World Future Council

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CLIMATE AND ENERGY COMMISSION

REGENERATIVE URBAN DEVELOPMENT:
A ROADMAP TO THE CITY WE NEED

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FOREWORD

Humanity has become a predominantly urban species. This historic development represents a fundamental, systemic change in the relationship between humans and nature. For thousands of years, humanity's relationship to the land was both enduring and one of huge respect. With the discovery and mass combustion of fossil resources and the self-perpetuating cycle of automation, humankind began to extract more and more utility from nature with increasing disregard for its ability to regenerate. We ignore at our peril the fact that human development and progress has and will always depend on the earth.

Nobel Laureate and atmospheric chemist Paul Crutzen described our modern era as the Anthropocene, a term that captures the evidence and extent of human activities and its overwhelming global impact on the earth's ecosystems. This is indeed reflected in our cities and our huge levels of personal consumption. Apart from a near monopoly on natural as well as manufactured materials, an urbanising humanity now consumes nearly half of nature's annual photosynthetic capacity as well.

Human impacts on the world's landscapes are dominated by the ecological footprints of urban areas that now stretch across much of the globe. The World Future Council's *Regenerative Cities* programme seeks to identify concepts and policies that help cities to harness their own regenerative capacity in order to reconcile the their ecological footprints with their geographical magnitude. The planning and management of new cities as well as the retrofitting of existing ones needs to undergo a profound paradigm shift. The urban metabolism must be transformed from its current operation as an inefficient and wasteful linear system into a resource-efficient and circular system.

The annual Future of Cities Forum was initiated by the World Future Council's Expert Commission on Cities and Climate Change as a modern platform for trans-disciplinary dialogue between scientists, policy makers and practitioners. Its aim is to re-examine what it means for cities to be truly sustainable. The Forum enables policy dialogue on comprehensive implementation strategies that foster an enhancing and mutually beneficial relationship between urban systems and the ecosystems they depend on. It seeks to crystallise controversial aspects and to identify technical and policy solutions.

The overwhelmingly positive feedback of many participants and the fact that they feel "inspired and empowered to unlock and accelerate concrete actions" encourages us to continue and constantly improve upon our work. Because as Jane Jacobs, the iconic thinker of modern cities said:

*"Dull, inert cities, it is true, do contain the seeds of their own destruction and little else.
But lively, diverse, intense cities contain the seeds of their own regeneration,
with energy enough to carry over for problems and needs outside themselves."*

Future of Cities

A Forum for Regenerative Urban Development

BACKGROUND INFORMATION

This report documents the main discussion outcomes of the 3rd Future of Cities Forum that took place September 4-7, 2013 in Hamburg, Germany. Organised by the World Future Council, it brought together over 150 mayors, ministers, parliamentarians, city councillors, academics, business and civil society representatives, architects and urban planners from 31 countries around the world to debate and develop effective tools and policies for regenerative urban development.

The two-and-a-half-day event was composed of keynote addresses, rich panel discussions, constructive smaller parallel workshops and a study tour of local project sites. The Forum is based on the following structure:

The vision of regenerative cities and communities was first developed by the international Expert Commission on Cities and Climate Change, convened by the World Future Council jointly with HafenCity University in 2008. Since then, policy workshops and forums in Delhi, Dubai and Hamburg in addition to an ongoing national series in Germany have served as interactive platforms to spur discussion and action between key policy makers and other stakeholders.

The World Future Council will continue facilitating policy dialogue on regenerative cities in 2014 with the 4th Future of Cities Forum.

For further information please visit **www.futureofcitiesforum.com**.

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EXECUTIVE SUMMARY

At the core of the regenerative vision is ensuring that future generations inherit a robust and intact world in which individuals can realise their full human potential and that cities continue to provide opportunities for all people to improve their quality of life. Even as cities increasingly rely on goods and resources from all around the world, knowledge and prioritisation of ensuring the long-term availability and vitality of these supplies is lacking.

The road to regenerative urban development begins with a switch in our thinking so that by-products conventionally considered 'waste' can be reframed and reused as resource inputs. Regenerative cities are productive centres that help to regenerate the materials and resources they use and foster a mutually beneficial relationship between urban areas and their surrounding territories.

Case studies presented in this report showcase the renewable energy developments in Hamburg-Wilhelmsburg, the socially inclusive and participatory planning process in Hamburg-Altona, the mutually beneficial industrial cooperation in Kalundborg, the 100% renewable power ambitions of San Francisco, the food security in Belo Horizonte and decentralised spatial planning in Indonesia.

While there are no examples of a fully regenerative city, many cities and urban regions around the world demonstrate that regenerative urban development is already a reality in certain sectors and areas. The shared characteristic of these examples is the desire for a new narrative on what the urban landscape can and should look like.

Cities that close their resource loops and source an increasing share of the resources they consume from their local and regional territory create social, economic and environmental value in their communities. Regenerative cities:

- Benefit the environment and natural ecosystems;
- Drive the local economy;
- Improve neighbourhood cohesion and health;
- Increase their own resilience; and
- Enhance participatory decision making.

Despite these benefits, barriers embedded in our political, financial and social institutional structures remain. The biggest challenges are a lack of political will and short-term horizons of policy makers. Further obstacles to progress include single-sector approaches to problem solving, a lack of coordination between different governance levels, a lack of mandate for local policy making and financing, and a lack of accountability.

Overcoming these challenges and achieving a new urban paradigm require policymakers and community leaders to envision a better future for their cities that is different from the past and act to realise their vision. This requires long-term perspectives, leadership and strong political commitment. It is also necessary to involve all stakeholders and to leverage public participation to legitimise the planning and development process, increase acceptance and accelerate change.

Regenerative urban development is enabled by governance structures that support decentralisation and multi-level policy dialogue and cross-sectoral coordination. Effective communication also plays a central role in successful implementation.

1. INTRODUCTION: WHAT IS A REGENERATIVE CITY?

1.1. GOING BEYOND URBAN SUSTAINABILITY

The original definition of sustainable development is often attributed to the Brundtland report of 1987: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.[1]" But the term has since become like a rubber band that can be stretched in all directions and has been used – and misused – by governments, institutions and corporations alike. 'Sustainability' has been appropriated by every interest group as a catchall phrase to mean something positive but the exact meaning is often unclear and it is no longer enough to only look at sustainable development because the ability of future generations to meet their own needs is *already compromised*.

"It is time to re-examine the concept of sustainable development." – **Herbert Girardet, Co-founder, World Future Council, at FCF 2013**

Humanity is currently depleting the natural capital stocks of the planet and eroding its resilience when it should be living off the income it regenerates. In 2013, by August consumption worldwide had already overshot the earth's annual natural production[2]. For the rest of the year humanity was incurring resource debt. Not surprisingly, cities and urban areas were major contributors to this trend. It is clear, then, that in order for cities to develop sustainably, they must not only stop their extraction of natural resources faster than ecosystems can recover, but reverse the trend by improving the regenerative capacity of ecosystems. This is the only way continuing urbanisation can be sustained in the long term.

1.2. RESOURCE FLOWS IN AN URBANISING WORLD

"We are using 50 per cent more resources than the Earth can provide, and unless we change course that number will grow very fast. By 2030, even two planets will not be enough." – **WWF Living Planet 2012[3]**

An urban revolution is sweeping the planet and is transforming the lives of billions of people. Cities dominate human economic activities and, amplified by new communication networks, they are at the heart of global human interactions. In order to exist, cities require vast amounts of resources that are drawn increasingly from nature's global bounty rather than from their own backyard. Yet knowledge and prioritisation of ensuring the long-term availability of these existential supplies is lacking.

Most modern cities have a linear metabolism
Resources flow through the urban system with little concern for their origin or the destination of waste by-products. Inputs and outputs are treated as largely unrelated. Fossil fuels are extracted from rock strata, refined, transported and burned, and the waste gases are discharged into the atmosphere. Raw materials are harvested and processed into consumer goods that ultimately end up as rubbish which cannot be easily or beneficially reabsorbed into living natural systems. Trees are felled for their timber and pulp and too often forests are not replenished. Similar linear processes apply to food: Nutrients and carbon are removed from farmland as food is harvested, processed and eaten. The resulting waste – with or without treatment – is discharged into rivers and coastal waters downstream from population centres and usually not returned to farmland. Rivers and oceans all over the world are contaminated by sewage, toxic effluents and mineral run-offs. The ecological, economic and social externalities of our urban systems need to be addressed in new ways.

1.3. THE REGENERATIVE VISION

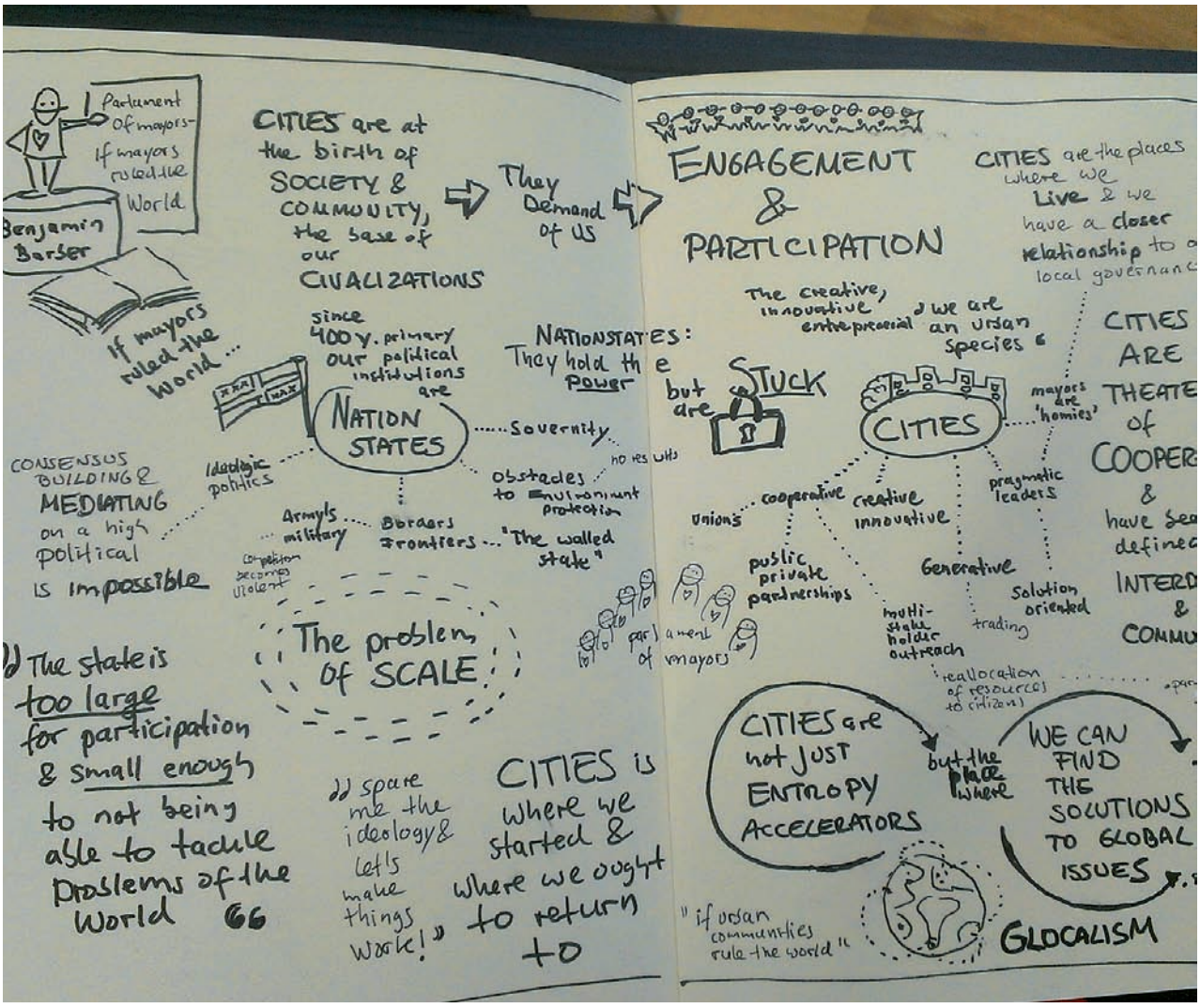
The unprecedented scale and scope at which cities consume and discard resources calls for a new urban agenda in order for cities to positively enhance the ecosystems they rely on. If urban areas are to continue to offer individuals around the world the prospect of an improved quality of life and ability to realise their potential and aspirations, they must recognise and embrace their role in ensuring that the earth's life support systems remain healthy and sound. This means going beyond the ambiguous notion of sustainability toward regenerative urban development with the objective to improve the currently degraded condition of our ecosystems.

The road to regenerative urban development requires a switch in paradigm away from the old linear metabolism – which allows cities to operate within an isolated segment of the resource cycle – to a new circular metabolism. In nature there are no landfills; all waste becomes organic nutrients for new growth. Regenerative urban development seeks to mimic the circular metabolic systems found in nature. Closing the urban resource cycle means finding value in outputs that are conventionally regarded as waste and using them as resource inputs in local and regional production systems. Specifically, a regenerative city reintroduces treated water into the hydrology cycle, increasingly sources food from urban and peri-urban producers, captures the nutrients from its sewage and waste to be applied to surrounding agricultural land, dramatically reduces its dependence on petroleum products and boosts the deployment of renewable energies in its power, transport and heating sectors. Closing resource loops in this way is the first step toward regenerative development.

"Most of us, especially those of us on the local level, think in a linear manner. Now we have to think in a cyclical manner. For example, in our solid waste problem, we have to think of ways of making use of the waste water, of treating it, and capturing the nutrients." - **Betty Tabanda, City Councillor, Baguio, the Philippines, at FCF 2013**

The second step is to actively work to regenerate the materials and resources the city uses, making the regenerative city a node of production. This can be aided by developing ecosystem service infrastructure within the urban area. While many cities, especially megacities and those located in resource-poor regions, may not be able to meet all their needs within their own borders, they can employ a concept of subsidiarity: to seek opportunities to optimise urban and peri-urban production as much as possible before relying on the surrounding region, only after which they would look further afield.

Establishing and nurturing a symbiotic link between urban areas and their surrounding areas lies at the heart of the regenerative vision. Unlike too many modern cities that heavily depend on their hinterland without giving back anything except waste that cannot be reabsorbed, regenerative cities have a mutually beneficial relationship with their peri-urban and rural territory. They work to improve their health and the health of the ecosystems they rely on, in part by reusing waste as resources of value. This entails returning organic nutrients to soils, tree planting, crop rotation, replenishing watersheds and developing ecosystem infrastructures within the city to encourage urban biodiversity. Doing so helps to strengthen the regenerative capacity of ecosystems on the local, regional and global levels.



1.4. CITIES: PART OF THE SOLUTION

"Cities and their mayors are in a position to take action even when the nations to which they belong do nothing." – **Benjamin Barber, Author, 'If Mayors Ruled the World', at FCF 2013**

On the one hand, poorly planned and managed urban development exacerbates global problems of climate change, loss of soil carbon and of the natural fertility of farmland, and the depletion of biodiversity around the world. On the other hand, cities are hubs of intense human interaction and creativity that incubate innovation and solutions. Cities are active agents that can positively impact their environment when designed and managed with care and when they are guided by a long-term, holistic vision. With high concentrations of human capital, they have tremendous potential to be an asset in tackling the pressing challenges of our time.

Cities are already proving to be leaders in the fight against climate change. Cities in the global network C40, which collectively house 8% of the world's population, are reducing greenhouse gas emissions through policies addressing sectors from transport to buildings and waste management. By 2020, these strategies are projected to reduce emissions by 248 million tonnes per year compared to a business-as-usual scenario[4]. The trailblazers in the transition to renewable energy are also local areas: From Fukushima, Japan, to Greensburg and San Francisco, US, Skellefteå, Sweden and 138 municipalities and regions in Germany, official targets of 100% renewable energy have been set and, in many cases, already reached.[5]

2. WHERE CAN WE OBSERVE REGENERATIVE URBAN DEVELOPMENT IN PRACTICE?

The case studies presented in this chapter are a selection of cases discussed at the Future of Cities Forum 2013. They demonstrate what regenerative urban development could look like in practice. They are by no means comprehensive but serve to illustrate important elements of regenerative cities

2.1. RENEWABLE WILHELMSBURG IN HAMBURG, GERMANY

The districts of Wilhelmsburg and Veddel are located on the Elbe Islands in Hamburg and have historically been on the social outskirts of the city. Deciding that this formerly industrial area was ripe for redevelopment, the city framed its new urban development as an International Building Exhibition (IBA). IBA is a format of packaging urban planning initiatives that has been used throughout Germany in the past, most famously at Emscher Park in the Ruhr region.[6]

Redevelopment of former industrial district:

- Roadmap to 100% renewable electricity and heat
- Improved energy efficiency
- Ownership through public participation
- Involvement of local businesses

The six-year IBA Hamburg project ran until 2013 and comprised over 60 sites and projects involving local enterprises and residents. The city's overall goal was to use IBA Hamburg as an urban planning tool to generate new initiatives that would transform the area into a mixed-use space and integrate it into the rest of the city. One priority of the project was to respond to the climate challenge, resulting in the formulation of urban sustainability goals that have a strong focus on energy efficiency and renewable energy. An overall target of the *Renewable Wilhelmsburg* concept was to supply the Elbe Islands with 100% renewable energy. In order to reach this target, the district of 50,000 inhabitants introduced high energy efficiency standards for new buildings, energy saving retrofits of old buildings, combined heat and power plants, and local renewable energy production. Following a step-by-step strategy, local renewable energy is expected to meet all electricity requirements of the Elbe Islands by 2025 and 85% of heating demands by 2050.

Integrating local companies and institutes that will continue their work in the long run after the IBA ended in 2013 was an important consideration. Getting partners like local energy supplier Hamburg Energie to invest in renewable energy projects was one of the steps taken to help ensure progress towards 100% renewable energy and other goals would continue.

IBA Dock, Hamburg-Wilhelmsburg

IBA Hamburg tried to incorporate a high level of public participation by establishing platforms like the IBA Lab and IBA Forum, through which residents were given the chance to discuss specific topics with international experts. In the *district ateliers*, citizens elaborated concepts together with IBA staff. This participation process allowed Wilhelmsburg's residents to feel greater ownership of the renewal of their district that helped mediate opposition to the development.

One well-known project was the transformation of a flak tower from the second world war into a solar power plant as well as a biogas-fuelled central heat and power station that provide 800 local households with renewable electricity and heat. Renamed the *Energiebunker*, this former symbol of war has become a large and visible symbol of climate action.
IBA Hamburg formed a basis for Wilhelmsburg to reach its ambitious and necessary goal of 100% renewable energy supply. It demonstrates how a major project to redevelop an entire district in a regenerative way – by focusing on local and renewable resources – can be successfully accepted and implemented. It is an example of future just urban development that reduces the district's dependence on its region by generating renewable energy locally.

2.2. 'A QUARTER FOR EVERYONE' IN HAMBURG-ALTONA, GERMANY

The socially inclusive and participatory approach in Hamburg-Altona is a good example of the kind of planning process that enables cities to develop in a regenerative way. The old freight yard in Altona is the object of a planning process in Hamburg, Germany, with the emerging quarter of Altona Centre projected to eventually contain 3,500 flats.[7]

Socially inclusive planning process:

- Citizen participation enshrined in Federal Building Code
- Transparent and open process
- Attention from media and local politicians
- Community input into urban policy making

Germany's urban land use planning is regulated in the Federal Building Code and mandates early public participation of citizens in all planning processes. In 2012 the Alsterdorf Evangelical Foundation's district development project 'Q8' joined the participation process in Altona Centre by organising an open meeting on the development of the freight yard which over 200 people attended, indicating strong public interest in the project.

"This bottom-up approach created openness and transparency." – **Michael Preuss, 'A Quarter for Everyone' Forum, at FCF 2013**

The outcome of the event was a forum called 'A Quarter for Everyone' that was facilitated in the subsequent process by members of Q8. Efficient organisation as well as an external moderation of the forum guaranteed a democratic alignment in the plenum, a non-hierarchal entity and a focused and goal-oriented forum. By this means the process reached a high level of acceptance of the citizens, legitimacy and enabled the realisation of consensus.

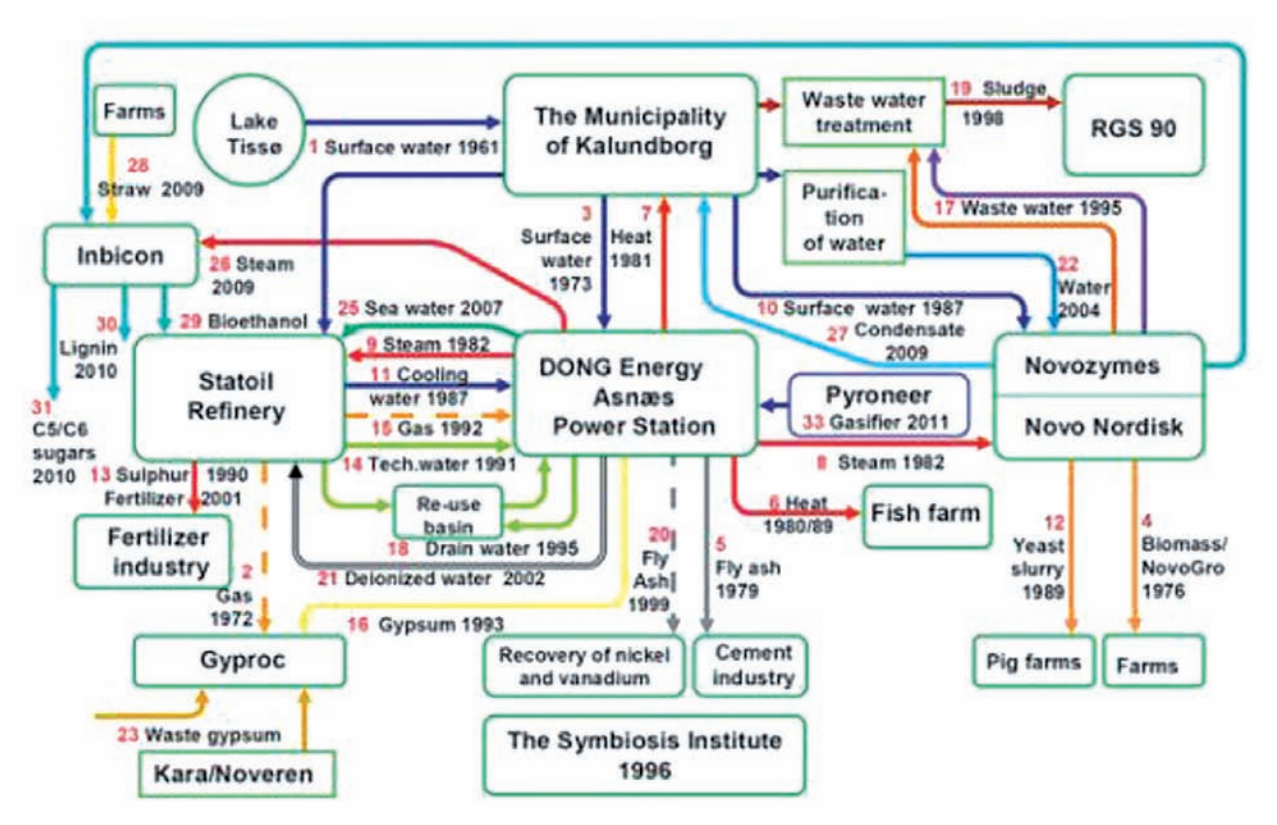
The participatory process resulted in a constant presence in the media, online and at political and public events. Most notably, the media coverage and the forum's transparency interested investors and motivated a large number of citizens to participate.

A characteristic of this bottom-up approach was a fluid and shifting set of goals, which eventually settled on a focus on social inclusion, social sustainability and the rights of people with disabilities. The participants of the forum agreed to 30 goals for the district development; covering issues of residence, mobility, healthcare, employment and economy, the goals specifically refer to human rights and the UN Convention on the Rights of Persons with Disabilities as a foundation.

Local politicians paid attention and when the goals were presented to the district assembly it unanimously decided to support them and called on the district and state government to consider these goals in future building projects. Currently, the Urban Development and Environment Authority of Hamburg (BSU) is conducting research on implementation of the proposals.

The case of 'A Quarter for Everyone' in Altona shows how the enormous potential of citizen participation can be mobilised to initiate change within urban planning

Energy Hill Georgswerder, Hamburg-Wilhelmsburg



In Kalundborg, one company's waste is another's resource

and development processes. It is an inspiring example proving that people can serve as a vehicle of change by collectively deciding ambitious goals of how to develop their own living environment. The forum also demonstrates how the rights of marginalised and vulnerable groups were taken into account and that social inclusion is already present in the heart of society. Regenerative urban transformations are facilitated by such participatory approaches that lead to equitable outcomes which are more accepted by citizens. 'A Quarter for Everyone' shows how bottom-up and community-driven initiatives and plans provide input into the local policy-making process.

2.3. SYMBIOTIC INDUSTRY IN KALUNDBORG, DENMARK

Kalundborg is a city in the heart of Denmark and is home to some of the country's largest industries. In 1961, a local oil company cooperated with the municipality to pipe water from a nearby lake to its power plant– a project that would later become the basis of a circular system of resources that include water, heat, gypsum, lime, fly ash, sulphur dioxide, straw and organic waste.[8]

Economically driven mutual cooperation in industry:

- Closed multiple resource loops in several industries
- Reduced waste
- Reduced input costs
- Economically attractive to remain in local area

In the 1970s, a handful of companies started discussing how to collaborate in a way that would reduce their operational costs. Their initial motivation was to reduce costs by seeking income-generating applications for industrial by-products. They each agreed to pass their unwanted by-products – some of which are named in the previous paragraph – to another company that would view them as resources. Central to this system was the participation of the municipal government, particularly in closing the water and heat cycles. By offering an all-around economic benefit, the system grew. Over time, the industrial enterprises of Kalundborg evolved into a cluster of companies that relied on each other for material inputs.

Energy Hill Georgswerder, Hamburg-Wilhelmsburg

"Every project within this network is economically viable. Otherwise there would be no incentives for the companies." –
Mette Skovbjerg, Project Manager, Kalundborg Symbiosis, at FCF 2013

Today, the municipality and 20 enterprises cooperate in a symbiotic and circular system with advantages for each. The overall efficient use of resources benefits the local economy and ensures an economic locational advantage. This makes it financially attractive to stay in the region despite lower labour costs elsewhere in the world. In 1993, plasterboard manufacturer Gyproc planned to relocate abroad to be closer to gypsum mines, but a cooperation with local power station DONG Energy – which produces gypsum as a by-product – made it economically viable for Gyproc and the jobs it created to remain in Kalundborg.

Beside the economic and social advantages, the symbiosis found in Kalundborg also leads to a number of ecological improvements. By way of example, capitalising on the waste by-products of the power station – namely steam – has led to reductions in oil consumption of 20,000 tonnes and water consumption by 25% per year in the system, and heat waste is placed in water used to optimise the conditions of a fish farm rather than being flushed away. Finally, a decrease in waste discharge reduces environmental pollution in the region surrounding this industrial base.

Kalundborg is an example of how one aspect of regenerative development could come to life. The municipality and the companies do not try to dump their 'waste' but rather see it as a cost effective resource for another process. Resources are thus reused several times and formerly degraded ecosystems are given the chance to recover. Furthermore, supply chains remain on the local level rather than being outsourced globally.

The Kalundborg approach evolved organically – rather than being intentionally planned – over the course of five decades primarily due to commercial interests. It serves as a best practice example to other communities of how to keep resources in a closed loop cycle and thereby reduce waste generation.

2.4. 100% RENEWABLE POWER IN SAN FRANCISCO, US

Making 100% renewables a reality:

- Mayor set 100% renewable electricity target
- Enabling policy framework on municipal and state levels
- Multistakeholder task force
- Local and decentralised electricity generation

Maximising San Francisco's high solar potential

In 2010 the mayor of San Francisco, US announced a 100% renewable electricity target to be achieved within ten years. The target – building on the 51% Renewable Portfolio Standard set in 2007 for 2017 – can be seen as one instrument to fulfil the Climate Change Goals Ordinance, adopted in 2008, which set high greenhouse gas reduction targets. While the ordinance only stipulates greenhouse gas-free electricity production by 2030, the 100% goal goes one step further.[9]

"We need public participation and engagement to make the programme work." – **Danielle Murray, Renewable Energy Program Manager, Department of the Environment, San Francisco, US, at FCF 2013**

The mayor initiated a task force to create strategies to reach the 100% by 2020 aim. It sought to involve all relevant stakeholders like local renewable energy leaders, business and community actors, representatives from environmental NGOs, labour, utilities, and relevant city departments. This participatory approach facilitated a higher level of co-determination and through that helped to raise public support for the project as well as involved the necessary technical expertise from Stanford University and UC Berkeley.

The task force first conducted a feasibility study and then identified three tools the city should use to become 100% renewable:

(i) Increased energy efficiency, which reduces energy demand;

(ii) Increased local and decentralised energy production, which improves energy security and strengthens the local economy; and

(iii) Option for customers to purchase 100% renewable electricity where locally generated renewable electricity is not available.

It also recommended that the funding of new renewable power plants be backed by private sector investments. In order to achieve implementation, the task force proposed a local feed-in-tariff, the adoption of a rooftop solar policy, net metering and an up-to-date planning and permitting process. As the city has a very high solar potential, on the task force emphasised policies for rooftop solar installations on newly constructed and renovated buildings as well as solar water heating.

Between 2010 and 2011 the share of renewables in San Francisco was raised by five percentage points, reaching a 46% renewables mix in electricity. The municipality is taking a leadership role by running all municipal operations and San Francisco International Airport entirely on renewable energy.

These developments were made possible by an active and involved mayor, engaged stakeholders and support from an enabling policy environment on the state level:

California state legislation passed in 2002 led to the creation of a Community Choice Aggregation programme in San Francisco that allows local authorities to aggregate the buying power of individual customers in their constituencies in pursuing renewable energy supplies.

San Francisco's bid to reach 100% renewable energy shows how regional conditions can be optimised to tap the full potential of renewable energies. It is becoming a more regenerative city by prioritising local generation of renewable electricity, thus decreasing its dependence on fuel and electricity imports as well as private utilities, which allows the city more control in steering towards its 100% target.

2.5. FOOD SECURITY IN BELO HORIZONTE, BRAZIL

Ensuring the right to food in the city:

- Market space in city for local and regional producers
- 30% of programme funding to purchase food from family farms
- Near elimination of hunger with just 2% of city budget
- 75% reduction in child malnourishment

The city of Belo Horizonte, Brazil has made significant advances in securing food for its 2.5 million inhabitants, thanks to its comprehensive policy framework for food sovereignty, which won the Future Policy Award 2009[10] of the World Future Council. The policy was based largely on a municipal law stipulating the right to food and the duty of the government to uphold this right. The Secretariat for Food Policy and Supply was founded to help reach the goals of the Belo Horizonte Food Security Programme.[11]

"Regenerative cities need regenerative food systems." – **Dr Cecilia Rocha, Director and Associate Professor, School of Nutrition, Ryerson University, at FCF 2013**

A central tenet was reinforcing support for local and regional farmers and family farms in particular. The policy attempts to reduce food prices by directly linking local producers and consumers and diminishing the role of wholesalers in the supply chain. Local producers are given market space to sell their products within the city, resulting in more customers. Government purchase is also encouraged to stimulate local and diversified agricultural production as well as income generation.

The secretariat developed several programmes to tackle hunger and malnutrition and simultaneously strengthened family farm-based food production in the surrounding areas. To support local production, the municipal government provides subsidised agricultural

credit, crop insurance and technical assistance. The Food Acquisition Programme supports the commercialisation of products from small farms by creating institutional markets for them, thus ensuring sufficient sales potential. This is also guaranteed by a requirement – though as yet unmet – that at least 30% of funding for the national school meals programme must be spent on purchasing food from family farms.

By promoting urban gardening in schools through the Food Security Programme, the children and youth of Belo Horizonte gain experience in self-sufficient resource provision and learn about locally based and healthy nutrition. Triggered by the programme, the city also started to plant fruit trees in public space, demonstrating that squares could serve as food sources as well.
A central result of the policy framework was the near elimination of hunger in Belo Horizonte at a cost of a mere two percent of the city's annual budget. In addition, the policy has had multiple positive side effects as there is now a closer interaction between small rural producers and urban consumers. The programme is also reducing rural-urban migration by giving family farmers fresh prospects to continue their work.

While many modern cities may not have the ability to feed all their inhabitants, Belo Horizonte is evidence that it is possible to enhance nutrition by making use of family farms on the urban periphery. This kind of farming contributes to a regenerative food system and in so doing to overall regenerative urban development. While the city is not food self-sufficient, policy support for local and regional farms allows it to reduce the radius of its food sources. This strengthens the linkage of the city with its surrounding area by increasing their interdependence.

2.6. DECENTRALISED SPATIAL PLANNING IN INDONESIA

Successful implementation of regenerative urban development requires national governments to give local levels the authority to plan development of their constituencies that is suited to local conditions and the resources to realise the plans. The case study of Indonesia demonstrates the importance of coherence between national and local policies in order to connect policy making and implementation.[12]

Stronger mandate for local authorities:

- Sustainability principles adopted on local level
- Zoning permits issued by local government
- 30% urban space must be open areas, including 20% public space

Indonesia is a rapidly urbanising country: Over half of the country's population lives in urban areas, a fifth of which lives in the metropolitan area of Jakarta, which is expected to house 11 million residents by 2020. Urban beltways connect the large cities of Indonesia

Indonesia is a predominantly urban country. Metropolitan Jakarta will be home to 11 million people by 2020

and blur the boundaries between urban and rural in the region, in both the physical and socioeconomic sense.

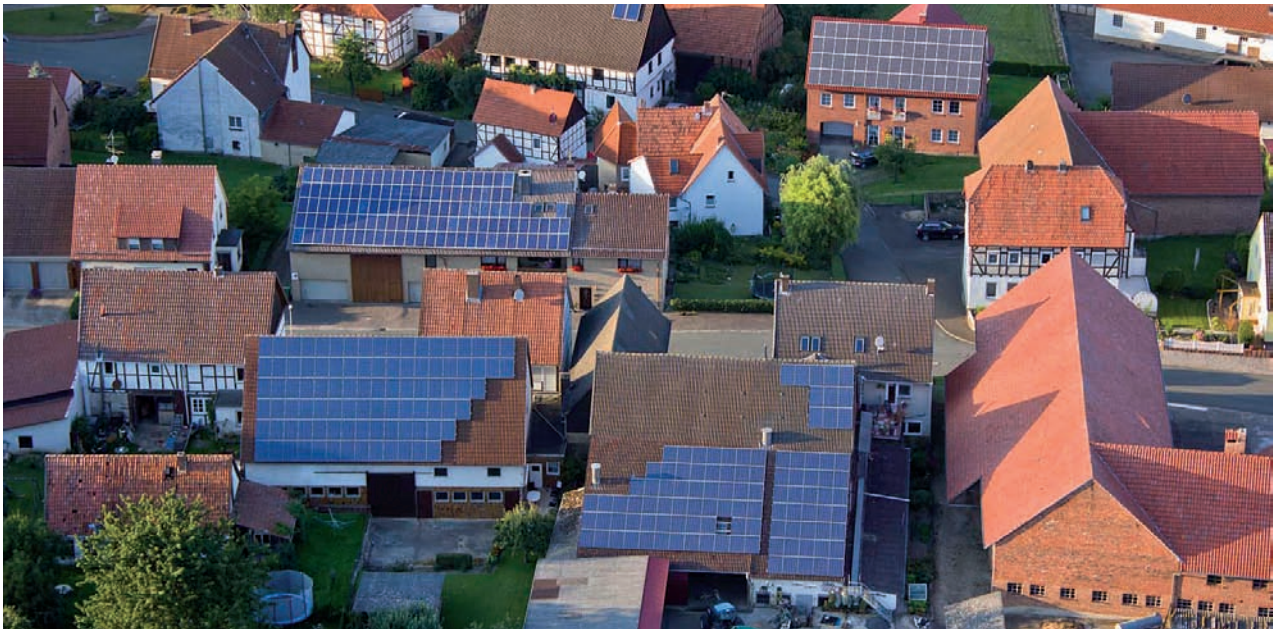
"Now, local governments have more power than previously. Coordination and local public participation are key." – **Eko Kurniawan, Deputy Director for Metropolitan Spatial Planning and Development, The Directorate General of Spatial Planning, The Ministry of Public Works, Indonesia, at FCF 2013**

A new law in 2007 and regulation in 2010 spurred a process towards decentralised planning in Indonesia, allowing local governments to have more power than previously. In an attempt at a clean break from the previous authoritarian regime, the Indonesian parliament passed the Spatial Planning Law 26/2007 – a replacement of the Spatial Planning Law 24/1992 – which explicitly lays out the mandate of provincial and district governments in spatial planning. In the past, spatial planning that crossed provincial borders fell under the jurisdiction of the national government, whereas with the new law, the responsibility lies with the governments of the respective provinces to coordinate with each other. Zoning and spatial planning permits are now issued by local governments. The spatial planning authority of the central government is thus curtailed and decentralised to the subnational level, allowing for urban spatial plans to be more readily implemented.

In this way, the central government is encouraging local government initiatives. In 2011, mayors helped finance green spatial planning in their cities by presenting plans to the central government and joining its green city development programme. Adoption of sustainability principles are done at the city level. The local government of Jakarta now has more decision-making and implementation tools and power, allowing it to consequently expand flood-protected.

The law mandates that a minimum of 30% of urban areas must be open spaces, with at least two-thirds being public open space. In addition, the law also includes a principle of accountability and a minimum standard of basic service provision, including provisions on allocation of public transport networks and pedestrian traffic. Most cities, however, have not reached the 30% threshold yet.

A move away from rigid centralised decision making in regenerative urban planning is important, as local authorities are more sensitive to the needs of their constituents, understand the latent opportunities in their constituencies, and are more nimble in adapting to change. The national government, however, still plays an important role in creating an enabling environment and framework that spurs the right kinds of policy and action on the subnational level facilitating networks between different cities and regions. Multi-level dialogue and cooperation in building regenerative cities are therefore crucial in ensuring coherent policy and coordinated action.



3. WHAT ARE THE BENEFITS AND VALUE CREATION RESULTING FROM REGENERATIVE URBAN DEVELOPMENT?

Regenerative cities:

1. Enhance the environment and natural ecosystems;
2. Drive the local economy;
3. Improve neighbourhood cohesion and health;
4. Increase their own resilience; and
5. Enhance participatory decision making.

The case studies in section 2 demonstrate the various benefits of regenerative urban development. Cities that close their resource loops and source an increasing share of the resources they consume from their local and regional territory create social, economic and environmental value in their communities. This section outlines these benefits in greater detail.

3.1. ENVIRONMENTAL BENEFITS

At the core of the regenerative vision is ensuring that future generations inherit a robust and intact world in which they can realise their full human potential and that cities continue to provide opportunities for all people to improve their quality of life. Despite challenges of degraded land, rising sea levels and polluted watersheds and air, cities can still progress towards this vision by regenerating, to the best of their capacities, the resources they consume and strengthening the health and generation capacity of the ecosystems they depend on.

As regenerative cities seek to mimic the circular metabolic systems found in nature, the transition to 100% renewable energy is inevitable. In aiming for a target of 100% renewable energy in all sectors, regenerative cities reduce their demand for fossil fuels and energy imports and, consequently, greenhouse gas emissions, which not only mitigates climate change but also has a direct positive impact on the cities' air quality. The transition to renewable energy is also an adaptation measure because decentralised renewable energy technologies disperse energy production points throughout the city and region. This reduces the negative impact on overall energy production should any one

plant or area be affected, for example by flooding, technical malfunction or sabotage. Furthermore, most renewable energies require less if any cooling water as compared to conventional power plants.[13]

Regenerative cities that rely increasingly on their surrounding territory rather than on the rest of the world to meet their resource needs reduce energy use by shortening the distance over which resources are transported. Promoting urban and peri-urban agriculture to feed the urban population also results in increased efficiency in water and nutrient use as well as a smaller energy demand through a lesser need for food storage and packaging.

Urban farming in an organopónico in Santa Clara, Cuba

Regenerating raw materials such as timber by replanting trees not only ensures the continued availability of timber but also creates benefits for the ecosystem. Afforestation holds topsoil together and in so doing improves soil fertility and prevents soil erosion. Forests also act as carbon sinks by absorbing carbon dioxide and adding to soil carbon.

Closing resource loops to enable a circular urban metabolism was identified as the first step of regenerative urban development in section 1.3. To close the water loop, cities have a cascading use of recycling and reusing, capture nutrients embedded in wastewater, and treat the remaining wastewater before discharging it into rivers or coastal waters. Doing so helps prevent rivers from drying up or becoming contaminated and reduces the amount of warmed water from industry from being dumped into river courses, which would impact the habitat conditions for fish and other river life.

Soil fertility benefits from regenerative urban development through soil application of the organic nutrients extracted from wastewater and waste as fertiliser. This is the case in Calgary, Canada where a municipal programme operating within a provincial level policy framework transforms biosolids into organic fertiliser for peri-urban farms.[14]

3.2. ECONOMIC BENEFITS

Regenerative cities optimise the biocapacity potential of its urban area and local hinterland. Local production of energy, food, and other inputs that flow into a city creates local jobs and residents employed in these production processes spend their incomes in their local communities, which allows tax revenue to remain in the area and keeps economic wealth circulating locally and regionally. Furthermore, as decentralised resource provision enables participatory urban governance that often results in more socially equitable cities, increased economic prosperity resulting from regenerative urban development potentially benefits more stakeholder groups in society.

Looking around the world, we observe that harvesting local renewable energy resources results in socio-economic development for the city, communities and region through local job creation, tax revenues and lower energy prices. According to *deENet,* a German network promoting distributed energy technologies, the main reasons communities switch to 100% renewable energy are economic development and the creation of local value as well as independence from fossil fuels. The transition in Germany from fossil and nuclear energy towards renewable energies like solar and wind – for the most part, decentralised and community-based – created 370,000 new jobs in the country from 2000 to 2010.[15] Many of these jobs, such as assessment, installation and maintenance, are local and cannot be outsourced, thus allowing the economic benefits of employment to remain within the local community.

A regenerative city shifts policy priority from highways and multi-lane arteries that accommodate cargo trucks and encourage private motorised vehicles to public and

non-motorised transport and mobility, which has a positive effect on real estate values.

As the cheapest kilowatt-hour is the one not consumed, the most cost-effective way to meet demand for energy, especially in an era of peak oil, is to decrease energy consumption by increasing energy efficiency. The same logic can be applied to water, food or any other resource. Regenerative urban development is easier to implement if urban resource consumption is low; this can be achieved through increased factor productivity, which also lowers operating costs.

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Moreover, reducing and eventually eliminating waste in pursuit of a circular metabolism means lessening the burden on municipal waste collection and disposal services, thus creating savings in the municipal budget. In addition, the case study of Kalundborg (section 2.3) shows that it was economic reasons that drove the search for ways to transform industrial by-products from their conventional classification as waste to resources that can be used as inputs in the production process: Increasing efficiency within the overall system helped the companies involved to reduce their operational costs which, in the case of Gyproc, made it economically viable enough for it to stay instead of relocating overseas.

Finally, regenerative development is attractive to businesses which see the long-term vitality of the city as lower-risk, more capable of withstanding external shocks, and thus reflective of long-term prosperity for the businesses themselves. A clear policy framework creates the kind of stable investment environment sought by investors.

3.3. SOCIAL & HUMAN BENEFITS

Closing the resource loop on a community level provides opportunities for human interaction as residents seek mutually beneficial ways to find value in what their neighbours consider to be waste and to have their own waste to be regarded as a resource by others. This can help create social bonds and enhance cultural value within the city.

As case studies from around the world have shown, urban agriculture has proven to improve social cohesion and lower crime rates by enabling local residents to take pride and ownership of their community and daily lives. This is especially pertinent in poor and marginalised neighbourhoods. People are able to connect with their neighbours as they work on a project together. Community farms in Philadelphia and Chicago, for example, provide employment for residents with past criminal records or otherwise have trouble finding work elsewhere, thus enabling their integration back into society.[16] Belo Horizonte (section 2.5) and Havana train students from local schools in the techniques of organic farming, which adds to the skillsets and knowledge found in the community. With the unique exception of Cuba, full self-sufficiency is rarely the ultimate goal of localising food production; rather, food is seen as a vehicle for positive social development and other policy sectors.

A direct benefit of a regenerative food system is the urban population's improved access to nutritious food. Another direct benefit of regenerative urban development is an elimination of both the conceptual notion of waste and the physical presence of it, creating a more liveable and a healthier living environment in the city.

3.4. RESILIENCE BENEFITS

The traditional urban-rural dichotomy is important to an understanding of cities and the roles they play. Urbanisation was historically made possible to a significant extent because of agricultural surplus, which allowed a larger portion of the population to engage in activities outside of agriculture because farmers produced food in excess of their own consumption. The excess was sold in urban markets to be consumed by the urban population. With the advent of improved transport links on land and water and technological advances in refrigeration and as cities grew bigger and

wealthier, they began to source food from farther distances, becoming less connected with the origins of their food. The same trend applies to other resources.

Regenerative development reconnects cities with the production systems they depend on by fostering urban-rural linkages. Each urban area becomes responsible for its material inputs, either by producing them itself or by helping to replenish them at source. This results in as many nodes of resource generation as there are urban areas, and decentralises production - from a global perspective - to the local and regional levels.
Increased self-sufficiency allows a city to be more resilient to external shocks, including instability of resource price and availability. San Francisco, for example, identified energy independence, security and resilience as important co-benefits in its push to expand decentralised renewable power generation within the city.[18]

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In an increasingly interconnected world in which local actors find themselves subject to complex globalised systems and decisions over which they often have little control, self-sufficiency provides the resource security needed for cities to regain some power in making decisions that affect their own development. By fostering local production, regenerative urban development reduces the city's dependence on imports of food and other resources, thus diversifying its portfolio. Shorter supply chains provide a safety net to support cities in the case that import channels are cut or the area of origin of the import is affected.

3.5. DEMOCRATIC BENEFITS

"One of the good things about cities is that they have localised structures, so that participation happens on a neighbourhood level." – **Benjamin Barber, Author, 'If Mayors Ruled the World', at FCF 2013**

Regenerative urban development is driven by democratic decision making and implementation in order to be future-just, equitable and accepted by the population. It understands social inclusivity and environmental protection as two sides of the same coin. Increased resilience and self-sufficiency through decentralised resource flows and production brings power back to the people through localised decision making. This encourages broader participation as citizens understand the genesis of the resources they use and the relevance to themselves: not only in the consumption of the final product, but participating in the shaping of the production process itself.

The national level promotion of decentralised renewable energy production in Germany, for example, resulted in the creation of community energy co-operatives. The national feed-in tariff policy was successful because it enabled broad participation, which triggered social acceptance, and acceptance resulted in investments. These are democratic organisations owned and controlled by their members, who share in the power structure by participating in setting policies and collective decision making for their mutual benefit.

"Public participation, i.e. the engagement of individuals with societies around them – or the strength of civil society in a city – has a strong link to environmental performance" – **Kees van Leeuwen, Chair, Water Management and Urban Development, KWR Watercycle Research Institute, at FCF 2013**

In order to close urban resource loops, cities must understand the ways in which different resources interact with each other beyond sectoral boundaries and facilitate horizontal coordination (see section 5.3.2). This has the potential to increase the multitude and diversity of interests and voices represented in urban developments, lending credence to the decision-making process and vitality to the decisions reached.

4. WHAT ARE THE BARRIERS TO REGENERATIVE URBAN DEVELOPMENT?

Challenges:
1. Short-term visions
2. Silo approaches
3. A lack of policy mandate and financing
4. Corruption

Despite the multiple benefits outlined in section 3, obstacles hindering progress on regenerative urban development remain. The main challenges arise from institutionalised failures in our political, financial and societal structures, requiring leadership and political commitment to overcome them. The following section summarises some of these barriers.

4.1. SHORT-TERMISM

The biggest barrier to change is the inability to imagine a future different from the present and conviction that its realisation is feasible. This obstacle manifests itself as a lack of political will and as short-term horizons.

With re-election as among the top priorities for most elected officials, there are few structures in place that systematically incentivise political decisions that benefit communities and the ecosystems they depend on in the long run but which are costly in the short run. Instead, the institutions currently in place, including election campaigning, promote quick political wins and instant gratification rather than long-term viability and continuing value creation. Furthermore, electoral offices tend to be short and are usually limited to four or five years. Frequent changes to government may lead to policy discontinuity.

4.2. SILO APPROACHES

Ecosystems comprise networks of intertwined elements and a change to one point in the system creates reverberations throughout the web. Not only do resource issues go beyond city boundaries, their relevance touches multiple city departments. In Istanbul, for example, there is a concerted government effort to increase water supply to the city that resulted in the construction of a pipeline from the reservoir. This raises the issue of habitat conservation, since water supply is unsustainable without proper ecological management.[19]

The organisational structure of local governments, however, is often divided into silos that assume issues of water, waste, energy, transport, housing, food and construction can be managed adequately by using a single-sector approach. This kind of structure does not encourage cross-sectoral cooperation to the extent required in sufficiently addressing the complex challenges of regenerative development.

4.3. LACK OF MANDATE & FINANCING

"Cities are asking the question: 'Why can't we steer urban development?'" – **Philotheusy Mbogoro, National Coordinator, Tanzania Cities Network, at FCF 2013**

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In many parts of the world policies affecting urban areas are made at the national level and funding for urban initiatives is under centralised control. This is especially the case on the African continent. Even when decision making power is ceded to the local government, local authorities may not be able to finance their programmes for want of access to the national budget and mandate to levy their own taxes. Local level measures depend instead on national subsidies. Where local authorities have some power to make urban policy, without dialogue and coordination with the national level there is the risk of conflicting policy targets and implementation.

Cities that have privatised their public services and utilities – such as water, energy and waste management – have reduced capacity to create well-integrated urban systems. Contracts with private providers reduce consumer choice and make it difficult for cities to have control over the details of provision: for example, while the mayor's office of Los Angeles announced a coal-free target, contract obligations with a coal-fired power plant prevent the city from simply walking away from the plant.[20] Cities may also be locked into long-cycle technologies such as waste incineration, which disincentivises waste reduction.

4.4. CORRUPTION

Instability of the law and low levels of political accountability on local as well as national levels of government present challenges to social progress. Corruption undermines the legislative framework and therefore damages the rule of law. It reduces public trust and leads to a lack of societal trust in the governing structure. In terms of the budget, public funds are not fully accounted for. In an absence of rule of law, there is a prevalence of uncertainty and lack of transparency - and hence a reduction in investment, which hinders the progress of urban development.

"There is a failure in implementation: Implementers are not in a position to implement. The main problem? Corruption and election interests." – **Margaret Zziwa, Speaker, East Africa Legislative Assembly, at FCF 2013**

A common experience of countering corruption – from Nigeria to the Philippines – is the importance of heightened awareness and commitment from the public to understand the scope and impact of the policy. All stakeholders need to be involved and engaged in the decision-making process in order for good governance to thrive, and civil society plays a central role in enlightening and empowering the public to hold their elected officials accountable.

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5. WHAT ARE THE TOOLS FOR SUCCESSFUL IMPLEMENTATION?

Useful tools:

1. Vision & leadership
2. Citizen & multistakeholder participation
3. Decentralisation and multi-level dialogue
4. Cross-sectoral coordination
5. Communication & education

This section presents recommendations drawn from the Future of Cities Forum and tools that enable decision makers to take the necessary steps towards regenerative development.

5.1. VISION & LEADERSHIP

"Reurbanising the space took more than a few years - it took a vision." – **Choong-Yeol Ye, Vice President, Planning and Administration, The Korea Transport Institute, at FCF 2013**

From Bogota to Dalian, Curitiba to New York, the power of an inspiring vision and the impact of committed local leadership on the direction and rate of urban development can be keenly felt in the fabric of the city. The former mayor of San Francisco, for example, was actively involved in developing the city's 100% renewable electricity target and plan.[21] Mayors of these cities envisioned a radically different and better future than what they observed around them at the time, and took the necessary steps to transform their vision into reality.

Being able to imagine a future different from the present reality is essential to breaking free from unsustainable path dependent development. Asking the questions 'What do I want my community and city to look like?' and 'What would improve the quality of life in my city?' helps create a vision to work towards; this image of an improved living environment creates goals and provides a framework to guide action. Visions, while ambitious, should also focus on strengths: for example, Växjö does not see a lot of sun but is located next to a forest, so it saw the merits of promoting biomass over solar as a source of energy.[22] It is the job of policymakers to make available information on the potential of various development options to their constituents, as people require information in order to take action.

The first step for a city is to set both qualifiable and quantifiable targets. Target setting demonstrates and communicates political will, commitment, leadership and vision. It catalyses change by streamlining and providing an official mandate for action. This mobilises additional actors to become involved; for example, clear and straightforward policy direction creates investment security and thus attracts investors.[23]

"Long-term vision and concrete milestones are necessary." – **Fatima Shah, Senior Urban Specialist, South Asia Urban and Water Unit, World Bank, at FCF 2013**

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That being said, target setting alone is insufficient in ensuring implementation. This is shown by as yet unmet targets in Indonesia's spatial planning law requiring 30% of urban space to be green and Brazil's national school meals programme requiring 30% of programme funding to go to family farms. Targets are more effective when complemented by additional measures such as a step-by-step strategy and a roadmap with intermediate indicators.

Oftentimes decisions requiring strong political will are made during times of crisis because there is no viable alternative. It is important to plan proactively rather than reactively, especially as doing so could prevent the crisis in some cases and will enhance the city's resilience in absorbing the shock.

5.2. CITIZEN & MULTISTAKEHOLDER PARTICIPATION

"Local authorities cannot do it alone. All stakeholders need to build the urban policy." – **Jan Olbrycht, Member of the European Parliament, at FCF 2013**

In the case studies in section 2, the local communities not only benefit from the outcomes of regenerative urban development, they also participated and engaged in the planning process. Decisions were more socially inclusive as a result and, carrying the mandate of the people, more accepted and legitimate.

Involving all major stakeholders from the outset has been shown time after time to result in more equitable development as a greater diversity of voices are represented in the planning process. In the case of San Francisco, diverse interests were represented in one room together with the local government as part of the task force to develop a plan and strategy, and the resulting public-private partnership decided to set up solar power installations in low-income neighbourhoods. In Toronto, a multistakeholder food policy council was established. In Japan, successful efforts to reduce and recycle waste always involved the full participation of citizens, showing that bylaws, while important, must go hand-in-hand with a corresponding change in culture.

"Local authorities have a lot of power in waste management, but examples have shown that real change in waste structures and behaviour is only possible after involving and consulting the public." – **Kazunobu Onogawa, Senior Fellow, Institute for Global Environmental Strategies, at FCF 2013**

To go beyond including the voices of those who are already vocal, project managers and coordinators should make a conscious effort to reach those typically overlooked in order to include vulnerable and marginalised groups. In the case of Altona, persons with disabilities see their needs and rights reflected in the final proposals because the forum explicitly listed them as stakeholders in the community planning process, making it easier for them to take an active role. Similarly in Wilhelmsburg, when immigrant

communities – typically underrepresented in decision-making processes – had low levels of response to a general call for public input, IBA Hamburg re-tailored its outreach strategy to these neighbourhoods by going door-to-door with translators in an effort to lower cultural and language barriers to participation.[24] This was a conscious decision to win them over as participants in the planning process.

Citizen participation in urban improvement developments is part of a positive feedback system in which residents who are proud of their city feel greater ownership of and identify with it. With this kind of 'buy-in', residents become more invested in the outcomes and therefore more engaged in the process of improving their living environments. A sense of identity and belonging with the city is a missing factor in Africa, where "a lot of city dwellers do not identify with the city. Many people go back to their houses outside the city, and therefore do not feel that the city is theirs.[25]"

5.3. GOOD GOVERNANCE

Although cities like Hamburg show that technological and policy solutions already exist, progress around the world is too little and too slow given the enormity of the challenges cities face. The main barriers are a lack of vertical and horizontal coordination, a lack of access to funding and expertise, and perceived conflicts in policy aims. Enabling governance structures help scale up best practices and connect scattered initiatives into an integrated policy approach.

5.3.1. DECENTRALISATION & MULTI-LEVEL DIALOGUE

"You cannot wait for national agreements or laws." – **Henrik Johansson, Environmental Coordinator, Executive Office of Strategic Planning, Växjö, Sweden, at FCF 2013**

The extent of government mandates on the various levels differs from country to country and region to region. In most cases in Africa, for example, it is national governments that make policies affecting urban populations – on housing, energy, water - while local bylaws are needed to ensure local implementation. A move towards decentralisation, as observed in Indonesia's spatial planning law (section 2.6), allows subnational policymakers to have greater power in making decisions that affect their constituencies and to tailor policy instruments to the local context.

"Urban planning policies are not a priority on the national level. We need bylaws to transform national measures into local implementation." – **Margaret Zziwa, Speaker, East Africa Legislative Assembly, at FCF 2013**

The national Indonesian government, however, still plays a key role in urban development by setting the right parameters – through, for example, incentive schemes – that guide local action. Effective governance in regenerative urban development follows a principle of subsidiarity whereby an issue falls under the jurisdiction of the least centralised level that is sufficiently capable of its management.

Energiebunker, Hamburg-Wilhelmsburg

A regenerative city is characterised by a good governance relationship with its hinterland as its resource bases often extend beyond municipal borders. In managing water provision and consumption, for example, it will consider the entire watershed if the goal is to have integrated allocative water management both in and outside the city. This requires the city authorities to talk to those governing the greater region.

Multi-level dialogue and coordination are crucial in ensuring coherent action. The importance of the link between national and local policy can be observed in Brazil (section 2.5), where national policies strengthen the rural farms that feed urban populations by creating urban markets for rural producers. The real potential of producing food and the capacity of cities to be regenerative depends on supporting and benefiting the entire local region, not just the urban area. Communication and collaboration between local, regional and national levels of government can also lead to an urban policy framework on the national level that empowers more authorities on the local level to take bold action and implement change.

5.3.2. CROSS-SECTORAL COORDINATION

Ecosystems are highly complex and integrated systems with interdependent elements. As such, resource issues rarely recognise municipal departmental borders. This was a recurring point raised by participants of the Future of Cities Forum in a number of sessions. Although governments conventionally isolate different sectors into separate departments or ministries, in reality many urban development issues are relevant to more than one sector. By way of example, Växjö captures biomethane from its sewage sludge and household waste to use as a fuel in its public transport vehicles. Urbanisation in industrialising countries in particular brings the nexus of water, land, energy and food to the fore.

It is ineffective and insufficient to consider any one issue only in the context of one sector. Closing the water cycle, for example, entails cascading use, but the nutrients embedded in wastewater are necessary in helping to close *other* resource loops. Regenerative cities are systems that consider the complete resource loop and abandon a silo approach by seeking out efficiencies across multiple sectors.

One way for cities to do this is to establish a special body or office within the municipality to coordinate different departments in pursuing integrated strategies. In order to carry out its climate protection master plan, Copenhagen coordinates its activities through its Technical and Environmental Administration. Environmental management is required in all departments and the city appoints environmental coordinators in each unit. The Technical and Environmental Administration monitors the progress and publishes regularly updated information that is easily accessible online for the public and other stakeholders. This kind of dedicated city office, tasked with linking up horizontally within the local government in order to facilitate cross-sectoral planning, implementation and synergies, is a useful tool in building a regenerative city.

5.4. COMMUNICATION & EDUCATION

Outreach, education and good communication must complement strong leadership and visions of city betterment. An ambitious target is more easily achieved with the support of a broad majority of citizens. An effective communications campaign is a tool:

(i) To change behaviour

Public campaigns are used by city administrators to alter individual attitudes and behaviour. For example, a strong public campaign by the Singaporean government helped reduce the city's daily domestic water consumption by 12 litres per capita within a decade.

(ii) To inform

Policymakers and civil servants communicate with their constituents in order to disseminate information about policies, programmes or initiatives. This demonstrates transparency and credibility, and helps to gain wider support.

City officials and campaigners are increasingly embracing new modes of communicating with their constituents. An innovative example can be found in Bristol, UK: After being named the European Green Capital 2015, the city used a sense of humour and fun to engage its public. Rather than writing a press release announcing it had won European Green Capital Award, it approached residents on the street that were, for example, recycling a newspaper, cycling or taking public transit, and used song and dance to publicly thank each person for their efforts. This was filmed and made into a short video compilation, complete with a catchy and uplifting tune, to reach out to more people.[26]

Considering water shortages in urban areas in South Asia, the crux of the problem is that users consider water to be free, resulting in inefficient and less restrained use. This reflects a linear system in which uninformed consumers do not value water resources. It is therefore important for governments and civil society to improve knowledge around resource generation and the inherent link between urban systems and natural ecosystems.

> *"Educating the public is important so that users understand that water doesn't just come out of a pipe."* - *Sanjay Prakash, Principal Consultant, SHiFt: Studio for Habitat Futures, India*

Education and learning is important not only for citizens but for policymakers and local authorities. In order for cities to successfully address climate change, resource scarcity, and other environmental, social and economic challenges, they must be capable of systematising best practice and constructive learning through knowledge sharing and open source systems or programmes. Increasingly, cities are collaborating bilaterally as well as within regional, national and international city networks. These networks and organisations allow cities to share technical expertise and experience with best practices and policies with each other.

6. CONCLUSION

The goal of this report was to outline the rich discussions from the Future of Cities Forum on progressing towards a regenerative vision in order to inject focus and substance in the concept of sustainable urban development. Drawing on the experiences from six of the case studies discussed at the forum, this report described the benefits of regenerative urban development, the challenges faced in implementation, and useful tools and action points for policymakers and urban stakeholders.

While there were no examples given of a fully regenerative city, many cities around the world demonstrate regenerative urban development in certain sectors and embody many of its elements. A notable discussion outcome was that the cities identified in this category have diverse characteristics: some have large populations while others are small cities; some are coastal cities while others are situated inland; some have low population growth while others are rapidly urbanising; some are in industrialising countries while others are in industrialised countries.

The common thread connecting all of these cities is the desire for a new narrative on what the urban landscape can and should look like.

It is not only urgently necessary for cities to become regenerative in order to ensure the long-term robustness of the planet they depend on for their existence, it is desirable for them to do so given the benefits to:

- the conditions of natural ecosystems;
- the local economy;
- the social and physical health of people and their neighbourhoods;
- the capacity of cities to withstand external shocks; and
- the democratic process.

That is not to say that there is a silver bullet solution or that the path to realising a regenerative vision will be easy or costless in the short term. Obstacles endemic in our political, financial and social institutional structures require leaders – whether they be policymakers in local or national governments, community leaders in civil society, or ordinary citizens – to think in a radically different way from the business-as-usual scenario in order to overcome these obstacles.

Successful implementation of a new urban paradigm is aided by:

- Leadership: A strong vision and political will;
- Inclusive policymaking: Public participation and involvement of diverse stakeholders;
- Integrated governance: Decentralised decision making coupled with vertical coordination;
- A holistic policy approach: A cross-sectoral approach that facilitates horizontal dialogue;
- Good governance: Enforcement and accountability; and
- Enhanced dialogue: Effective communication and education.

With these tools, regenerative cities can lead the way not only in securing long-term prosperity for their citizens, but also positively enhancing the health of their environment and the vitality of the planet.

ENDNOTES

All online references last accessed 4 March 2014.ß

1 Report of the World Commission on Environment and Development: Our common Future, Part I., 2. Towards Sustainable Development. Permanent link: ***www.un-documents.net/wced-ocf.htm.***

2 Global Footprint Network. ***www.footprintnetwork.org/en/index.php/gfn/page/earth_overshoot_day/.***

3 World Wide Fund, Living Planet Report 2012, ***www.awsassets.panda.org/downloads/1_lpr_2012_online_full_size_single_pages_final_120516.pdf.***

4 C40 Blog, "C40 Blog Mayors of the World's Largest Cities Demonstrate Progress in Greenhouse Gas Reductions and Launch Two New Initiatives." ***www.c40.org/blog_posts/mayors-of-the-world%E2%80%99s-largest-cities-demonstrate-progress-in-greenhouse-gas-reductions-and-launch-two-new-initiatives.***

5 Global 100% Renewable Energy, ***www.go100re.net.***

6 Case study based on information from the FCF 2013 presentation by Uli Hellweg, Managing Director, IBA Hamburg; interview with Katharina Jacob, Assistant Project Coordinator, Cities and Climate Change, IBA Hamburg; and Energy Atlas: Future Concept Renewable Wilhelmsburg, IBA Hamburg 2010

7 Case study based on information from input at the FCF 2013 by Michael Preuss, Forum Eine Mitte für Alle; and Q8, Eine Mitte für Alle, ***www.q-acht.net/Eine-Mitte-fuer-Alle.11.0.html***

8 Case study based on information from the FCF 2013 presentation by Mette Skovbjerg, Project Manager, Kalundborg Symbiosis; Kalundborg Symbiosis, ***www.symbiosis.dk***; and Kalundborg, Interntional Institute for Sustainable Development, ***www.iisd.org/business/viewcasestudy.aspx?id=77***

9 Case study based on information from the FCF 2013 presentation by Danielle Murray, Renewable Energy Program Manager, Department of the Environment, San Francisco, US; and 'San Francisco Mayor's Renewable Energy Task Force: Recommendations Report,' September 2012

10 'Future Policy Award 2009: Celebrating the World's Best Laws to Tackle Hunger,' World Future Council, ***www.worldfuturecouncil.org/fpa_2009.html***

11 Case study based on information from the FCF 2013 presentation by Cecilia Rocha, Director and Associate Professor, School of Nutrition, Ryerson University; and Celebrating the Belo Horizonte Food Security Programme, World Future Council 2010

12 Case study based on information from the FCF 2013 presentation by Eko Kurniawan, Deputy Director, Metropolitan Spatial Planning and Development, Directorate General of Spatial Planning, Ministry of Public Works, Indonesia; Tommy Firman, "Urbanization and urban development patterns" The Jakarta Post, May 12, 2012; 'A Historical Overview of the Spatial Planning in Indonesia,' Indonesia's Urban Studies, ***www.indonesiaurbanstudies.blogspot.de/2008/09/historical-overview-of-spatial-planning.html***; and 'Indonesia: Country Profile, An Overview of Spatial Policy in Asian and European Countries,' Ministry of Land, Infrastructure, Transport and Tourism, Japan, ***www.mlit.go.jp/kokudokeikaku/international/spw/general/indonesia/index_e.html#g02***

13 'From Vision to Action: A workshop report on 100% Renewable Energies in European Regions,' World Future Council, Nordic Folkecenter and Climate Service Center at the Helmholtz-Zentrum Geesthact, March 2013.

14 'Towards the Regenerative City,' World Future Council 2013

15 'From Vision to Action: A workshop report on 100% Renewable Energies in European Regions,' World Future Council, Nordic Folkecenter and Climate Service Center at the Helmholtz-Zentrum Geesthact, March 2013.

16 Alex Kotlowitz, "Plant Tomatoes, Harvest Lower Crime Rates," Mother Jones, July/August 2012, ***www.motherjones.com/media/2012/07/chicago-food-desert-urban-farming***

17 'Towards the Regenerative City,' World Future Council 2013

18 'San Francisco Mayor's Renewable Energy Task Force: Recommendations Report,' September 2012

19 FCF 2013 presentation by Kees van Leeuwen, Chair, Water Management and Urban Development, KWR Watercycle Research Institute

20 "Los Angeles to be coal-free by 2025, declares mayor,"Power to the People, ***www.power-to-the-people.net/2013/03/los-angeles-to-be-coal-free-by-2025-declares-mayor***

21 FCF 2013 presentation by Danielle Murray, Renewable Energy Program Manager, Department of the Environment, San Francisco, US

22 FCF 2013 presentation by Henrik Johansson, Environmental Coordinator, Executive Office of Strategic Planning, Växjö, Sweden

23 'From Vision to Action: A workshop report on 100% Renewable Energies in European Regions,' World Future Council, Nordic Folkecenter and Climate Service Center at the Helmholtz-Zentrum Geesthact, March 2013.

24 FCF 2013 presentation by Uli Hellweg, Managing Director, IBA Hamburg

25 FCF 2013 presentatin by Margaret Zziwa, Speaker, East Africa Legislative Assembly

26 FCF 2013 presentation by Darren Hall, Manager, Bristol Green Capital Partnership, UK

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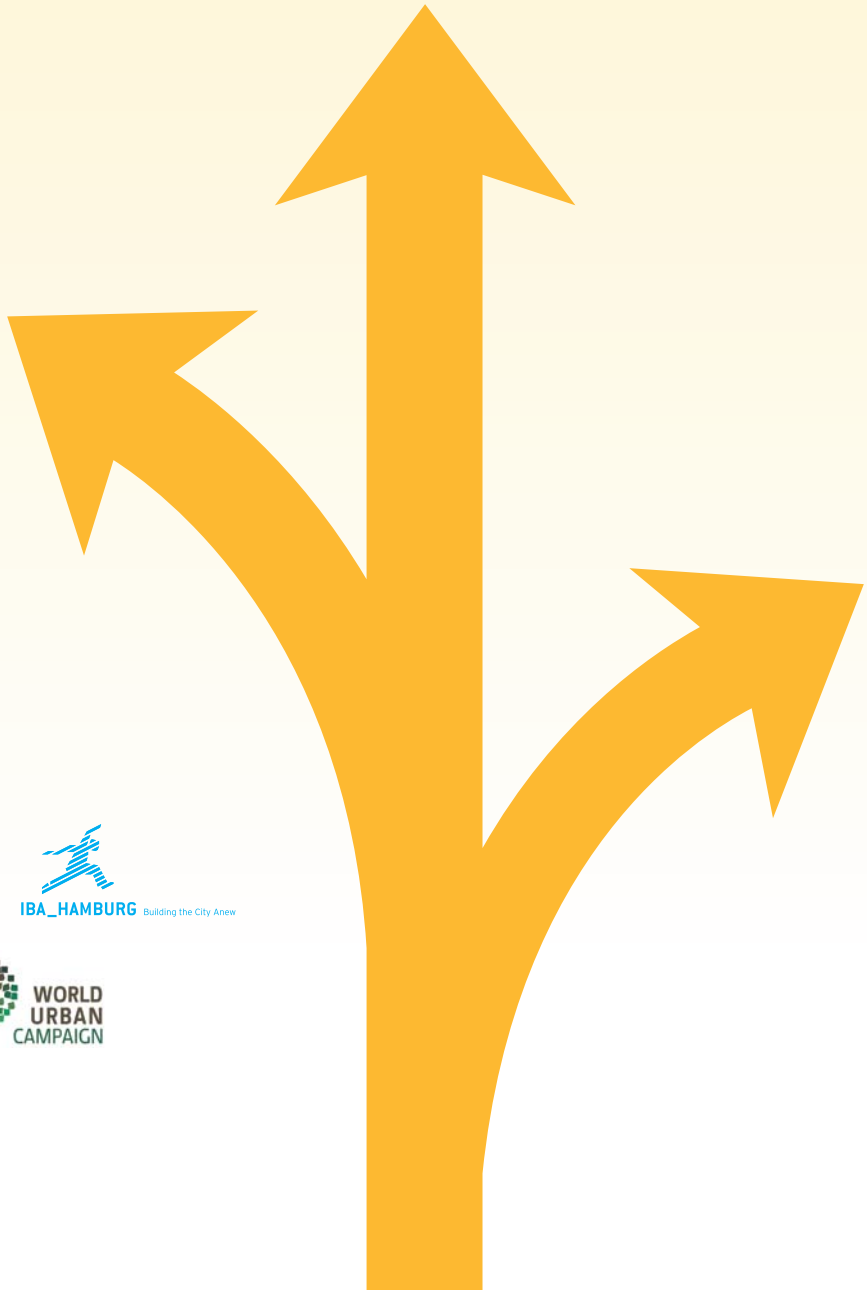

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