social and economic resilience based on the “triple-bottom line” of Environment, Equity and Economy.

Project East’s experts from “mature” new towns have stressed the importance of preparing for the unpredictable. Mismatches occur between current jobs and the future economy when one industry anchors the community’s economy. Top-down economic decisions can limit flexible development over time. Faced with limited choices, the skilled workers will relocate to follow opportunities in an increasingly mobile economy. In contrast, staging development by leveraging existing investments to achieve multiple benefits is key to regional sustainable resilience. The circular image of the STAR Community urban strategy cards illustrates this interrelationship of sustainable and resilience strategies. The “Livability Principles” from the Partnership for Sustainable Communities ties the goals of environment, equity and environment to the strategies of transportation, housing, ecological investments and the value of neighborhoods.
Regional green infrastructure linked across grey infrastructure. (J. Raven)

Natural features define edges of urban zone and shape compact development. (J. Raven)

Reconfiguring today’s cities into sustainable and resilient cities challenges the existing urban development patterns. New strategic frameworks are required for these communities to adapt and thrive in changing conditions, meet the requirements of energy reduction and other environmental measures, and sustain its population by providing necessary and desirable amenities for a high quality of life. This fundamental transformation of current development paradigms calls for long-term investment, clear management process and public commitment built to last over political cycles. Building expertise now among key local decision-makers and the community will lay the foundations for success well into the future. Just as the foundations for many of the world’s ancient monuments and cathedrals were laid by one generation in the certainty that their descendants would carry on the mission, sustainable and resilient communities of the future rely upon our generation’s foresight to lay these foundations.

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India

Road in Naya Raipur
Pictures © Edoardo Guglielmetti and © Pascaline Gaborit

Women living in Naya Raipur © Pascaline Gaborit
New construction areas in Naya Raipur © Pascaline Gaborit

Children in a village near Naya Raipur
Street vendors in Naya Raipur © Pascaline Gaborit

Naya Raipur
Tribal art in Naya Raipur

Museum of tribal arts-Naya Raipur
China

Housing areas, New Towns around Shanghai © Pascaline Gaborit
Songjiang New Town near Shanghai

© Edoardo Guglielmetti
Old district in Songjiang

Square in Thames Town, Songjiang District
Opera in Zhujiajiao Old Town

Shanghai, the urban realm and traffic.
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