OurPlanet

United Nations Environment Programme

October 2016

Urban solutions

Making cities strong, smart, sustainable

UNEP

Photo: © CC BY-NC Chris Goldberg

OurPlanet

Address:
PO Box 30552
Nairobi, Kenya
E-mail:
publications@unep.org
Telephone:
+254.20.762.1234

For past issues visit:
www.unep.org/ourplanet

ISSN:
1013–7394

OurPlanet,
the magazine of the
United Nations Environment Programme
(UNEP)

Director of Publication: *Naysán Sahba*
Executive Publisher: *Stefan Smith*
Editor: *Geoffrey Lean*
Assistant Editor: *Stephen Graham*
Managing Publisher: *Oona Tully*
Layout: *Viola Kup*

Produced by:
United Nations Environment Programme

** All dollar ($) amounts refer to US dollars.*

UNEP

Printing:
- *Poligrafica C.A., Durán, Ecuador 500 copies/October 2016*
- *UNON, Publishing Services Section, Nairobi, ISO 14001:2004-certified 800 copies/October 2016*

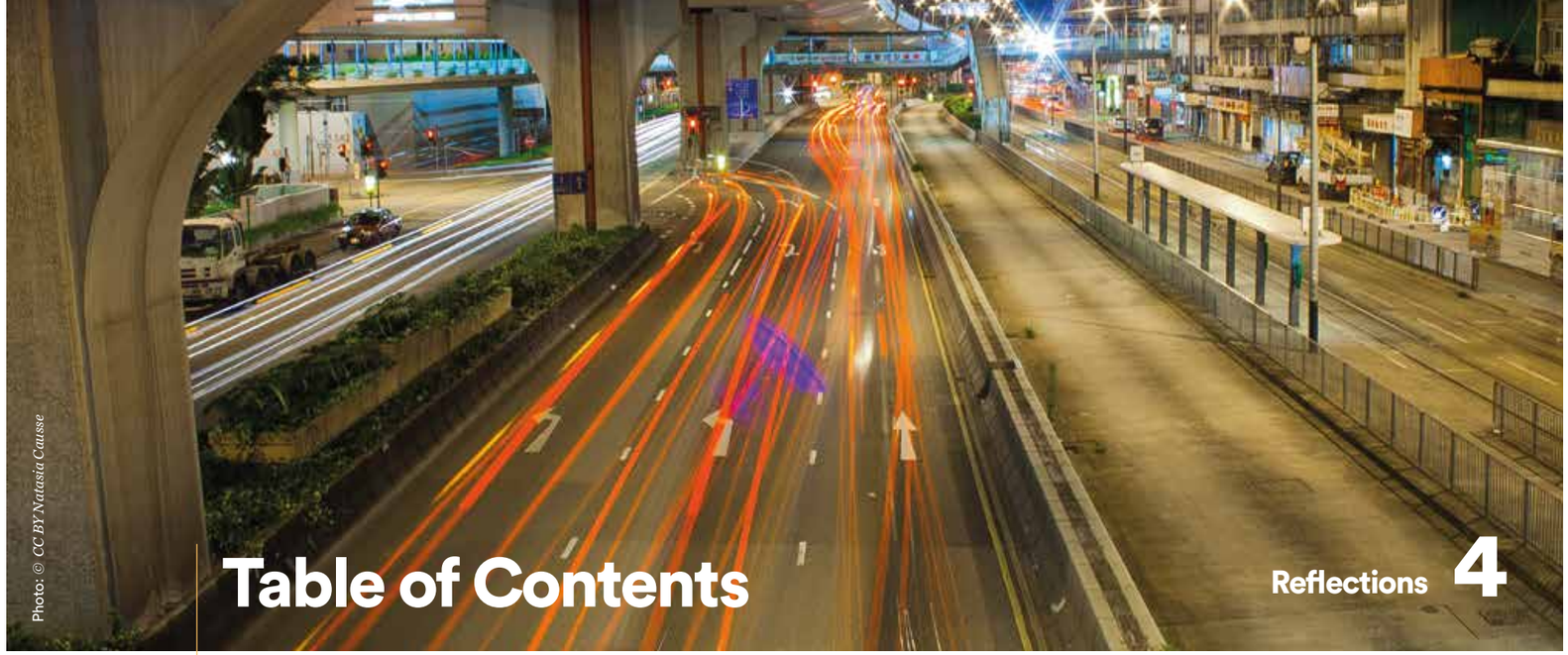
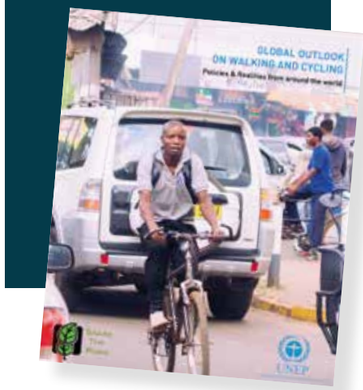


Photo: © CC BY Natasia Causse

Table of Contents



Features

Our Planet
Urban solutions: *making cities strong, smart, sustainable*

In this issue of Our Planet, government leaders, environmental policymakers, and experts in settlements and urban health examine the challenges and opportunities of our rapidly urbanizing world.

Photo: © CC BY Kelvin Trautman

48
Environmental Champion
Lewis Pugh

Erik Solheim
Reflections

Photo: © UN Habitat / Julius Mwelu

Erik Solheim

United Nations Under-Secretary-General and UN Environment Executive Director

In 1996, when the United Nations held its last conference on the urban environment, Habitat II, the city of Nairobi had some 800,000 inhabitants. At that time the ride from the airport to UN Environment headquarters on the other side of the city was something of a mini-safari.

As we prepare for Habitat III, Nairobi has become a bustling metropolitan hub in East Africa, a city of 3.5 million people. The same journey from the airport now takes you past sparkling glass-clad buildings on a six-lane highway, and a number of informal settlements.

Nairobi is just one example of many around the globe that illustrate the dramatic transformation underway in urban areas. A bit more than half of the world's population lives in cities today. That portion is expected to grow to two-thirds by 2050.

We are living in the age of the city. Decisions we make now on our urban environment have an enormous impact on the future of billions of city dwellers. Can we make the right choices that allow us to live in cities sustainably? Can we harness the transformative power of cities to achieve goals for fighting climate change? Can we use these decisions to make our cities more equitable and secure? Technology is not the limiting factor. It is a matter of choice.

We need to make choices that break down economic and social barriers, while restoring our ecosystems on which we depend for our very survival.

Cities currently account for more than 70 per cent of global energy and resource consumption. But energy efficient technologies and clean energy options are quickly evolving as costs fall. Today, renewable energy capacity far surpasses even the most optimistic forecasts from a couple of decades ago. With this windfall of technology, a number of cities have adopted ambitious objectives. Some, like Copenhagen, aim to be 100 per cent renewable-powered. We need more ambitious targets like this.

How will we transform infrastructure and housing and who will finance it? Much of the technology to make this a positive transformation already exists: walls that store energy for heating or cooling, roofs and windows that collect rainwater and generate electricity. Modern district energy systems can pipe heating and cooling into connected buildings while making use of wasted heat from power stations, industry and local renewables. New York City has district heating systems that provide heat and electricity to critical infrastructure such as hospitals. During Hurricane Sandy, a number of hospitals stayed online because of their district heating system.

One infrastructure technology that has already seen widespread adoption has been bike sharing. Over 500 cities have some form of bike sharing initiative, which is a great complement to public transport. Thinking big, we can imagine that by the time of the next Habitat meeting, autonomous vehicles powered by clean energy may be a core element of city transport systems, reducing local air pollution, and storing renewable energy capacity in vehicle batteries.

Environmentally sound solutions are not necessarily more costly. Often, investments are paid back by lower operating costs. And taking a longer-term perspective, efficiency gains reduce the need for more infrastructure. In Sydney, the city's comprehensive Energy Efficiency Master Plan estimates that a $166 million investment in residential energy efficiency will result in infrastructure savings of more than $70 million, in addition to direct energy savings of $286 million.

For cities to make the right choices, every economic decision must tell the environmental truth. That means the future cost and risk of environmental impact must be accounted for.

For cities to make the right choices, every economic decision must tell the environmental truth. That means the future cost and risk of environmental impact must be accounted for.

The best choices and solutions will address several challenges at the same time. For example, urban green space in cities caters for recreational activities and makes a city more attractive for its citizens. At the same time, it provides ecosystem services such as cooling down heat islands, cleaning the air and water management. Some studies even point to reduced crime and violence in urban areas with prominent green space.

All of these choices rely on ambition. Does a city want to be healthier, more environmentally friendly, and better-off economically? If it does, there should be no limit to the goals that it sets for itself. What if all cities had the aim of producing zero net waste and zero net carbon emissions? What if all cities aimed to meet World Health Organization air quality standards (only 12 per cent do now)? What if every city aimed for a minimum percentage of public green space? These are questions of aspiration.

Cities have the opportunity to be havens of sustainability, security and equality. What's required is ambition and commitment. ▲

Tony Tan Keng Yam
The Singapore story

Environmental achievements of this nation-state over the past five decades

Dr Tony Tan Keng Yam

President of the Republic of Singapore

Singapore has come a long way in its journey towards sustainability. In the 1960s, Singapore was like any other developing country of that time – dirty and polluted, lacking proper sanitation and facing high unemployment. These challenges were more acute for Singapore given our constraints as a small island city-state with no natural resources.

The imperative of a clean and green Singapore was recognised early on by Singapore's founding Prime Minister Mr Lee Kuan Yew. He believed that "a blighted urban jungle of concrete destroys the human spirit" and that "we need the greenery of nature to lift our spirits". In 1963, Mr Lee planted the first tree to kickstart the national effort for tree planting. Today, almost 50 per cent of Singapore is covered by greenery, with about 3 million trees in our streetscapes, parks and residential areas.

Besides our early efforts to green the country, we also shifted pollutive industries away from residential areas and made new laws against pollution. As a young nation that needed to attract industries and secure economic growth, our leaders were committed to ensuring that the environment was not compromised in the pursuit of rapid industrialisation.

One of our largest transformations involved the Singapore River, which was literally an open sewer in the early days. The cleanup of the river was an enormous endeavour that required the efforts of numerous agencies. It involved the relocation of thousands of street hawkers, squatters and pollutive industries such as pig farms, and the removal of over 250 tons of rubbish accumulated in the river and its banks. The cleanup took 10 years, and when it was completed in 1987, the water was finally clean enough for fish and other aquatic life to return.

It was, however, not enough to simply clean up the Singapore River; we made bold plans to transform the riverine stretch into an attractive waterfront promenade. The successful cleanup also set in motion a process to create a reservoir in the heart of the city. By damming the mouth of the Marina channel, the Marina Barrage, completed in 2009, offers the triple benefits of water supply, flood control, and a place for recreation.

Driven by our vision to make Singapore a 'City of Gardens and Water', we launched the Active, Beautiful, Clean (ABC) Waters Programme in 2006 to transform utilitarian drains into attractive waterways, bring people closer to water, and improve runoff quality using green cleansing features. Our waters have become a part of 'home' that Singaporeans enjoy and cherish.

As a small island with limited land for water storage, Singapore needed to diversify our water sources. Apart from water import, we expanded our local catchment areas to capture as much rainwater as possible, and invested in drought-resilient sources, namely NEWater - high-grade reclaimed water produced from treated used water that is further purified using advanced membrane technologies and ultra-violet disinfection, making it ultra-clean and safe to drink - and desalinated water. We also planned water infrastructure well ahead of demand. For example, we are now building Phase 2 of our Deep Tunnel Sewerage System that will meet Singapore's needs for the next 100 years.

Given our dense urban development and large industrial base, maintaining good air quality is another top priority for Singapore. To ensure good air quality, we have implemented strict enforcement programmes and air quality monitoring since the 1970s. Over the years, we have shifted from the use of fuel oil to natural gas in our power plants, mandated the use of near sulphur-free diesel for vehicles, and regularly tightened our emissions standards. As a result, Singapore today enjoys a high standard of air quality.

Photo: © CC BY Michaela Loheit

Singapore is diversifying its water supplies by expanding its catchment areas and securing drought-resilient supplies through investment in high-grade water reclamation and desalination.

Singapore has also made great strides in building an effective waste management system and aims to become a 'Zero Waste' nation. In 1979, we built our first waste-to-energy plant, where waste is incinerated to generate energy. Today, about 37 per cent of waste generated in Singapore is incinerated at four 'waste-to-energy' plants and most of the remaining waste is recycled. We aim to achieve a national recycling rate of 70 per cent by 2030. The ash generated from the incineration process and non-incinerable waste is disposed at our offshore Semakau Landfill. The landfill not only meets our waste disposal needs, but also supports a thriving ecosystem with rich biodiversity. It is a good example of how countries can pursue environmental protection in tandem with development goals.

As part of plans for a 'car-lite' Singapore and to further reduce our carbon footprint, we are investing heavily in our rail network, bus services, and supporting infrastructure such as sheltered walkways and cycling paths. Electric car-sharing is being trialled alongside a state-of-the-art GPS-based Electronic Road Pricing system to regulate car usage.

To appreciate Singapore's transformation, we have distilled our urban development journey into the Liveability Framework. The Framework has three policy outcomes that have been constant in how Singapore has envisioned liveability. They are: a competitive economy that attracts investments and provides jobs; a sustainable environment that helps the city thrive despite limited natural resources, especially land and fresh water; and a high quality of life that benefits people. These outcomes are built on the twin foundations of integrated master planning and development, and dynamic urban governance.

Integrated master planning means planning for the long term, while retaining the flexibility to review plans as needs change. Dynamic urban governance means leading with vision and pragmatism, underpinned by a culture of integrity in the public service, and strong institutions with well thought-out systems and processes. It is also important that government agencies engage the public and community groups, giving everyone a stake in their country's long-term good. With these principles, we have made many environmental achievements over the last five decades and they have helped to make Singapore an endearing home.

As we work towards our vision of a liveable and sustainable home, we also need to exchange knowledge and share experiences with others, within and outside Singapore. International conferences - such as the World Cities Summit, the Singapore International Water Week and the CleanEnviro Summit Singapore - are useful for this knowledge-sharing. As a responsible global citizen, Singapore supports international efforts, including those by the United Nations, to chart a sustainable development pathway for the world.

Singapore today is the result of visionary leadership, careful long-term planning and resolute execution by our forefathers. To chart the next phase of our sustainable development till 2030 we have developed a Sustainable Singapore Blueprint 2015 that outlines our national vision and plans for an even more liveable and sustainable Singapore. Collective action and commitment are central to securing the vision laid out in the blueprint and we will continue to encourage greater stewardship over the environment, where it becomes second nature for everyone to care for our common spaces.

Our journey towards sustainability is a challenging one. Together, we can build more liveable and sustainable cities for present and future generations. ▲

Joan Clos
Seizing the opportunity

Habitat III is a chance to rethink the sustainability of our cities and launch a New Urban Agenda.

Joan Clos

Secretary-General of Habitat III and Executive Director of UN-Habitat

Habitat III, the Third International Conference on Housing and Sustainable Urban Development, offers the world an exceptional opportunity to rethink the sustainability of our urban model. It is largely recognized that cities have become the main driver of economic development. Yet an analysis of the urbanization of the last two decades reveals that current urban practices are unsustainable: our cities consume 78 per cent of the world's energy, produce more than half of all greenhouse gas emissions and consume much more land than is needed, with consequent environmental impacts.

The New Urban Agenda is a set of strategies that aim at reducing and reversing these negative trends, by advocating a new model of urban development that results in equity, prosperity and environmental sustainability. It will be a guiding framework that, if implemented, will lead to better planned, designed, and governed cities in a world where half of its people are already urban. Good urbanization is essential to the success of Agenda 2030 and to the well-being of billions of people.

One key question in this analysis is to identify how good, well-planned urbanization can contribute to the planet's environmental sustainability. Urbanization that promotes compactness, connectivity and walkability is good for climate change mitigation and adaptation. Agglomeration and proximity provide enormous opportunities for energy efficiency.

Compact and connected urban development results in lower greenhouse gas emissions and can also reduce the capital and operating costs of basic infrastructure and services.

The latest UN-Habitat analysis of world urbanization reveals, however, that the current model of urbanization does not follow these principles. Cities are increasingly less planned, leading to spontaneous urbanization, which in turn decreases the quality of life for millions. The density of cities has also declined by 52.5 per cent and 37.5 per cent in developed and developing countries, respectively, over the last 20 years. Such urban sprawl and reduced density is a result of lifestyle change, suburbanization both for the rich (in gated communities) and the poor (in mass housing schemes), land speculation, and spontaneous and informal land occupation. Excessive urban expansion, combined with a corresponding decrease in density, has contributed to: the increased need for transport (and thus energy consumption); environmental degradation; growing per capita costs of urban services (water, sanitation and drainage); increased per capita costs of public space and infrastructure; and decreased productivity through urbanization, with less economies of agglomeration. We must address this quickly, and effectively. UN-Habitat proposes a paradigm shift based around five strategies:

1) Develop National Urban Policies which establish mechanisms of coordination between central and local governments, preventing duplication of services and costs. These amalgamate the dispersed energy and potential of urban centres within a national system or hierarchy of cities and towns. They help coordinate the work of different sectors and tiers of government, establish incentives for more sustainable practices, and provide a basis for the allocation of resources.

2) Ensure proper urban legislation. Robust legislation, and its equitable implementation, shapes operational principles and stabilizes organizational structures, fostering institutional and social relationships that underpin the process of urbanization.

3) Support urban planning and design. Good planning can change a city's internal structure, form and functionality, contributing to a more compact, integrated and connected layout, and leading to sustainable solutions. Densification, social diversity, climate change mitigation and adaptation, the sustainable use of natural resources, and adequate public spaces - including vibrant streets - are all results of good urban planning and design.

4) Urbanization must be financed. In order to create employment, urban areas and regions require strong economic growth strategies that take into account regeneration, cluster development and industrial zones. Strengthening municipal finance is about realigning fiscal authority, responsibility and revenue sharing, i.e. achieving the right balance between different levels of government, designing new financial mechanisms, exploring new sources of capital, and improving revenue collection systems and budget management and transparency.

5) Finally, in expanding a city, we must maintain planned city extensions and planned city in-fills. This results in lowered urban energy use and greenhouse gas emissions.

In 20 years, the density of cities has declined by **52.5 per cent and 37.5 per cent** *in developed and developing countries, respectively*

With the adoption of the Paris Agreement and, soon, a New Urban Agenda, there is renewed impetus for action. The New Urban Agenda is an opportunity further to improve the sustainability of our planet. It envisages cities that protect their ecosystems (water, natural habitats, and biodiversity) and minimize their environmental impact by changing to sustainable consumption and production patterns. At Habitat III, participants will have the opportunity to discuss environmental issues through the lens of urbanization: clean energy, sustainable use of land and resources in urban development; sound waste management; digitalization of services; innovative transport technologies; protecting ecosystems and biodiversity; sustainable consumption and production patterns; urban resilience; reducing disaster risks; and mitigating and adapting to climate change.

Let us seize this opportunity and achieve a better urban world for all. ▲

Urbanisation that promotes compactness, connectivity and walkability is good for climate change mitigation and adaptation. Agglomeration and proximity provide enormous opportunities for energy efficiency.

Photo: *CC BY aotaro*

UN Environment at Work
Ecosystems for urban resilience

Seeing cities within their ecosystems shows how to adapt them to climate change

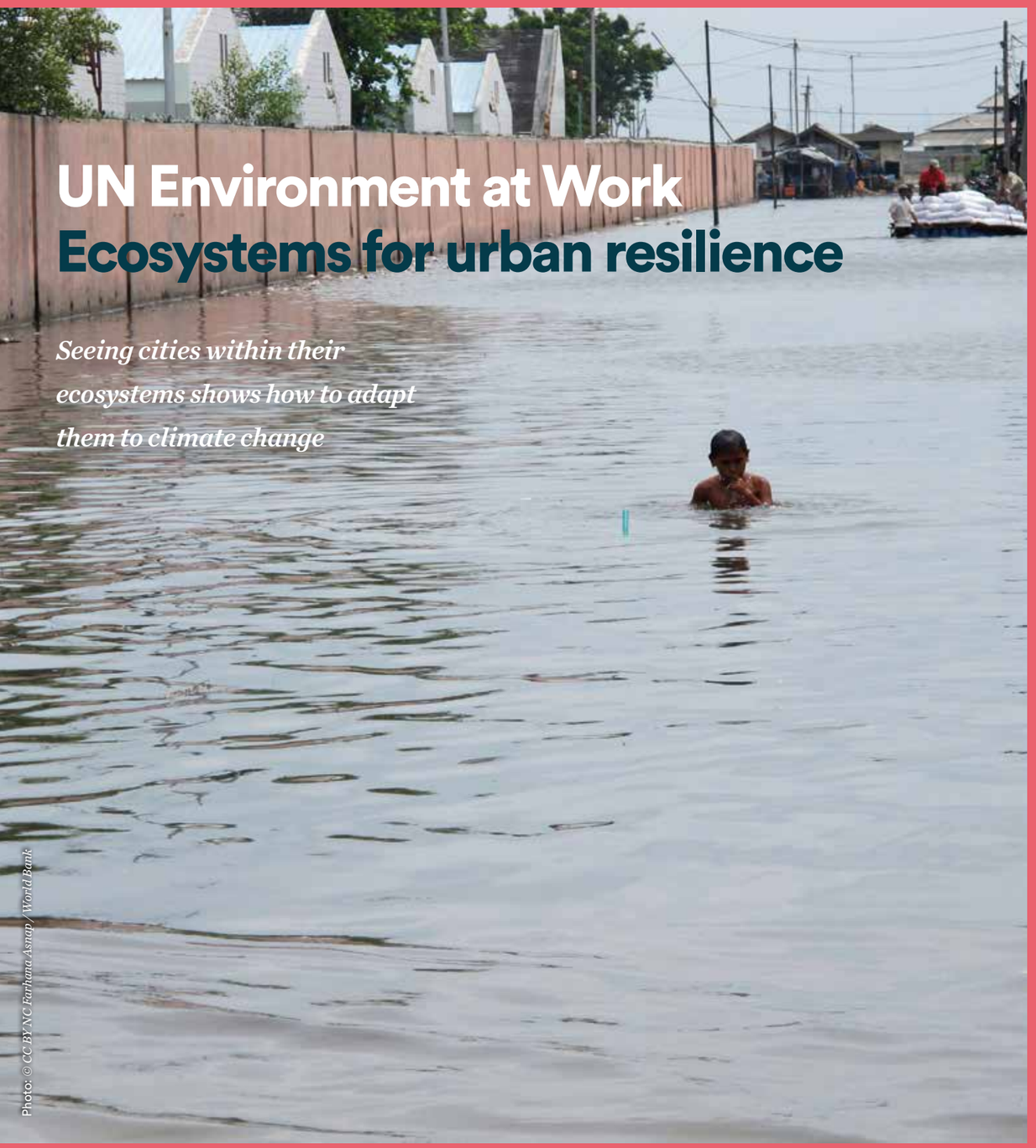


Photo: © CC BY NC Farhana Asnap / World Bank

Cities depend on their surrounding bio-physical landscape, utilising goods and services provided to urban populations from ecosystems. These include provisioning services such as food and water; regulating services such as climate and flood control; supporting services such as nutrient cycling and crop pollination; and cultural services such as connecting urban inhabitants to natural values. The health of the ecological system within and surrounding the city influences the health of the city itself. UN Environment recognises that building the resilience of urban populations depends on how climate and non-climate drivers are tackled together. The management of urban and surrounding peri-urban ecosystems has the potential to contribute significantly to the overall resilience of the city to climate change and other pressures.

Urban Ecosystem-based approaches to Adaptation (EbA) is an adaptation approach that aims to build resilience of the ecosystems surrounding and within city boundaries, of peri-urban areas and of the broader landscape. For example, the restoration of degraded watersheds – forests, rivers and other ecosystems within a city's ecological hinterland – to improve drinking water availability and quality; the regulation of river flows for abstraction and mitigation of flood risk; control of sediment flow and salinity; as well as providing attractive landscapes to urban populations.

Photo: © CC BY NC Bart Verweij / World Bank

UN Environment provides cost-effective adaptation solutions to cities seeking to maximise ecosystem goods and services while making themselves more resilient to climate change impacts.

Through its urban EbA programme, UN Environment provides cost-effective adaptation solutions to cities seeking to maximize ecosystem goods and services to their populations and strengthen the role of urban institutions, leaving cities more resilient to climate change impacts such as sea level rise, flooding, freshwater and food insecurity, and urban heat island effects.

The goals of the urban EbA programme are twofold:

- Reduced vulnerability of urban populations to climate change impacts by preventing critical ecosystem losses under current and future climate and socio-economic scenarios, and secure future provision of ecosystem services to urban populations.

- Strengthened governance, knowledge and capacity at national and city level to understand the socio-ecological interactions between ecosystems and cities, including the trade-offs between competing land uses; and national and city authorities and institutions able to sustainably manage urban ecosystems for current and future urban populations.

UN Environment is executing two regional urban EbA projects, funded by the Least Developed Countries Fund and the Special Climate Change Fund under the Global Environment Facility. One in Asia is working with the cities of Thimphu (Bhutan), Kep (Cambodia), Phongsaly and Oudomxay (Lao PDR) and Mandalay (Myanmar), delivering on-the-ground urban EbA activities centred on reforestation, urban agriculture and restoration of wetlands in urban areas.

The second is in the Latin America and Caribbean region. In San Salvador (El Salvador), the project is implementing climate-resilient reforestation and conservation agriculture approaches to restore the degraded Arenal-Monserrat watershed; in Kingston (Jamaica), the Hope watershed that surrounds the city will be restored to mitigate the impacts of more frequent and severe floods and droughts; and in Xalapa (Mexico), revegetation and soil conservation at the watershed scale will be undertaken along the El Palenquillo stream using native riparian species adapted to regular flooding.

In addition, UN Environment and the Government of Lao PDR are developing a large scale urban EbA project in six of the country's most populated and climate vulnerable cities, including the capital Vientiane for funding by the Green Climate Fund. Through urban EbA interventions the project seeks to reduce the climate vulnerability of up to 820,000 people. ▲

Margaret Chan
Healthy cities

Health should be the "pulse" of the new urban agenda.

Photo: © CC BY - NC - ND - Vit Polywoda

Margaret Chan

Director-General, World Health Organization

Health needs to be an integral part of Habitat III, the Third UN Conference on Housing and Sustainable Urban Development, and of its outcome.

The New Urban Agenda, the outcome document, will guide policies on cities at a time when urban growth will have a defining role in the future of climate and environment, and on our ways of doing business, on our lifestyles, and on our health.

Twenty years ago, at the time of Habitat II, most of the world's population was still based in rural towns or villages. Massive urban migration since then has meant that more than half of us now live in cities, with low-income ones growing fastest.

The growth of cities has created unprecedented economic opportunity, as well as greater access to health and social services for many of the world's poor. But rapid uncontrolled urban growth has also had profoundly negative impacts, which need urgently to be addressed to fulfil the potential of urban communities and contain global temperature rises.

Developing countries are confronting a "double burden" of communicable and non-communicable diseases. Longstanding epidemic-prone illnesses, such as dengue fever, are again threatening cities, while new threats, like the Zika virus – transmitted by the same mosquito vector – are emerging. Transmission is exacerbated by poor water and waste management and broader trends of globalization and changing weather. Slum conditions are breeding grounds for other infectious diseases, like childhood pneumonia, diarrhoea, and tuberculosis.

Meanwhile, soaring levels of urban outdoor air pollution, sedentary lifestyles, unhealthy diets, and road traffic injuries are contributing to the global pandemic of noncommunicable diseases.

According to the latest World Health Organization (WHO) data, as many as one-quarter of deaths from heart disease, and one-third or more of deaths from stroke, lung cancer and chronic respiratory illness result from exposures to outdoor and household air pollution. The greatest exposures to outdoor air pollution are often in and around cities.

Air pollution levels are still 25-50 per cent above WHO air quality guidelines in many wealthy cities of Europe, and much higher than that in lower-income ones.

The good news is that strategies are available for making cities healthier and more vibrant places to live, work and raise families.

Air pollution levels are still ***25-50 percent*** *above WHO air quality guidelines in many wealthy cities of Europe, and much higher than that in lower-income ones.*

The same sources of urban air pollution are drivers of other health threats – and inequities. Poor neighbourhoods are often located near the busiest highways and dirtiest industries, for instance. Pedestrians, many of them children and teens, are often most at risk of traffic injury and other environmental health hazards.

Cities also consume two-thirds of primary energy resources, and are a driver of climate change. Sustainable urbanization is thus critical to limiting global average temperature rise to 1.5 °C.

The good news is that strategies are available for making cities healthier and more vibrant places to live, work and raise families. Many cities, both rich and poor, have well-documented successes in transport, housing, air quality and waste management. Safe rapid transit systems and pedestrian and bike routes can reduce long term health risks from air pollution - as well as the very immediate, and catastrophic effects of traffic injury - while supporting healthy physical activity as cities grow and develop.

Urban green spaces for community gardens and urban design policies that foster fresh food markets and other basic services within walking distance of residential neighbourhoods can help improve access to healthier foods.

Healthy planning of compact walkable neighbourhoods is also more equitable, as it ensures access by the poor and carless to jobs, education and basic health services. It can also reduce energy consumption and pollutant emissions.

Linking health to the New Urban Agenda can help make the difference to the future of cities, our health and our environment. WHO is doing its part to advance this kind of vision at Habitat III, advocating for health as a cross-cutting theme and for an urban air quality target that can mobilize action. It is also collaborating with the Climate and Clean Air Coalition (CCAC) to Reduce Short-lived Climate Pollutants, hosted by UN Environment, to foster new examples of urban health initiatives that cut both air pollution and climate emissions, and position the health sector as an advocate of change.

Public awareness is critical. The WHO/CCAC BreatheLife campaign (www.breathelife.org), announced at the Second Global Climate and Health Conference in July 2016, is helping raise awareness of air pollution and climate among the urban public, using digital media in innovative ways and urging urban leaders to "breathe life" into their cities by committing to reduce air pollution to WHO guideline levels.

Thanks to WHO's global Air Quality and Health platform, detailed data are available on air pollution trends and health impacts for 3000 cities. Research institutions and other UN agencies, including UN Environment, are collaborating to improve data generation and assessments.

All of these actions are underpinned by a new World Health Assembly Air Pollution resolution, approved in 2015, followed by an implementation "Road Map" in 2016. Both reflect the growing commitment of the health community to address today's biggest environmental risk to health.

We know that health can be a powerful catalyst to help address complex subjects ranging from poverty to climate change. Focusing our efforts on the New Urban Agenda, we can build on the promises of the 2015 Paris Climate Agreement through comprehensive urban actions. As I said at the Paris conference last December, "healthy people and a healthy planet" are two sides of the same coin. The New Urban Agenda has the opportunity to advance both.

Let's make this vision a reality, block by city block. ▲

Charlie Hales
Dramatic turnaround

A city once known for pollution is slashing carbon emissions and banning bulk fossil fuel terminals as it grasps the opportunities of the green economy.


Photo: CC BY NC Ian Sane

Charlie Hales

Mayor of Portland, Oregon, United States of America

One November afternoon, the Portland City Council chambers were filled with men and women in suits, serious and practical. Standing out in the crowd were two middle school girls, poised but nervous. One of them, 12-year-old Isabel, walked to the testimony table and spoke: "If we don't take action now, we will never grasp the opportunity to stop climate change. This is our future."

In that moment, she captured the concerns of Portlanders, of Americans, and of global citizens.

A global issue like climate change seems to dwarf the influence of an individual city. But when mayors hear our cities' children pleading for help, we know we must mobilize on the front lines of the battle. Portland stands alongside C40 cities, the US Conference of Mayors, Climate Mayors, the West Coast Alliance of Mayors, and other coalitions to show that while nations negotiate burdens, cities find opportunities for positive action. Cities are the locus of innovation and action on climate change.

This approach has already had a significant impact: C40 cities alone are taking 10,000 individual actions to reduce greenhouse gas emissions. In Portland, our aggressive climate action agenda has reduced carbon emissions by 21 percent from 1990 levels — even as our population grew by 33 percent and we added 90,000 jobs.

That is a dramatic turnaround from 30 years ago, when Portland's air quality was among the worst in the country. We cleaned up our air and reduced carbon emissions through significant investments in transport infrastructure — rail, transit, electric vehicle, bike — and recycling. As Portland transport commissioner in the 1990s, I saw impending growth, and invested in the first modern streetcar in the United States. Our streetcar loop has since attracted $4.5 billion of low-carbon development, and has increased the market value of the corridor by $11.63 billion.

Our electric vehicle charging infrastructure is the best in the United States, as is our broad and growing bicycle infrastructure: 7 percent of Portlanders now commute to work by bike. Five years ago we extended recycling and curbside compost services citywide, and took waste generation from a staggering 21 percent above 1996 levels, down to 10 percent below that level. These investments are driving us toward our goal of reducing emissions by 40 percent by 2030, and 80 percent by 2050.


Photo: CC BY Adventures of Pam & Frank

In moving past the status quo, there are myriad opportunities to be prosperous in the green economy.

Portland's streetcar loop has attracted **$4.5 billion** *of low-carbon development, and increased the market value of the corridor by* **$11.63 billion.**

But we won't achieve those ambitious — and necessary — goals without even more dramatic action. We are working to double the amount of solar energy captured at City facilities, with solar panels on police precincts and community and water treatment centres. We have implemented energy performance reporting for large commercial buildings; this addresses our city's largest energy consumer, and saves building owners money on energy costs. Our next step is to join just four other cities in the United States to require energy reporting for residential homes, which will have the same cost-saving and energy-reduction benefits. This set of actions alone will reduce Portland's carbon emissions by another seven percentage points.

Perhaps the most dramatic action is my proposed policy to prohibit all new bulk fossil fuel terminals in the city of Portland. This is a deliberate transition from dirty, dangerous fuels to clean, renewable energy. And it's a reinforcement of the "green wall" that West Coast cities are building to signal their values in protecting our public from the devastating effects of climate change, rejecting the fossil fuel status quo, and positioning themselves to innovate early — a strategic move that will prove both economically beneficial and climate-responsible.

In moving past the status quo, there are myriad opportunities to be prosperous in the green economy. In Portland, we have more than 12,000 jobs in the clean, green tech industry, and that number is growing rapidly. We have changed investment priorities, joining a growing wave of cities, universities and businesses by divesting from fossil fuel companies and investing in the clean energy of the future. We are also starting to use green bonds, which match the city's climate-related priorities to a market looking for reliable, environmentally sound investment options. In the new economy, climate action and prosperity go hand-in-hand, and Portland is joining West Coast cities as the first to invest.

As mayor, I have been moved by my constituents' pleas for action on climate change. And I have been moved by my peers' response. In Paris last winter, I stood with more than 1,000 mayors and local leaders from around the world, as we pledged to make national agreements real. I'm proud that the example and the pressure from so many mayors taking a strong stand helped embolden the global negotiations.

A global issue like climate change may seem greater than the influence of an individual city. But together, on the front lines, cities can have a real impact. We can make good on our nations' promises. We can heed our communities' plea.

That plea has been heard by the Portland City Council, and we cannot resist its eloquence and immediacy. On that November afternoon, Isabel's 13-year-old classmate, Lailanie, leaned over her written statement as she spoke. When she reached the last line, she straightened in her chair, looked Council members in the eye and said: "Please don't let future generations look at a dying earth and say that we're the generation that killed it. Let them look back and say that we're the generation that saved it."

She spoke her truth - and for all of us. That is our mandate, and our opportunity to take local action that changes the world. ▲

Mauricio Rodas Espinel

Empowering cities

The potential for sustainability at the local level is huge, fundamental and achievable.

Mauricio Rodas Espinel

Mayor of Quito, Sustainable City Envoy for ICLEI - Local Governments for Sustainability, including for Habitat III.

Europe, Africa and Latin America now each have roughly half a billion people living in cities. In Asia, there are two billion city-dwellers. Very soon, two-thirds of the global population will be urban.

These are impressive numbers, but what do they mean, in practical terms, for local leaders and civil servants? They mean that more people need access to essential services, and that cities must outpace urbanization with quick, innovative and adaptive plans. We have to think ahead, to ensure more sustainable cities for all.

The potential to achieve sustainability at the local level is huge, fundamental and achievable. But local governments and civil servants cannot do it all on their own.

After all, we have to ensure that city residents live in affordable, healthy, safe and low-carbon buildings; that they move through an intelligent mix of public, private and shared or non-motorized mobility; that they have access to clean water and affordable, clean energy; that inequality is curbed and women are empowered; and that we protect our environment and manage waste in a sustainable way.

Take waste – one of the many administrative areas affected by the momentous growth in urban population, and a challenge for all fast-growing urban areas of the world. Some 1.3 billion tons of municipal solid waste are produced every year globally, a figure that will rise to 2.2 billion tons by 2025. If we were to load it all onto garbage trucks and put them in single file, they would stretch all the way from Alaska to Tierra del Fuego.

Quito's approach in recent years has been to add a social inclusion element to waste management, by training almost 3,000 local collectors from the most vulnerable sectors of the population. We are now setting up an inclusive waste collection plan, by creating five recycling centres where citizens will be able to bring all their collected recyclable waste.

This is the kind of important issue mayors must deal with every day. Sometimes we succeed in planning for, and managing, them in a smart and sustainable way using existing human and financial resources. Yet there is still a financial gap that could be closed by creating new lines of financing, open directly to cities, as well as through integration and support from national governments.

All levels of government and all stakeholders must come together in a multi-level decision-making process to: develop national funding schemes that help achieve the Sustainable Development Goals in cities; come up with innovative financial instruments that also provide funds for projects that require much longer investment horizons; and

A strong New Urban Agenda can make sustainable urbanization possible also for cities with fewer resources and more challenges.

Quito has trained almost **3,000 local waste collectors** *from the most vulnerable sectors of the population and is creating five recycling centres.*

leverage existing resources within each city, bridging the rich-poor divide and delivering a city that is not only more sustainable, but also more just.

Adequate financing is not the only ingredient for sustainable urbanization. The single variable that often defines a successful approach is the existence of strong national frameworks and support. National governments have a crucial role – through legislation, fiscal incentives, progressive taxation, funding schemes and capacity-building programmes – in ensuring that local actions for sustainable urbanization keep being nurtured and sustained.

Such support for cities, where present, enables them to develop and leverage their unique assets: leaders who articulate their vision to local residents and international observers; civil servants who have the knowledge to conceptualize and execute plans and projects; and communities and local stakeholders who are engaged in defining and implementing a progressive urban agenda.

This is particularly true of cities with high growth expectations, large challenges and few resources. In my capacity as Sustainable City Envoy for ICLEI – Local Governments for Sustainability, I have spoken with fellow leaders from cities of all sizes. We all agree that, while our vision is often quite clear, the path to achieve it requires further innovation and perseverance.

In 2015, we saw an unprecedented series of groundbreaking deals, from the decision on the Sustainable Development Goals to the Paris Agreement, from the Sendai Framework on Disaster Risk Reduction to the Addis Ababa Action Agenda on financing for development.

Local and regional governments played their part in securing these results, by setting good examples and by pushing their national counterparts for more commitment.

Beyond this, local and regional governments have gladly taken up the challenge and opportunity of sustainable urban development, integrated and institutionalized in the management of our cities. But now we need to translate these global frameworks into action on the ground. We need a roadmap for sustainable urbanization.

The New Urban Agenda has the potential to be that roadmap. By bringing together nations to discuss urban policies, the process has sparked a beneficial debate - but there is still much to do. We need a strong New Urban Agenda that truly globalizes local actions for a sustainable city. With it, a sustainable model of urbanization will also become possible for cities with fewer resources and, arguably, more challenges.

Local governments have contributed to sustainable urbanization, and will continue to do so. Now it's the moment for nations to come together and bring this work forward. Habitat III should produce something as strong as the ambition we have on the local level. After all, it is cities that translate the words of policy into real action on the ground every day. ▲

Photo: *CC BY John Sotavo (soodiaro)*

Redesigning cities

Urban resilience and resource efficiency at the heart of UN Environment's work

Cities are innovation hubs. They provide the setting, the stimulus and the substance for people to come together and exchange and develop new ideas. Cultural diversity, universities, informal meeting places and key pressure points spur the investigation into new approaches. Access to capital and shorter decision-making processes help the best of them become a reality. In this way, cities have spawned so many new trends.

UN Environment is promoting a neighbourhood approach to harness the innovation capacity of cities. This level of intervention is close to people while still benefiting from economies of scale. It supports decision-makers in their task of responding to short- and long-term risks and challenges brought about by climate change and resource scarcity.

Resilience and resource efficiency are two agendas at the heart of UN Environment's work.

Resilience, as defined for Habitat III by the 'Urban Ecology and Resilience' policy unit led by UN Environment and the Rockefeller Foundation, involves investments for climate adaptation (such as early warning and preparedness and nature-based solutions to reduce risk of extreme weather events or natural disasters) and also for human development (such as participatory processes). Resilience allows a city or a neighbourhood to prepare for and respond to shocks such as flooding or typhoons, and stresses such as sea-level rise, and to reduce the environmental, social and economic risks they pose. Resilience allows cities to condition themselves to meet challenges as diverse as poverty or migration, to absorb the impacts of shocks and stresses to effectively 'bounce back', but also to transform themselves and 'bounce forward'. Resource efficiency enables cities to disconnect economic growth and development from resource use, by changing the ways in which we consume and produce goods and services. Resource efficiency is an essential element to building urban resilience. Resource efficiency, in turn, can be accomplished more effectively when it is built in the context of a resilient system.

At neighbourhood level, realizing resilience and resource efficiency entails connecting infrastructure and encouraging sustainable lifestyles. Housing, mobility, food and leisure are the key domains of such sustainable lifestyles, where behavioural changes are critical to reduce impacts, whether on climate, resources or health. For example, the THINK.EAT.SAVE campaign of UN Environment, FAO and partners spotlights the enormous impacts that food waste has on resources such as land and water, and on our climate; and it gives ideas on how to consume differently to avoid this wastage. Based on a study of key factors and decision points of an individual's day-to-day decisions, a lifestyles campaign is under preparation.

Photo: © Great Eat / OzHarvest


Photo: CC BY Jeremy Levine

Connecting infrastructure at the neighbourhood level can take the form of single technologies or integrated systems. Solutions differ whether neighbourhoods are being built, or whether existing infrastructure is to be retrofitted. Also, neighbourhoods come in different shapes and sizes, and are characterised by their natural, geographical and cultural features. Factoring these parameters into planning, design and how we build and rebuild our neighbourhoods determines liveability and sustainability.

The International Resource Panel, in its first report on city-level decoupling, distinguishes between four types of green urban networks: integrated eco-urbanism, such as eco-neighbourhoods where the design includes integrated infrastructure networks to achieve high sustainability goals; urban networked technologies, where new construction projects focus on the development of a particular technology or infrastructure; systemic urban transitions, where existing infrastructures and buildings are retrofitted using an integrated network approach; and urban networked infrastructures, where infrastructure systems are retrofitted focusing on a particular technology.

UN Environment's work on district energy systems, featured elsewhere in this issue, is an example of connecting buildings to cover their heating and cooling needs. At the same time, it allows more renewable energy into the system, thereby improving air quality by reducing use of oil, coal and woodstoves, while also increasing resilience by focusing on locally produced energy in a decentralized system. New ownership models appear around shared renewable energy infrastructure, such as cooperative models in a given neighbourhood.

UN Environment, a partner in the Urban Health Initiative of the Climate and Clean Air Coalition, and hosting the CCAC Secretariat, is supporting the use of electric motorbikes, thereby addressing with one measure several objectives: improving air pollution with related health benefits, contributing to climate mitigation, and improving mobility. Another example of an integrated solution and resilience-building at the neighbourhood scale is the integration of transport, buildings and energy systems by designing the re-charging infrastructure so as to use the storage capacity of vehicle batteries to allow higher shares of intermittent locally produced renewable energy into the system.

Green space in a neighbourhood is critical, with trees providing natural shade and thereby reducing cooling needs and providing air purification services. This makes neighbourhoods more liveable thanks to recreational space as well as opportunities for urban gardening which yield locally produced food supplies. UN Environment's work on urban ecosystem-based adaptation in Asia and Latin America is another example of improving resilience and quality of life by supporting urban reforestation, urban agriculture and the restoration of wetlands as a flood and drought control mechanism.

To allow the design of integrated solutions, material and resource flows need to be better recognized by cities, analysed, and incorporated into planning and decision-making. UN Environment, through its Global Initiative on Resource Efficient Cities (GI-REC), helps cities understand their 'urban metabolism' based on the environmental, social and economic impact of resources that flow through cities. These include water, waste, energy, food and other materials. Through a network of global partners in the platform, GI-REC facilitates peer-to-peer learning to share lessons learnt and good practices, and is developing a toolkit for cities to increase their capacity to understand and manage local resources. ▲

Robert Doyle
Going green on a dry continent

How the world's most liveable city has won that status by embracing sustainability.

Robert Doyle

Lord Mayor of Melbourne, Australia

Melbourne has just been named the World's Most Liveable City for the sixth consecutive year. Naturally I am tremendously proud of that, but such an accolade cannot be achieved without a strong focus on sustainability. For liveability and sustainability are intrinsically linked. In particular, we do much to mitigate and adapt to climate change. Take our international award-winning Urban Landscapes Adaptation Program, concentrating on trees, water and green open space.

Australia is the driest continent in the world and Melbourne is known for its extreme weather. Heat now causes more deaths in the city each year than road accidents. Over ten days in 2009, the temperature exceeded 104°F (40°C), culminating in a 116°F (46.7°C) day which became known as 'Black Saturday'. One hundred and seventy three lives and 2,029 homes were lost in the worst bushfire in our state's history. It also caused irreparable damage to our trees: afterwards, 40 per cent of them were dying or in decline.

With the program, we acted to protect and renew our urban forest, our green infrastructure. Tasked with doubling our tree canopy cover, cooling our city by four degrees, and retaining our precious water resources through stormwater harvesting, it is still in operation and has been an unprecedented success in helping to improve liveability.

We have spent 60 million Australian dollars (AUD) over the last six years to plant 18,000 new trees and bring the value of our urban forest to AUD1 billion, converted 16,200m² of asphalt into parkland -– with a further 63,000m² now undergoing conversion – and captured 25 per cent of the water we need for our parks, gardens and trees.

Every time we undertake a major urban design project, we think about how we can make that space more environmentally sustainable. For example, while redeveloping Lincoln Square in Carlton, one of the city's many open public spaces, we have incorporated Australia's first combined stormwater harvesting and flood mitigation tank.

The AUD3 million underground tank, which can hold 2 million litres of water, sits at the top of a catchment and relies on new technology which allows water to either be released or retained depending on the weather. This prevents stormwater collecting around Flinders Street Station, a flood-prone area which was once a creek. And it harvests water for use, including on the World Heritage-listed Carlton Gardens. We have undertaken similar projects at Fitzroy Gardens, Birrarung Marr park, Queen Victoria Gardens, Darling Street and the Royal Park Wetlands. Indeed, the city aims to source half of its water requirements from rainwater tanks.

The City of Melbourne became a certified carbon-neutral organisation in 2011/12 and has since maintained that status. There is a major focus on moving the city to a renewable energy supply, sourcing 25 per cent of the municipality's electricity from renewables by 2018. The city is encouraging the retrofit of 1,200 commercial buildings – two-thirds of the building stock that contains office space – while a new metro rail project will alleviate pressure on the existing public transport network by allowing an additional 20,000 people to access inner Melbourne at peak times.Other measures designed to meet our strategic goal of being an eco-city include the Zero Net Emissions Strategy, Total Watermark Strategy, Open Space Strategy, Urban Forest Strategy and Climate Change Adaptation Strategy.

Melbourne is a smart city as well as an eco-city, and we rely on partnerships here and around the world to ensure we have access to the brightest minds and latest technologies to protect and enhance sustainability. We take great pride in our membership of the C40 network of cities committed to addressing climate change, and find it a useful way for cities to share their experiences, projects and views. Cities are the closest level of government to their people and I love the way the C40 encourages us to share, not hoard, the secrets of sustainability and liveability. Smaller scale projects which are measureable, scalable and transferable are always the best.

Photo: © City of Melbourne

Melbourne is expected to be Australia's largest city by 2051, with a **population of 7.7 million.** *By 2070, it is expected to experience more than* **twice as many heatwaves** *as at present, and an* **11 per cent decline in rainfall.**

In 2013, Melbourne was selected as one of the first 33 cities to participate in the Rockefeller Foundation's 100 Resilient Cities Centennial Challenge. Its Chief Resilience Officer, funded through this initiative, started work in December 2014 and has completed the Resilient Melbourne Plan. Developed in collaboration with municipalities in the Greater Melbourne area and our State Government; the plan outlines practical measures to strengthen our ability to identify and manage shocks and social and economic stresses. It represents the first time metropolitan Melbourne's 31 local authorities have united on a project to ensure sustainability, liveability and future prosperity.

The City and the University of Melbourne recently appointed the internationally recognised scholar, Prof. Lars Coenen, as our inaugural Chair in Resilient Cities, and will jointly fund the position over five years to help combine expertise on improving resilience, and in order to enhance Melbourne's role as a leader in knowledge-based urban resilience, leverage opportunities to attract research funding and provide a new model for collaborative research.

We support local and international universities to expand knowledge of the adaptive capacity of green infrastructure. We are, for example, supporting PhD research at the University of Illinois to understand how our integrated water management approach can be applied by other cities. Our urban forest work has been referenced in several academic peer-reviewed publications in Australia and overseas.

Looking forward, we have commissioned the University of Melbourne to collaborate with us in developing the Integrated Climate Adaptation Model, which will provide a visual decision-making platform for adaptation action. It aims to understand the best approach to minimising flood impacts, drought and extreme heat vulnerability simultaneously through multi-purpose interventions.

Melbourne is a smart city as well as an eco-city, and we rely on partnerships here and around the world to ensure we have access to the brightest minds and latest technologies to protect and enhance sustainability

We are also collaborating with IPCC AR5 lead author Prof. Roger Jones to develop a Green Infrastructure Economic Framework to assess the economic benefits of green infrastructure and so advance the business case for early adaptive interventions in the city. We are also seeking to understand how the urban landscapes approach can be extended to the private realm and working with the city's development community to create a new program.

Melbourne is expected to be Australia's largest city by 2051, with a population of 7.7 million people. By 2070 it is expected to experience more than twice as many heatwaves as at present, and an 11 per cent decline in rainfall. If we are to maintain our status as the world's most liveable city, we must be smart about how we prepare for our future growth as well as for major shocks and stresses and climate change. ▲

Federico Gutiérrez Zuluaga

Transported to the future

Once-notorious Medellin is becoming a city based on trust, with mobility designed for people, not vehicles.

Federico Gutiérrez Zuluaga

Mayor of Medellin, Colombia

Remarkably, Medellin is now a global reference point for urban planning, efficient governance and social inclusion; moreover, the city has undergone a major transformation to get there. We owe this success to our people, and to working with different sectors of society: public, private and academic.

Medellin has come a long way, but still has far to go. Those who pay more to use public transport are those who have less, and that is a factor in social inequity. This anomaly can be reduced by integrating the transport system and making it more efficient. Our city now has such a system, composed of: a Metro with two rail lines; three lines of Metrocable (cable car) with two more under construction; a bus rapid transport system, Metroplús; and a free bicycle system, EnCicla.

This integrated transport system is a pioneer in Colombia, but we are also working to give priority to pedestrians. We want mobility for people, but we cannot force them to stop using private cars without providing them with alternatives. So our task is to optimize public transport through Medellin's Public Transport project, applying unified fares and implementing a card payment system on the buses. We are also increasing the number of sidewalks, to make pedestrians secure, and improving signs in order to avoid accidents.

The city will invest a great part of its economic resources in sustainable mobility through its Development Plan 2016-2019: "Medellin counts on you". Constructing a new tram route on Avenue 80, an area with a high concentration of schools and universities, is part of this programme. This light rail will enable students to spend less money and time getting from one place to another, will increase the impact of the Metro system and is planned to be developed in stages. The route - 13.5 km long, with 19 stations - will have an initial demand of 160,000 passengers per day. Part of the necessary resources will be raised through public-private partnerships.

We are also implementing comprehensive strategies to reduce emissions from the vehicles in Medellin's public transport system, contributing to the commitments made at COP21 in Paris last December, where Colombia pledged to cut greenhouse gas emissions by 20 per cent from what is projected for 2030. The city intends to increase the number of public transport vehicles running on clean technology from 700 to 1,500.

Photo: © CC BY Marcelo Druck

Photo: © CC BY Secretaría de Movilidad de Medellín

The city we dream about is secure, equitable and sustainable; a city with opportunities, in which people feel calm and where a vision of the future always exists. In short, we are building a city of trust.

Photo: © CC BY Secretaría de Movilidad de Medellín

We have started creating 84 kilometres of bus lanes, which will reduce travel time and improve vehicular flow. Digital signs will be installed to allow passengers to know the routes, estimated times of arrival and the status of the traffic flow. We are also constructing another Metrocable line in the Picacho sector, 35,000 square metres of sidewalks, and 80 new kilometres of bike paths.

Medellin will continue to advance, but not only with works made of concrete: this is a collaborative work with the citizenry. Their responsibility is essential if cities are to continue on the path of sustainability. Without citizen culture, sustainable mobility is not possible. Major infrastructure and transport works are useless if there is no commitment and respect when they are used.

Cities are for people. Road safety programmes and improving air quality are priorities for Medellin. So one of our main objectives is to reduce emissions of particulate pollutants by 393 tons in five years. In order to meet this goal, 394 polluting buses will be taken out of circulation and another 2,900 will be modernized to run on electricity or natural gas.

Each achievement brings a greater challenge. Medellin has received numerous awards for its social and urban transformation and innovation - and for being one of the most resilient cities in the world. Our challenge is now to maintain and improve good practices to give our people a better quality of life. The city we dream about is secure, equitable and sustainable; a city with opportunities, in which people feel calm and where a vision of the future always exists. In short, we are building a city of trust. ▲

UN Environment Creative

Dreaming up the city we want to live in

Maskbook is an artistic initiative which invites people to take an ordinary dust or pollution mask and transform it from a symbol of fear into a symbol of hope. Chinese artist and photographer Wen Fang gave the initiative its name: "In China, since we all wear masks to protect us against the pollution, we say that Facebook for us should be renamed Maskbook."

Wen Fang is a member of Art of Change 21, which has teamed up with UN Environment to bring Maskbook to the capital of Ecuador for Habitat III. From Beijing to Paris, more than 40 workshops and six exhibitions have already been held. The website maskbook.org features a gallery of masks from some 1,500 participants in over 30 countries.

In Quito, a Maskbook workshop will be held ahead of Habitat III under the motto 'Dreaming up the city we want to live in.' Citizens and visitors can customize a mask to show their vision of a healthy, liveable city that is low-carbon, resource efficient and resilient.

Several masks commissioned earlier from renowned architects including Tadao Ando, Jeanne Gang and Dr. Ken Yeang will be displayed during Habitat III in the UN Environment exhibition at the UN Pavilion. The Climate and Clean Air Coalition and World Health Organization are organizing more Maskbook activities at the Breathe Life exhibition within the Habitat III village. ▲

www.maskbook.org

MASKBOOK by ART of CHANGE 21

YOU
VOUS
您

Dieter Salomon
It starts here

Sustainable development – considering tomorrow's needs in today´s actions – must first become a reality in cities and towns.

Dieter Salomon

Mayor of Freiburg, Germany.

In recent decades there has been an unprecedented increase in the proportion and number of people living in urban environments. In 2014, 54 per cent of the world's people were urban dwellers, compared to 34 per cent in 1960. This trend is expected to continue, while the global population is predicted to grow from 6.1 billion in 2000 to 9.7 billion in 2050, and the size of the urban area expected to triple within the next two decades. It is clear that cities are where our future is going to be decided. This places a large burden of responsibility on us, as administrators and decision-makers looking at how we shape our cities now and in the future.

Freiburg has a long history of sustainable urban development. While we are proud of our achievements, we do not want to become complacent in light of the challenges faced by us and other cities across the planet. We have set our standards and expectations high, with a wide and comprehensive understanding of sustainability that goes far beyond the traditional remit of climate change and environmental protection, to include social justice, education and culture.

Freiburg´s tradition of sustainable development can be traced to a 1970s protest movement against a planned nuclear power station at nearby Wyhl. This impulse from citizens to move towards a more sustainable future was taken up by the City Council which made the landmark decision in the early 1980s to pedestrianize the city centre, running counter to the national and global mainstream. Keys to this success were the introduction of a regional intermodal transport ticket and close cooperation with other administrations and transport providers. Now there is an extensive integrated public transport network connecting the greater Freiburg region, providing a tram or bus stop within 400 metres of every residence.

The city is a signatory of the 1994 Aalborg Charter for sustainable development, inspired by the Rio Summit's Local Agenda 21 plan and supported by more than 3,000 local governments. Freiburg reiterated its support in 2006 when it signed the Aalborg Commitments. Freiburg adapted the Commitments' original 10 policy areas into 12 overarching policies, each with five goals of equal importance, resulting in a set of 60 targets. These Sustainability Goals were adopted by the City Council in 2009 as the basis for all political action. The Council's action plan envisions participatory implementation of the goals and developing an impact-oriented indicator-based reporting system to measure local sustainable development.

An Office of Sustainability Management was set up at the beginning of 2011 as a coordination and guidance office reporting directly to the Mayor in order to strengthen Freiburg's sustainability profile. Its tasks are: to institutionalize sustainability further as a cross-cutting issue in City policy; to create an integrated approach to sustainability management across the administration; and to manage partnerships with scientific research, non-governmental, and economic institutions within and outside the city.

The Office coordinates the Freiburg Sustainability Council, a 40-member panel of experts representing politics, science, economy, and civil society. Chaired by the Mayor, it advises the City Council and recommends ways to implement the sustainability goals. It also coordinates a sustainability working group within the city administration to disseminate information and maintain dialogue between the departments, the Sustainability Council and various project partners. The Mayor serves as one of 20 founding members of the mayors' covenant for sustainable cities at the invitation of the German federal government's Council for Sustainable Development.

We have an understanding of sustainability that goes far beyond climate change and environmental protection to include social justice, education and culture.

Photo: © FWTM

In 2012, in recognition of its ongoing commitment, Freiburg became the first major city to be awarded the German Sustainability Award. In December 2014, it was the first German municipality to decide to introduce combined financial and sustainability reporting, effective from its 2015/16 budget. This allows the city to measure how well it is achieving its sustainability goals through a series of monetary and qualitative indicators. Such improved monitoring forms the basis for results-oriented policies in all city departments and provides transparency for decision-makers as to how finances are allocated in relation to sustainability activities.

So what are we doing, as a dynamic and growing city, to ensure that we continue to meet our high standards of sustainability, and to consider the future in the actions we take today?

The northern business park – home to 300 industrial, commercial and service companies, as well as science and research institutes, together employing around 15,000 staff – is being transformed into a resource-efficient Green Industry Park in a joint initiative by the city, private businesses, and local research organizations. The City Council has set an ambitious target to cut CO2 emissions by 50 per cent by 2030 from 1992 levels and to achieve carbon neutrality by 2050.

Building on a long tradition of energy-efficient house-building, Freiburg has adopted an energy efficiency standard (Effizenzhaus-Standard 55) for all new residential dwellings. This sets the maximum allowable primary energy demand and transmission heat loss at 55 per cent and 70 per cent, respectively, of the standard values established by Germany's federal energy efficiency decree. Meanwhile, commercial buildings used primarily as offices are subject to Freiburg's Effizenzhaus-Standard 70 which exceeds the federal standard by 30 per cent. Freiburg is also home to the word´s first energy efficiency retrofit 1960s high-rise, which was carried out by the city´s Freiburger Stadtbau.

The city's Transport Development Plan 2020 focuses on expanding tram and cycle path networks, on accessibility and integrating transport modes. Speed restrictions are in place throughout the city: 90 per cent of Freiburg residents live on roads with speed limits of 30 km/h or lower.

Finally, the city administration has taken a further step towards planning for a sustainable future - hand-in-hand with the citizens of Freiburg - with a participatory development masterplan, the Perspektivplan, which sets out an overarching vision of how Freiburg will be built over the next 15 years and will guide all future planning processes. It aims to balance the need for affordable housing with the desire to maintain Freiburg´s open spaces and rich biodiversity.

If we want a sustainable and viable society, it must first become a reality in cities and towns, as that is where sustainability lives and shapes the world. A forward-looking urban policy must consider the expectations of residents in order to transform them into political action, making ecological, economic and social sustainability a basis for urban quality of life. ▲

Photo: © FWTM / Schoenen

Luis Revilla Herrero

Creating cities for people

A paradigm shift towards a model for sustainable urban development and eco-efficiency

Luis Revilla Herrero

Mayor of La Paz, Bolivia

Latin American cities are going through accelerated urbanisation and reflect high levels of inequality. The continent is the world's most urbanised developing region, with eight out of ten people living in cities. Conditions are often unfavourable for rapid expansion because of problems including poor public services, socio-economic inequality and environmental degradation. Yet these cities present opportunities for a paradigm shift in how to plan, develop and manage urban development.

Our cities need to move toward transforming urban policies, legal frameworks, levels of management and local action in order to change forms of government and promote a new model of cooperation between local and national levels, under a scheme of strategic partnership.

As local leaders, it is our responsibility to promote a model of balanced spatial development in cities, in which they produce in a sustainable manner, protect ecosystems, and develop their capacity in adaptation, mitigation and resilience to climate change.

Over the last decade, Bolivia has made significant progress in designing macro-policies and strategies aimed at mitigating and adapting to climate change.

In the city of La Paz, the strategy and vision for developing the environmental and climate change component in the comprehensive plan "Peace 2040" directs the municipality's efforts towards resilient development and adaptation to climate change, based on comprehensive management for the future.

Municipal policy needs to:

- establish a municipal and regional ecological context for urban development planning;
- generate more specific rules, in addition to those already established, on land occupation and use, so as to reduce uncertainty in private and public decision-making, and to encourage investment and sustainable development; and
- develop more specific strategies that balance environmental impact and overall resilience in the municipality.

La Paz is a wonderful and biodiverse city of some 900,000 people. It sits in an Andean valley about 4,000 metres above sea level. The area has 12 glaciers, who act as witnesses of climate change, five watersheds and 364 rivers. Its forests and rural areas are home to 1,800 varieties of higher plants and 204 species of fauna.

However the city, with its mountain ecosystems, is highly vulnerable to climate change, mainly due to its effects on lakes, ponds, rivers, glaciers and snowy peaks, on which the provision of water and the maintenance of wetlands depend. In the last 10 years, there have been changes in rainfall patterns and the water cycle: glaciers have lost 40 per cent of their mass, with adverse effects on power generation and food production. It is also vulnerable to disaster in the form of avalanches, landslides, droughts and floods.

As a result, the current municipal administration is focused on establishing tools and mechanisms that contribute strategically to integrated environmental management, promoting the consolidation of eco-efficient planning models. The Autonomous Municipal Government of La Paz has proposed a development model, called "Centralidades Urbanas", to make it a "compact, polycentric and integrated" city. This will develop sites for modern, affordable, eco-efficient and intelligent infrastructure, with better social services and facilities available to citizens. Nineteen

Despite problems including poor public services, socio-economic inequality and environmental degradation, these cities present opportunities for a paradigm shift in how to plan, develop and manage urban development.

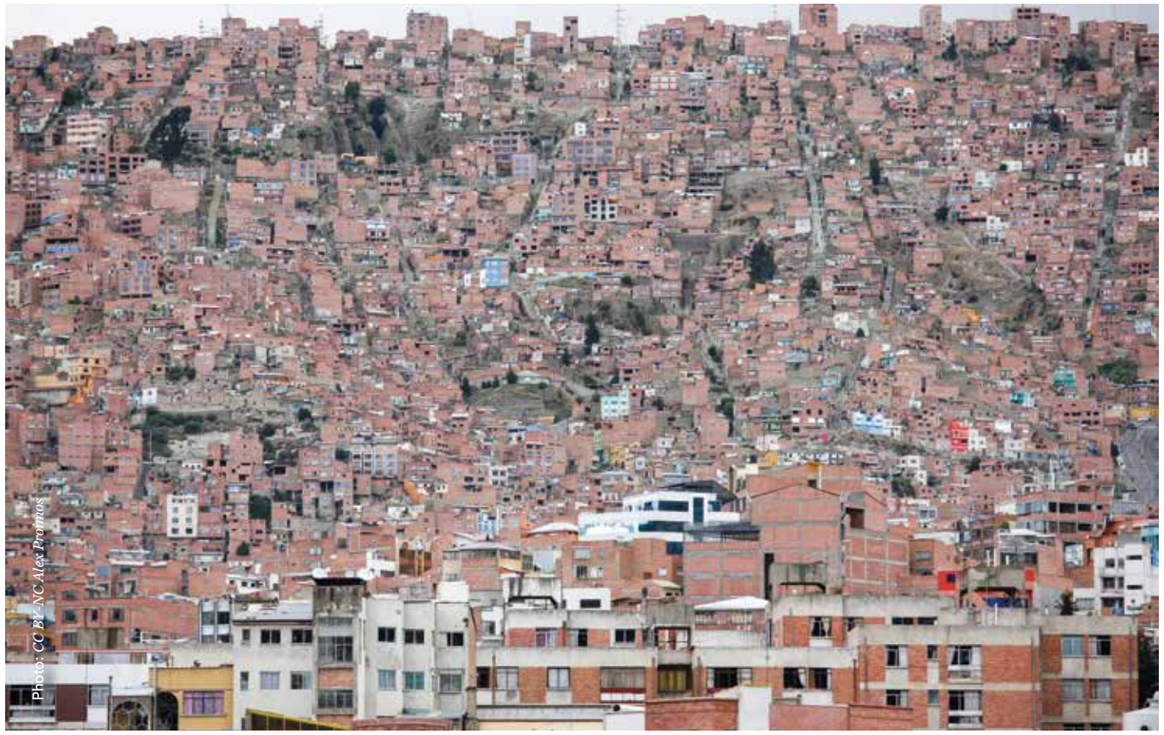


Photo: CC BY-NC Alex Proimos

such 'centralidades' have already been identified as new hubs in the city.

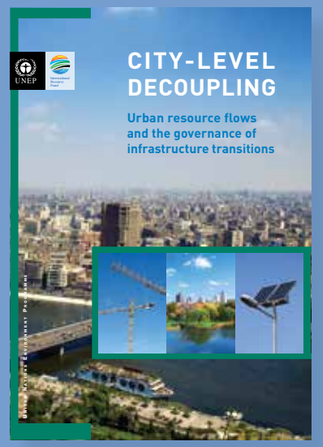
This will allow the municipality to:

- Bring goods and services closer to city dwellers and decentralise the historical centre, reducing greenhouse gases emissions;
- Rearrange the structure of the city, reducing distances and travel times to the centre;
- Transform urban areas with potential for renewal, providing a better habitat for the inhabitants and layers of the city;
- Reduce consumption of energy and fuel in the city's public spaces, through implementing eco-efficient systems and services;
- Recover and renew the city's green spaces with trees that deliver environmental functions and services;
- Generate synergies and new market niches for entrepreneurship, dynamism and competitiveness in areas of the city;
- Promote social encounters, urban life and human development and the traditions of each area, revaluing and recovering neighbourhoods;
- Promote participation, ownership and citizen involvement so as to generate greater social identity and collective self-esteem, and;
- Develop new mechanisms for self-financing projects of great social impact.

This model of urban and strategic spatial planning is proposed as an effective mechanism for meeting the challenges of urbanisation and sustainability, and strengthening urban-rural links to a compact, connected, comprehensive, sustainable and resilient city.

The municipal government has accepted the challenge of leading a city with features that are both complex and ambitious, in the context of the new models of urban development. In short, of developing a city for its people. ▲

UN Environment Publications



City-Level Decoupling

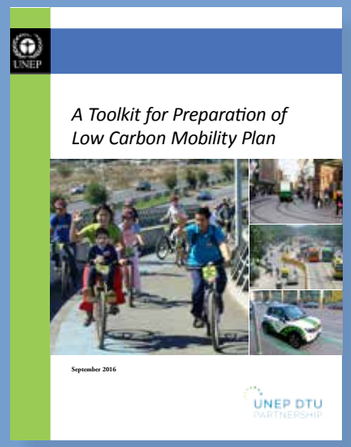
Building upon previous work of the International Resource Panel on Decoupling Natural Resource Use and Environmental Impacts from Economic Growth, this report examines the potential for decoupling at the city level. While the majority of the world's population now live in cities and cities are where most resource consumption takes place, both the pressures and potentials to find ways to reconcile economic growth, wellbeing and the sustainable use of natural resources will therefore be greatest in cities.

Urban Environmental Sustainability and Resilience: the new Urban Agenda

Cities are expanding throughout the world, in terms of both growing population and urban land area. By 2050 there will be 9.7 billion people on the planet, with two thirds living in urban areas. The global economy is also increasingly concentrated in urban centres, and so is the consumption of natural resources. In this context of a rapidly changing environment, the third United Nations Conference on Housing and Sustainable Urban Development (Habitat III) is particularly timely and offers a unique opportunity for rethinking how cities are built and governed.

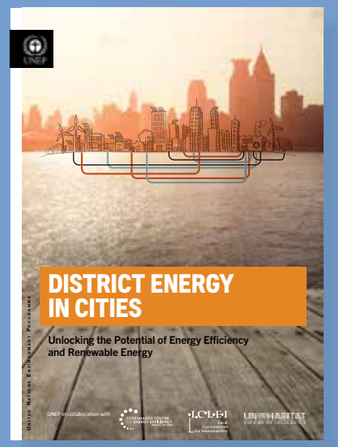
A framework for shaping sustainable lifestyles Determinants and strategies

How we choose to live as a society and as individuals – what houses and build, what food we eat and grow, how we spend our spare time, and what type of transport we use – will have an enormous impact on the trajectory of human history. This publication will help policymakers, individuals and other stakeholders understand what a holistic approach to lifestyle means and how different contexts require different lifestyle solutions.



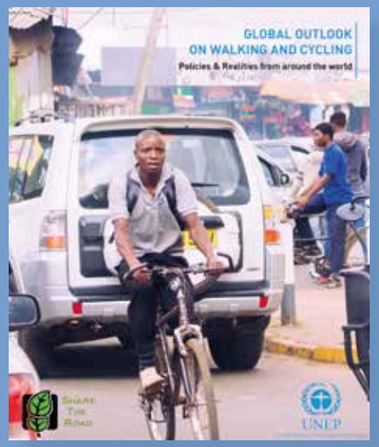
A Toolkit for Preparation of Low Carbon Mobility Plan

The toolkit supports the development of a long-term vision for sustainable urban transport that integrates transport planning with safety, social inclusivity, reduced air pollution, and carbon dioxide emissions. It provides a step-by-step approach on how to integrate mobility planning with urban planning, prioritize accessibility for all socio economic groups, prioritize shifts to sustainable transport modes and reduce environmental impacts. The toolkit also provides guidance on the role of stakeholders and the institutional arrangements necessary for preparation and implementation of low carbon mobility plans. The toolkit caters for small, medium and large cities and is also available as an online toolkit.



District Energy in Cities Unlocking the Potential of Energy Efficiency and Renewables

This UN Environment flagship publication provides best practice guidance for cities and national governments to implement sustainable heating and cooling through four chapters on technology, local policy, business models and national policies and regulations, and a fifth chapter describing a methodology for cities to develop modern district energy. The publication is based on interviews, surveys and consultations with nearly 150 respondents from 65 cities around the world in order to gather expert and local stakeholder perspectives.



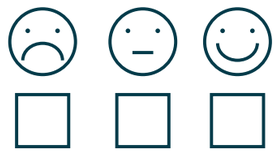
Global Outlook on Walking and Cycling Policies and Realities from around the world

This document reports on the policies of more than 20 low- and middle-income countries, and highlights the policy themes that aim to serve the needs of people who walk and cycle (referred to here as non-motorized transport, or NMT).

Our Planet – *Our Survey*

Tell us what you think!

unep.org/ourplanet/oursurvey/



All UN Environment publications are available online at:
www.unep.org/publications

Marcelo Mena
Tackling short-lived climate pollutants

The Paris Agreement must enable countries and cities to combat air pollution and climate change simultaneously

Marcelo Mena
Vice-Minister of Environment, Chile

Since 2014, Chile's Ministry of Environment has focused on three objectives: identifying and addressing the climate effects of air pollution; taking a leading role on addressing short-lived climate pollutants (SLCPs); and working to integrate these two concepts at both the local and global level.

One of the greatest challenges that we face in achieving our environmental, development, and climate goals is identifying metrics that can harmonize our near- and long-term objectives and identify win-win solutions that help us achieve both together.

Yet science tells us that simultaneously addressing drivers of both near-and long-term climate change is the only way to realistically achieve our climate and development goals. Indeed, being able to do both at the same time brings much greater benefits than either can separately, particularly for public health and air quality.

This made us realise that we must include measures to reduce SLCPs, particularly black carbon. Informed by the Climate and Clean Air Coalition draft guidelines, the Intended Nationally Determined Contribution (INDC) that we submitted ahead of the Paris Agreement recognized that taking action on SLCPs can provide a "substantial contribution to the mitigation of the causes of climate change," while also providing co-benefits such as "reducing the levels of local atmospheric pollution in urban centers." We joined Mexico and Nigeria in noting the important contribution of black carbon to fine particulate matter air pollution and climate change in our INDCs.

We are already turning our pledges into action. We are implementing local decontamination plans focused on black carbon in numerous cities throughout Chile. These include measures such as: subsidies to improve insulation in 300,000 homes and overhaul 400,000 dirty wood burning stoves and heaters; banning the use of firewood in the urban area of Santiago; modernizing the Transantiago bus fleet to Euro 6 emissions standard, and setting stringent emissions standards for industrial, transport, and residential sectors. We are also establishing a permanent ban on non-Euro 5 diesel vehicles, hoping to achieve a deep overhaul of our car fleet. Finally, we are the first country in Latin America to regulate existing and new off road machinery.

We have designed this new Santiago Respira plan with the hope of reducing wintertime pollution by 80 per cent, and thus reducing premature mortality by 2,200 cases per year. These measures come at a cost, but the benefits are eightfold, due to fuel savings and health benefits. Through these actions we are proving that it is possible for countries to improve the quality of life of their citizens while also being responsible global citizens. However, we continue to struggle to define and communicate our multiple objectives within the context of the climate treaty and sustainable development.

If we are to understand the implications of our mitigation actions and pledges on local and global temperatures in the near and long term, and be able to quantify benefits from improved air quality, we need to understand what the pledges mean for different substances emitted to the atmosphere. It would be an important step, therefore, for the Ad Hoc Working Group of the Paris Agreement (APA) to recommend that countries pledge emission reduction targets of each substance separately as part of their Nationally Determined Contributions (NDCs), instead of combining them into a single carbon dioxide equivalent (CO_2e) pledge.

The use of a single metric obscures crucial differences between substances: how they act in the atmosphere, how long they stay there, and what other effects they have beyond warming such as the impacts of these pollutants on near-term health and agriculture. The use of a single combined pledge is a significant barrier to reaching the goals of the Paris Agreement of keeping warming "well below 2°C" above pre-industrial levels while also recognizing the "intrinsic relationship that climate change actions, responses, and impacts have with equitable access to sustainable development and eradication of poverty."

As the APA considers the formal methodology for future NDCs it can build upon the strength of the INDCs by allowing Parties to: pledge emission reductions of substances individually (e.g. as tons of each substance) rather than in CO_2e; report on progress made in implementing and achieving their NDCs substance by substance; and voluntarily include pledges for non-greenhouse gas emissions, including aerosols such as black carbon, that affect the climate, health, and ecosystems.

Photo: © CC BY NC ND Alejandro Tnostroza

Taking this approach would provide clear, unambiguous data for the United Nations Framework Convention on Climate Change to track progress towards global climate goals while also recognizing the distinct multiple benefits of SLCP strategies. It would make the system more precise and transparent, and would facilitate a more holistic approach to climate action, aligning closely with social, economic, and environmental priorities. This would also allow countries like Chile to focus on climate and development benefits of particular concern to them, such as decontaminating cities, protecting glaciers and areas with snow cover, protecting water supplies, agricultural and wine activities; and above all, the health of the people.

Allowing countries to set separate pledges for different emitted substances would send a powerful message that countries need not choose between their near-term sustainable development priorities and long-term climate goals; they can and should achieve both. The overall objective of our climate negotiations is to protect the planet and ultimately save lives. We cannot overlook the fact that acting on SLCPs now saves lives now and protects our climate immediately. A shocking 92 per cent of the world population breathes dirty air. Nobody has overcome air pollution issues. Combined air pollution and climate policies multiply benefits, make them direct and immediate, and are the best pathway to a clean climate and healthy economy. Many have focused first on air pollution, and then climate. But working on both could be the most efficient, cost-effective, and successful approach. ▲

Combined air pollution and climate policies multiply benefits, make them direct and immediate, and are the best pathway to a clean climate and healthy economy.

Photo: © CC BY NC ND Orlando Sørensen

Judith Rodin
Bouncing back

Breaking the mould with new partnerships and financing to build urban resilience

Judith Rodin

President, The Rockefeller Foundation

In these rapidly changing times, as the effects of climate change and population growth challenge urban areas, we need a new paradigm for cities. They must be resilient to adapt and thrive.

Building resilience is about managing the avoidable and avoiding the unmanageable, making people, communities, and systems better prepared to withstand catastrophic events - both natural and manmade - and better able to bounce back quickly and emerge stronger from shocks and stresses. A dollar spent on prevention saves four dollars spent on recovery. But building resilience at scale requires breaking out of siloed approaches. The best solutions require deep integration and the coordination of actors working together, each applying its specific skills, talents, and advantages.

100 Resilient Cities (100RC) was pioneered by The Rockefeller Foundation to help cities become more resilient to social, physical, and economic challenges, show how cross-sectoral partnerships can unlock new opportunities, spur innovation, and drive broader change. Medellin – whose mayor tells its remarkable story elsewhere in this magazine – is one of them. A central component of what 100RC offers member cities is creating (and funding) a Chief Resilience Officer (CRO), who reports directly to, or works closely with, the city's chief executive, and acts as its point person for resilience building, helping to coordinate all its efforts. 100RC works with CROs to develop a resilience strategy, which must include the engagement and participation of all sectors – government agencies, business, academia, and civil society. Dakar's CRO, for example, has engaged a diversity of actors including local entrepreneurs, artisans, and the municipality to encourage producing and consuming quality local goods made from recycled materials through the resilience strategy's #MadeInDakar initiative which is poised to address the city's waste management challenges while creating income-generating opportunities for artisans.

Once a city has developed a collaborative resilience strategy, the 100 Resilient Cities Platform provides cities with innovative goods, services, technical expertise, and technologies to implement it. 100RC has about 70 partners on board, again from multiple sectors, and the number is growing. For example, the geospatial and positioning software company Trimble together with satellite imagery provider Digital Globe are analyzing Boulder's tree canopy to assess where it is damaged and where it can be strengthened. And RMS, a catastrophe risk management firm, is helping to spotlight sea-level rise and build solutions in California's Bay Area.

These platform partners offer their services to 100RC cities pro bono. This is great for the cities but we know and welcome the business purpose behind the platform partners' engagement – the awareness that urban resilience is a growing and necessary market, creating new business partnerships. Veolia and Swiss Re – both 100RC platform partners – have launched a cutting edge, pre-funded partnership that will help ensure the quick recovery of critical infrastructure after disastrous events. This responds to the reality that cities rarely have financial plans in place to protect critical assets against shocks before they occur – while, in their aftermath, cities must determine what is damaged, how it will be fixed, who can fix it and how to fund repairs, which can take months or years. The partnership will improve and streamline existing processes and works with cities to plan for major shocks and stresses. Thus cities strengthen the resilience of their vital infrastructure, limit economic interruption and begin quickly to repair damage without waiting for insurance assessments and solicitations. Everyone wins: city government, business and city residents.

Building urban resilience will require investing billions over the next few years. The Rockefeller Foundation is focusing on identifying innovative financing mechanisms for unleashing new sources of capital, funding almost two dozen large-scale pilot projects as part of our Zero Gap initiative.

The Forest Resilience Impact Bond, for example, presents a financial solution to the forest fires and drought that threaten Los Angeles and other cities in the Western United States, where it costs up to 40 times more to put out a fire than prevent it. The bond raises capital from private investors to fund NGOs with proven strategies to prevent or decrease future wildfires and increase water availability for local utilities. The savings provide water and electric utilities with the funds to repay the bondholders. This type of financing tool can provide a solution to cities worldwide: drought and high temperatures have recently led to devastating wildfires around Sydney, Melbourne and Canberra, for example.

Fiscal benefits come not just in novel ways to access more infrastructure financing. Cities can realize savings in borrowing costs by showing that they have a clear resilience strategy and approach. Norfolk, Virginia maintained its credit rating from Moody's despite significant increases in water and flooding risk thanks to its resilience work with The Rockefeller Foundation.

Cities should look at how such investments can lead to immediate and ongoing benefits, as well as longer-term protection, through what we call 'the resilience dividend.' A comprehensive 'Resist, Delay, Store, Discharge' water management strategy for the New Jersey town of Hoboken features a layered infrastructure design that will provide new underground parking, green space, and storm water flood prevention. Those three wins with one investment will improve the city's capacity to deal with flood risk while giving the local community parks and economic development.

Over the last ten years, The Rockefeller Foundation has invested more than a half-billion dollars in resilience-building, while leveraging $25 billion in known investments and commitments for building resilience from government, the private sector, and NGOs. In times of more limited resources, cities must obtain increased leverage for their investments and be prepared to explore new partnerships and innovative financing approaches. For those ready to engage, there are compelling models of success, and many willing collaborators. ▲

Photo: © CC BY U.S. Forest Service photo by Mike McMillan

Once a city has developed a collaborative resilience strategy, the 100 Resilient Cities Platform provides cities with innovative goods, services, technical expertise, and technologies to implement it.

The Rockefeller Foundation has invested more than a half-billion dollars in resilience-building, while leveraging **$25 billion** *in known investments and commitments from government, the private sector, and NGOs.*

Sean O'Donoghue, Itumeleng Masenya

Empowering the vulnerable

Participatory action to mitigate and adapt to climate change can also alleviate poverty.

Itumeleng Masenya

Climate Change Mitigation Manager, Energy Office, eThekwini Municipality, South Africa

Sean O'Donoghue

Manager, Climate Adaptation Branch, eThekwini Municipality, South Africa

Many cities in the developing world lack the capacity to adapt in the face of emerging climate variability, caught in a perfect storm of population growth, escalating adaptation needs, and substantial development deficits. In South Africa, these challenges have been exacerbated by a legacy of formalised racial division that has created widespread social, economic and environmental injustice.

The city of Durban, also known as eThekwini Municipality, is in a biodiversity hotspot, one of only 35 of its kind worldwide, but faces serious threats to its ecosystems. As the planet warms, temperatures in the Municipality are likely to increase by 3-5°C by 2100. This is likely to manifest itself in more frequent extreme rainfall events and higher stream flow intensity, with prolonged dry spells. Projected impacts include an increase in extreme weather overall, the erosion and loss of topsoil, a rise in vector-borne diseases, species extinctions and potential reductions in agricultural yields.

The Municipality has tried to adopt a systemic approach to dealing with climate change by developing an integrated mitigation and adaptation strategy. This was developed through a public participation process to deepen our shared understanding of the climate change problem, and to identify opportunities and co-benefits for service delivery and job creation through the solutions pursued.

Much of the adaptation and mitigation work undertaken in the city since the initiation of its Municipal Climate Protection Programme in 2004 has been opportunistic and reactive. A more strategic approach was adopted in 2015 through the Durban Climate Change Strategy, which has 10 thematic areas: Water, Sea Level Rise, Biodiversity, Food Security, Health, Energy, Waste and Pollution, Transport, Economic Development, and Knowledge Generation and Understanding. Implementing it is overseen by a political climate change committee.

Durban was recognised in the C40 Infocus report for its climate change achievements and was singled out as the only African city that scored highly for the quality and completeness of its environmental risk reporting for 2015.

The Municipality's mitigation work – undertaken by its Energy Office and highly informed by South Africa's commitment to reduce greenhouse gas emissions by 34 per cent by 2020 and by 42 per cent by 2025, compared to a "business-as-usual" scenario - starts with the development of an emissions inventory, per source and per economic sector. It mainly focuses on reducing emissions from electricity generation, principally through energy efficiency and promoting the uptake of renewable energy. The goal is to transition to a less emissions-intensive energy mix – with economic benefits resulting from improved efficiency – while incentivizing economic growth in sectors with lower energy intensities.

Specific projects that have been implemented include: energy efficiency interventions in municipally owned facilities and infrastructure; solar water heating systems, water pumps and motors; installing solar panels on municipal buildings; a cycling programme for staff members; and an attractive public transport system.

Adaptation – overseen by the Environmental Planning and Climate Protection Department - focuses on biodiversity, and is anchored by the city's 79,000-hectare Metropolitan Open Space System. It includes indigenous reforestation projects in the city that also aim to alleviate poverty. Residents of some of Durban's poorest and most vulnerable communities have been trained as "treepreneurs", who collect indigenous seeds and grow seedlings, earning credit that can be exchanged at quarterly "tree stores" for things like food and building materials, or to cover school fees.

Photo: © Errol Douwes eThekwini Municipality

Photo: © Errol Douwes eThekwini Municipality

Residents of vulnerable communities have been trained as "treepreneurs", who collect indigenous seeds and grow seedlings, earning credit to exchange for things like food and building materials.

Reafforestation projects have been established, including to offset carbon emissions from hosting mega events like the 2010 football World Cup. Green roofs are championed for municipally-owned buildings and there is a successful programme to alleviate poverty and develop skills by employing people to manage fires and undertake invasive plant control, mostly in priority areas of high biodiversity.

Planning is underpinned by long term research commitments through the Durban Research Action Partnership with the city's local tertiary institution of higher learning, producing knowledge that both provides guidance for implementing adaptation and fills critical skills deficiencies in the local job market.

Implementing the climate change strategy builds upon the initiation in 2008 of Municipal Adaptation Plans for water, health and disaster management, and seeks to extend the climate change response to other functions and to residents of the city. Partnerships are being developed to implement initiatives like the Palmiet Rehabilitation Project, where multiple stakeholders have together developed an understanding of catchment-based challenges and solutions through a climate change lens. The stakeholder group brings leadership from informal settlements into the planning process to empower their communities with solutions. These have included a positive community response to solid waste and the training of snake monitors to alter negative perceptions of the reptiles, which are attracted to pests associated with the waste and have bitten some people. Developing project stakeholder groups able to address multiple root causes of problems, rather than their symptoms, and empowering vulnerable communities together present a compelling vision of how transformative action should be.

Such action aligns with national priorities such as poverty alleviation, international obligations including the Paris Agreement and the Sustainable Development Goals, and local imperatives like the City's Integrated Development Plan. It seeks to address mitigation and adaptation, whilst generating co-benefits and building the green economy. Globally, there has never been stronger recognition of the urgency that should be given to climate change action, and this is reflected in the finance mechanisms that have become available.

Durban is now planning a large-scale transformative programme to address climate change not just in the city, but in its surrounding municipalities, through the Central KwaZulu-Natal Climate Change Compact. This partnership is endorsed by the Durban Adaptation Charter, which seeks to scale up climate change action beyond municipal boundaries, and has been signed by 341 mayors and local government leaders, representing 1,069 cities from 45 countries, half of them African. Compact partnerships are now being planned across Southern and East Africa, where neighbouring municipalities are seeking to share resources and skills to plan and implement climate change programmes through a transformative approach that builds good governance. ▲

The authors are grateful for the contributions of Magash Naidoo and Debra Roberts to this article.

Share the Road: Putting pedestrians and cyclists first

Photo: © UNEP

Every 30 seconds someone dies in a road crash. That's over 1.2 million people every year dying on the world's roads. The World Health Organization's Global Road Safety Report of 2015 shows that, worst still, half of these deaths are vulnerable road users – pedestrians, cyclists and motorcyclists. Tragically, 500 children die every day in road crashes.

What is even scarier is that many of these deaths are preventable and that, without action, road traffic crashes are predicted to be the third most common cause of premature death in the world by 2020 (rising from 10th as of 2015). Millions more people die from the outdoor air pollution (3.7 million premature deaths worldwide in 2012) that road traffic contributes to. If that wasn't enough, vehicle emissions are also fuelling climate change (the transport sector is responsible for 27 per cent of energy-related CO_2 emissions globally).

On the other hand, people walking and cycling made about 37 per cent of urban trips worldwide in 2005. In developing countries, this number can be even higher (e.g. 47 per cent in Nairobi, Kenya). But despite the high proportion of people relying on non-motorized transport (NMT) around the world there is a mismatch between what people need and the allocation of funding for NMT investment. This leaves the mobility of pedestrians and cyclists severely impaired, forcing citizens who are just trying to get to school or work to literally risk their lives to do so.

While transport is an enabler of economic activity, social connectivity and mobility, a bias towards planning for the needs of the car driver, rather than planning for people, has led to a vicious circle: to address congestion, more and more roads and flyovers are constructed to accommodate the increasing number of private motorized vehicles, but the new infrastructure is soon overwhelmed in turn.

Congestion, pollution, road fatalities and all the other problems caused by the rise of the car is something that all transport planners and governments would like to avoid or solve. All cities have visions of quieter, greener spaces and healthier populations. The solutions seem obvious (more public transport, more bikes, more walking, better infrastructure for sustainable mobility). But the question is how do countries get started on that path?

The UN Environment Share the Road Programme was launched in 2008 with co-founder the FIA Foundation for the Automobile and Society and tries to address this question. It brings together the environment, safety and accessibility agendas in the context of urban transport in the developing world where the majority of people – those moving by foot or bicycle – are disadvantaged on the road.

The initiative supports governments in developing countries to move away from prioritizing building more roads for the car-driving minority, toward investment in infrastructure for those who walk and cycle. The initiative does this through global advocacy, development of tools and guidance, and in-country technical assistance such as developing policies which promote investment in walking and cycling infrastructure.

Investing in infrastructure for walking and cycling leads to massive benefits: in the environment, through less pollution and greenhouse gases; in safety, through the protection of vulnerable road users from high-speed traffic; and in accessibility itself, by providing the majority of global citizens with a more viable, enjoyable and affordable means of travel to reach basic services and connect with other transport options such as buses and trains.

For example, in Kenya, the Share the Road initiative supported the Kenyan Urban Roads Authority in designing and constructing a pilot showcase road with safe walking and cycling infrastructure and also helped the Nairobi City County government in developing and launching a Non Motorized Transport Policy for Nairobi in March 2015. The policy aims to create a transport system in Nairobi that fully integrates walking and cycling by creating a safe, cohesive and comfortable network of footpaths, cycling lanes and tracks and green areas. The Nairobi City County government went a step further and committed 20 per cent of their existing and future road construction budget to NMT and public transport infrastructure and services.

The Share the Road initiative is helping governments change direction; by recognizing the massive benefits of a clean environment, safer roads and better mobility from increased investments in NMT infrastructure. ▲

Lack of investment is severely impairing the mobility of pedestrians and cyclists, forcing citizens to literally risk their lives just to get to school or work.

Photo: © UN Habitat / Julius Mwelu

Xueman Wang
Shaping tomorrow's cities

Pursuing an integrated approach in a mission for transformation

Xueman Wang

Coordinator, Global Platform for Sustainable Cities, World Bank.

I recently visited one of China's eco-cities, and was impressed by its highly efficient buildings and use of renewable energy for street lighting. However, this newly built city is struggling to attract people, largely due to lack of accessibility to public transport and its distance from jobs. The city's urban planner told me that the isolation of this "eco-enclave" could have been avoided if a more holistic approach had been taken early in the planning stage, including considering various aspects of land management, urban services, connectivity, and jobs.

Indeed we often tend to see urban infrastructure – buildings and roads – as engineering projects, and interventions tend to focus on single sectors. Addressing complex and interrelated urban sustainability issues instead requires a holistic, systems approach that brings together the physical, economic, and social dimensions essential for the functionality and liveability of cities.

The Global Platform for Sustainable Cities (GPSC) launched in March 2016 is intended to provide just that. Coordinated by the World Bank in partnership with other multilateral development banks, UN organizations, city networks, and think tanks, it is expected to leverage $1.5 billion over the next five years for urban sustainability programmes in about 30 cities across 11 developing countries: Brazil, Côte D'Ivoire, China, India, Malaysia, Mexico, Paraguay, Peru, Senegal, South Africa, and Viet Nam. It is part of the Sustainable Cities Integrated Approach Pilot initiative supported by the Global Environment Facility.

The GPSC aims to provide access to cutting-edge tools and promote an integrated approach to sustainable urban planning and financing. Knowledge generated from the platform will not be limited only to the participating cities, but will reach many more through sharing data, experiences, ideas, and solutions to urban challenges, and by linking the knowledge to finance that will influence investment flows towards building cities' long-term urban sustainability.

It is heartening to see these cities and countries fully embracing this new approach to their urban programmes. When 200 representatives from participating cities and organizations attended the launch of the GPSC in Singapore, they were eager to share good practice and learn about transit-oriented development and approaches to integrating low carbon and resilience into urban planning. Johannesburg, for example, shared its flagship Corridors of Freedom project, a spatial plan consisting of transport arteries with a focus on mixed-use development that blends residential, commercial, cultural, institutional, and industrial uses. It provides pedestrian connections to transform settlement patterns that have, in the past, shunted the majority of residents to the city's outskirts, away from economic opportunities and access to jobs and growth. For residents, the project is not only about mobility, but more importantly about a change from the social exclusion that has hampered the city's long-term growth.

Cities are eager to share good practice and learn about transit-oriented development and approaches to integrating low carbon and resilience into urban planning.

CC BY NC Yang Aijun / World Bank

The Global Platform for Sustainable Cities is expected to leverage **$1.5 billion over 5 years** *for sustainability programmes in* **30 cities** *across 11 developing countries.*

Seven Chinese cities are part of the GPSC, and all have committed to transit-oriented development that promotes public transport to create compact, walkable, mixed-use communities. They are taking action to pursue a new urban form, characterized by a variety of land-use patterns, varying intensities of development, and vibrant neighborhoods. Responding to the challenges of rapid urbanization, the Chinese government has launched a new strategy to plan their cities – one that is 'human-centered' and promotes an integrated approach to creating a better urban environment.

Urban efficiency, inclusiveness, and productivity is surging because cities are adopting new sectoral policies and approaches, and because, more critically, they can bundle policies in a more integrated way and adapt governance practices to maximize potential. Integrated planning is a strategic process allowing cities to shape a vision, an overarching framework to integrate a multiplicity of actions and initiatives that will reinforce each other.

The GPSC has recently started developing an 'Urban Sustainability Framework' to support cities in adopting such integrated approaches. This guidance document helps cities lay out their strategic vision for sustainability, adopt and implement the new indicators for Goal 11 of the UN Sustainable Development Goals, develop an action plan to improve their urban sustainability status over time, and prioritize investment to support their strategic objectives. The long-term vision is to create a platform to store cutting-edge knowledge and advocate good practice of sustainable urban development, to provide a global convening space for dialogue, and to position cities as hubs of action and opportunities for sustainable urban investment.

The GPSC has embarked on a mission for transformation. By promoting urban systems as a whole, where every link works together in a well-coordinated way, we can shape cities of tomorrow that are socially inclusive, safe, resilient, and sustainable. ▲

The views expressed in this article are those of the author; they do not necessarily reflect the views of the World Bank, the Executive Directors of the World Bank, or the governments they represent.

CC BY NC Yang Aijun / World Bank

The GPSC's partners include the GEF implementing agencies: UN Environment, UNDP, UNIDO, African Development Bank, Asian Development Bank, Inter-American Development Bank, and Development Bank of South Africa; and partners: the World Resources Institute, C40 Cities Climate Leadership Group, and ICLEI.

Martí Boada, Roser Maneja

Cities are ecosystems

Urban green governance increases the quality of life and protects vital services

Photo: *©CC BY NC Nicolas Mirguet*

Martí Boada

Professor and senior researcher, Institute of Environmental Science and Technology – Autonomous University of Barcelona

Roser Maneja

Professor and postdoctoral researcher, Institute of Environmental Science and Technology – Autonomous University of Barcelona

Cities are often perceived as monuments of human disregard for the natural world, the very antithesis of nature. But urban biodiversity has become a sustainability indicator and the importance of urban green governance is increasingly apparent.

Biodiversity must play an essential role in the sustainability of 21st century cities, not just as a bioindicator, but because of its contribution to urban quality of life, and provision of ecosystem services. Such services are regulating (purifying air and water or mitigating floods); provisioning (including supplying food, water, or medicines) and cultural (covering aesthetic, spiritual, recreational, and intellectual benefits). Indeed it is more accurate to affirm that cities are ecosystems than that cities have ecosystems.

Urban ecosystems consist of three subsystems: green (all living matter in natural soil), grey (built-up areas) and blue (coastal zones, rivers, standing water, and fountains). Each can be divided further into specific biotopes – living spaces that provide suitable conditions for the development of certain living organisms – or localized elements, such as trees (in the green system), sidewalks (grey) and ponds (blue). All three are of equal importance. Walls and buildings, for example, are as much part of the urban ecosystem as are forested areas. Jerusalem's Wailing Wall, for example, is an important and ancient nesting site for swifts, while the caper bush grows wild in stone walls throughout Rome and Amman.

Cities can 'naturalise' to increase the presence and resilience of a diversity of species through initiatives aimed at blending nature more broadly and deeply into urban life. This includes creating feeding, breeding and sheltering sites in green, grey and blue areas. Establishing parks and gardens is a common tactic, but activities can also include creating green roofs, walls, facades and balconies.

Barcelona's Jardí Terradellas, for example, is a 'green wall' structure that is home to extensive bird life. This approach includes creating natural connectors that criss-cross a city, and link to natural areas (or 're-charge nodules') outside it. It is a key tool for promoting a city's biodiversity objectives, relying on urban green areas as entryways for flora and fauna from beyond the city system. The result is an expansion in the number or area of ecosystems within a city that can function autonomously, without human input. Such a city makes valuable green areas available for citizens, while also providing and promoting urban biodiversity services.

Photo: *© CC BY SA Herodotplomeu*

Biodiversity must play an essential role in the sustainability of 21st century cities, not just as a bioindicator, but because of its contribution to urban quality of life, and provision of ecosystem services.

Birds are among the most relevant indicators of these processes. Due to their high mobility, they use street trees and avenues as corridors that connect re-charge nodules with urban and peri-urban areas and provide permeability to the urban system.

Animals living in urban ecosystems face less pressure from natural predators than those living in peri-urban and surrounding natural areas. As a result, urban animals show reduced stress levels and a decrease in 'alert distance', or the point at which an animal begins to exhibit alert behaviours in response to an approaching human.

Urban fauna can be classified in relation to its origin in the urban system. Drawn fauna are those those species that are linked symbiotically to human activities, taking advantage of available resources and materials flows without causing either negative or positive effects (such as sparrows). Induced fauna exist as a result of human activities and installations that have favoured the presence of certain species originally from other habitats, and even other continents, (such as parrots in Rome, or grey heron in Barcelona). By contrast, some fauna continue to live in more natural, longstanding green habitats (such as squirrels in Hyde Park, London and common starling in Central Park, New York).

Urban fauna doesn't only produce beneficial effects and is often perceived negatively, through being scary or unpleasant. In some cases, it may carry disease and cause disturbance or damage to urban infrastructure and amenities. Examples include monkeys in New Delhi, baboons in Durban, and raccoons and coyotes in some US cities.

Still, urban biodiversity is a strong indicator of human well-being. It serves as a tool for monitoring global change and measuring a city's efforts to harmonise its activities with nature. In recent decades, several urban biodiversity indexes and indicators have been developed and used on the ground. Such indexes bring together parameters such as biodiversity, ecosystem services and management practices. They are useful tools for both policymakers and urban planners confronting issues such as climate change, and can help guide the development of urban masterplans. They can also make cities aware of important gaps in information about their biodiversity, and help them become acquainted with the ecological and cultural value of each species.

Urban biodiversity is an indicator of urban health. Cities that are more species-diverse are more resilient and produce enhanced ecosystem services, such as enabling city dwellers to enjoy the beauty of different seasonal effects. A deeper understanding of the importance of urban biodiversity can lead to improvements in the relationship between humans and the planet, meaning sustainable cities provide hope for the future. ▲

UN Environment at Work

District energy: a tried-and-tested answer to modern urban energy problems

In homes and workplaces, schools and hospitals, technologies such as boilers and air-conditioners consume vast amounts of energy. Indeed, half the energy buildings use is for heating and cooling and most of this comes from fossil fuels, burned in buildings' individual boilers and in power plants on the outskirts of our cities. Citizens, cities and countries are starting to take real action to move away from this status quo to more sustainable solutions, and this monumental shift is cutting greenhouse gas emissions, cleaning our air, saving money and reducing energy imports.

Consuming 70 per cent of global energy and as managers of local infrastructure, cities provide the ideal opportunity to develop innovative and sustainable solutions to heating and cooling. The concentration of buildings in cities means solutions can integrate multiple sectors, such as heating homes with underground heat or using cold water from rivers to cool whole neighbourhoods, as seen in cities ranging from Copenhagen and London to Tokyo and Seoul. The citizens of these cities are the first to benefit: less fossil fuels means cleaner air, steady heating prices and an easier fight against fuel poverty. Sustainable cooling cuts electricity demand from air conditioning during the hottest times of the day, increasing energy security for millions by reducing rolling blackouts and costly electricity infrastructure upgrades.

Many cities are prioritizing modern district energy as the integrated solution needed for sustainable heating and cooling. District energy systems consist of a network of underground insulated pipes that pump hot or cold water to multiple buildings in a district, neighborhood or city. Some systems just connect a few buildings, while others connect thousands of buildings and homes across a city. The result is the same: by providing heating and cooling to multiple buildings, district energy systems are able to use far larger sources of heating and cooling than can be connected to just one building. Such sources include: waste heat from industry or power stations; solar thermal; heat from groundwater and sewage; and free cooling from lakes, rivers or seas.

For cities, these larger sources of heating and cooling are greener and cheaper and make them more energy independent. In addition, district energy systems take advantage of surplus wind or solar power or surplus heat in the summer – at the lowest cost compared to other energy storage options. This energy can be integrated to balance variable renewable power through conversion to heat and stored for use seasonally (using soil or water) or during peak demand. Neighbourhoods, cities and countries are increasingly making district energy the cornerstone of their strategies to achieve 100 percent renewable energy targets.

Paris is one example of what can be achieved. The City of Light has developed Europe's first and largest district cooling network, using the river Seine that divides the city in two for cooling. The Paris district heating company uses geothermal, excess heat from sewage and industry, as well as waste-to-energy in order to serve the equivalent of 500,000 households, including all hospitals, as well as 50 per cent of all social housing and public buildings, such as the Louvre Museum. There are plans to use 60 per cent renewable or recovered energy in the network by 2020.

The concentration of buildings in cities means solutions can integrate multiple sectors, such as heating homes with underground heat or using cold water from rivers to cool whole neighborhoods.

The city turned to district energy as a core strategy to mitigate pollution from coal in the 1920s. Today it is putting Paris on the pathway to a 75 per cent reduction in CO^2 emissions by 2050. In addition to providing cheaper and more renewable heating and cooling, district energy provides €10 million in fees and dividends to the city and has estimated annual benefits of €19.5 million.

Similarly Gothenburg in Sweden utilized district energy to reduce air pollution from burning oil for heating in the 1970s. Today the city's district heating system uses 80 per cent renewables and waste heat, eliminating sulphur dioxide emissions, cutting nitrogen oxides by more than 90 per cent and halving emissions of carbon dioxide.

These are just two of the 45 examples from UN Environment's flagship report District Energy in Cities – Unlocking the Potential of Energy Efficiency and Renewable Energy, which sets out the best practice technology applications, policy and business models needed for cities to implement sustainable heating and cooling.

"Through 150 interviews across 45 low-carbon cities, district energy systems emerged as a best practice approach in scaling up renewable energy and energy efficiency," notes the report author, Lily Riahi. "Cities worldwide, in countries as diverse as China, Canada, the US, South Korea, Singapore, Colombia, Russia, the EU, Saudi Arabia, the UAE and Japan are using modern district energy to reduce energy consumption for heating and cooling of urban buildings by 30 – 50 per cent and to achieve ambitious targets for renewable energy, CO2 and clean air."

"Switching to modern district energy requires innovative local planning that integrates energy and land-use, and coordination across multiple city sectors such as energy, transport, housing, waste collection and wastewater treatment. Because it's new to many cities it takes time and many local governments worldwide do not have the capacity, accounting tools, or a clear mandate from their national governments to intervene in the sector," Riahi said.

In response to these barriers, UN Environment's District Energy in Cities Initiative is supporting local and national governments worldwide to strengthen policy and planning frameworks that will enable accelerated investment in modern district energy systems.

"Cities are turning to this Initiative to help them scale district energy and achieve multiple benefits such as waste reduction, local jobs, climate mitigation and power grid resilience. The benefits of district energy are aligned with many of the Sustainable Development Goals, such as improved health and wellbeing, which district energy delivers through real action on air quality," according to Djaheezah Subratty, head of the Policy Unit of the Energy, Climate and Technology branch at UN Environment.

For example, in Bosnia and Herzegovina, air pollution is an invisible killer, resulting in 44,000 years of life lost every year and costing 21.5 per cent of national GDP. One of the main culprits for this air pollution is local heating using heavy fuel oil. The Initiative is working with the city of Banja Luka to expand and modernize its district heating network. This will cut fossil fuel consumption by 27 per cent, improving local air quality and saving 20,000 tons of carbon dioxide and €4.5 million in fuel expenditure each year.

China, Chile and Serbia have prioritized modern district energy at the national and city level as a solution to local air pollution, while the refrigeration emission reductions from district energy also make it a priority in Colombia.

The Initiative has built a partnership of almost 40 organizations including technology providers, utilities, financial institutions, academia, international organizations, city networks, NGOs and champion cities to raise awareness and transfer policy best practice worldwide.

"Although in commercial use for decades, district energy has remained relatively unknown to many decision makers. Countering misconceptions, while communicating the benefits and limitations of district energy will help them feel more comfortable exploring this technology approach," says Subratty.

Indeed, district energy has been quietly building momentum and credibility over time. Today the US, EU and recently the G20 have signalled how essential it is to delivering clean air and decarbonization targets. District energy is also included as a key planning and infrastructure solution in the draft New Urban Agenda for Habitat III. Now the transfer and exchange of best practice, and the visionary leadership of local governments will be required to realize the full benefits and potential of district energy and create the sustainable cities of tomorrow. ▲

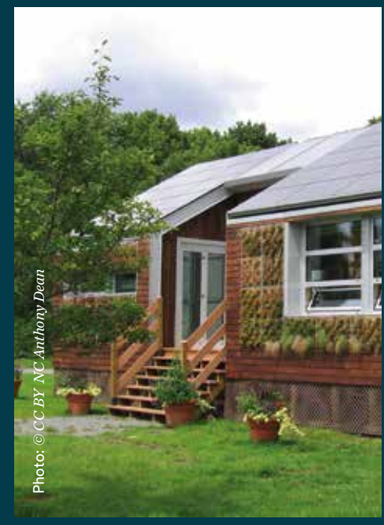


Photo: © CC BY NC Anthony Dean

Betsy Agar
Going for 100%

More and more cities are pledging to switch over entirely to renewable energy

Betsy Agar

Research Manager, Renewable Cities, Simon Fraser University Centre for Dialogue, Vancouver, Canada

Oxford County is a sleepy little farming county in the agricultural heart of southwestern Ontario, Canada. Some 4,000 km away, San Diego is a Californian metropolis of 1.4 million dubbed the "City of Villages" for its many distinct communities. Across the Atlantic, Osnabrück, Germany is home to a Volkswagen car plant and known as the "City of Peace" for its role in ending the 17th century Thirty Years' War.

Despite their diversity, these municipalities have something in common: they all have set 100 per cent renewable energy targets, making them leaders in the fight against climate change. And, since creating the Renewable Cities program, we have learned that they are in good company.

After a devastating tornado in 2007, Greensburg, Kansas elected to rebuild using only renewable energy, spurred by rising fuel prices and a wish to keep energy dollars and jobs local. In 2014, Fukushima, Japan pledged it would be entirely powered by renewable electricity by 2040 in direct response to the 2011 Daiichi nuclear plant meltdown. And last year, Vancouver, Canada set a 100 per cent renewable energy target for 2050 as the next step in its Greenest City Action Plan.

After a decade of negotiations with the California Utilities Commission, customers in San Francisco can now purchase locally-produced renewable electricity through Community Choice Aggregation. Following re-municipalization of the electricity grid, residents of Wolfhagen, Germany now participate in democratic decision-making through an electricity cooperative they co-own with the utility. And the T'sou-ke Nation of British Columbia has become Canada's first Aboriginal solar community as it seeks self-sufficiency and freedom from fossil fuels.

These examples show that the reasons for shifting to 100 per cent renewable energy are as different as the communities themselves. Each local government, having its own priorities and values, has an equally unique rationale and strategy for reaching the target.

Fortunately, such strategies can be integrated into pre-existing planning frameworks and reporting schemes. Smart cities can tailor energy services at a hyper-local level well suited to micro-grids. Members of the 100 Resilient Cities network are able both to mitigate their vulnerability to natural and manmade risks and to adapt to system interruptions. And for carbon neutral cities, renewable energy systems can also be zero-carbon (though 'renewable' should not be presumed to be synonymous with 'zero-carbon').

Unfortunately, integration into complex policy and planning documents makes it hard to track 100 per cent renewable energy targets – and new commitments are continually being made and achieved. In July, for example, the Sierra Club's Readyfor100 campaign summarized 10 case studies of American cities and towns that have set such targets. But the number of legislated commitments had already grown to 13 by the time its list was published. Similarly, the rapid rate of uptake makes it hard for GO100RE and GO100PERCENT to keep up to date the interactive maps they host of projects, corporations, and communities with these targets. In fact, even as I wrote this, the City of Victoria, British Columbia was voting in favour of such a commitment—bringing Canada's 100 per cent renewable energy municipalities to three in less than a year!

The proliferation of ambitious renewable energy targets shows that cities are taking action where other levels of government are lagging. Yet when Renewable Cities formed in 2015, the commonest question was: Why cities? The answer, to quote a participant at our recent North American Dialogue in San Francisco, is: "At the city level, the buck stops here. There aren't really excuses, we can't run off to a state or federal legislator; we have to be responsive immediately." Cities are "where the rubber hits the road." They are where "grassroots" action meets policy-making, and they are the "sponges" that absorb climate refugees. Every cliché fits the role local governments must play in the global drama of fighting climate change. Still, cities are not alone.

The City of Victoria, British Columbia voted in August to become the **third Canadian municipality** *so far this year to commit to* **100% renewable energy.**

Corporations are also setting 100 per cent renewable energy targets. RE100 - a campaign led by the Climate Group and CDP (formerly Carbon Disclosure Project) - helps companies like Apple to reach them. The 'green Apple' story is about a large corporate campus thriving without fossil fuels and becoming energy independent, demonstrating that large renewable production and storage is feasible. Corporations also lend a loud voice to the call for transforming traditional energy utilities with new ownership models and invest much needed capital in technological innovation. Indeed, the world's wealthiest corporate leaders recently formed the Breakthrough Energy Coalition to speed up innovation in clean, affordable energy. And corporate commitments directly help cities achieve their own targets.

Targets for 100 per cent renewable energy are at the intersection of policy-making and technological development. Putting theory into practice, Professor Mark Jacobson of Stanford University has charted a completely renewable energy mix for every American state and Canadian province, and is now turning his attention to cities. Oxford County, for example, is forming a "sustainability cluster" in partnership with stakeholders like York University and the Canadian Urban Transit Research and Innovation Centre to become a public hub of innovation. Needless to say, investors won't have to look hard for opportunities.

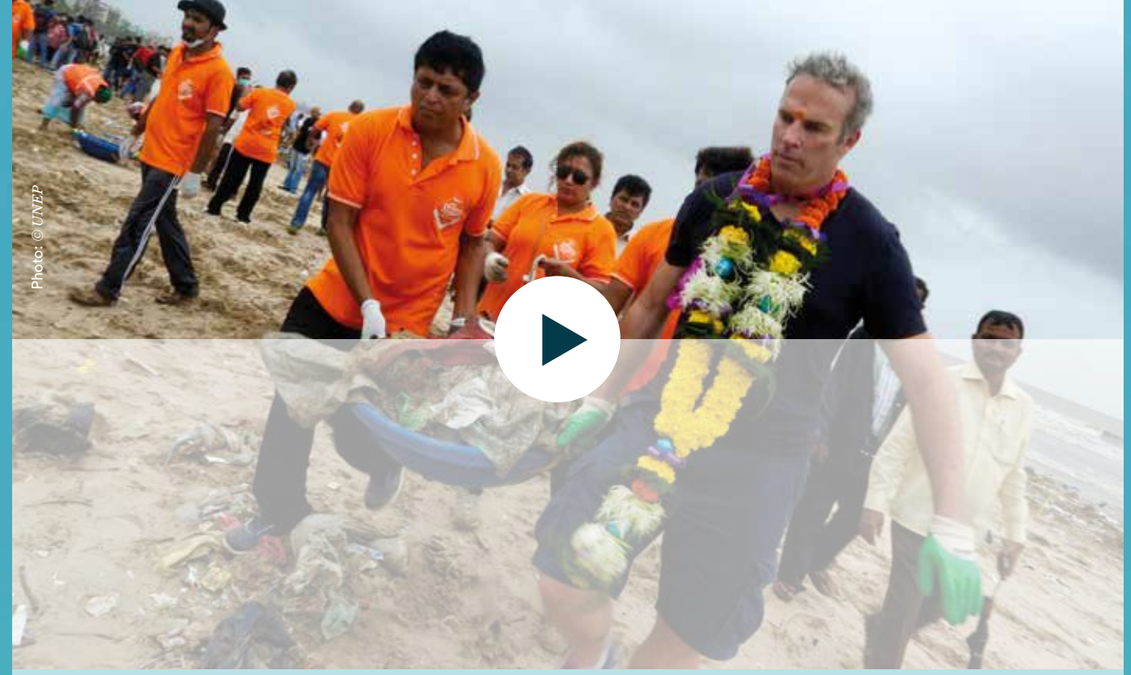
So, what does a climate leader look like? It is a local government that plans to power all its community's energy needs using renewables in at least one of the three main sectors: electricity, heating/cooling, and transportation. It puts renewable energy at the core of its planning to help the community reduce GHG emissions and pollution and become resilient to system shocks caused by climate change and other threats. Even more than that, it puts people first and envisions a community that is self-sufficient with a growing local energy economy, creating local jobs and keeping energy money at home, while also promoting energy conservation. In short, it looks like every local government that is fighting the impacts of climate change, with a commitment to 100 per cent renewable energy. ▲

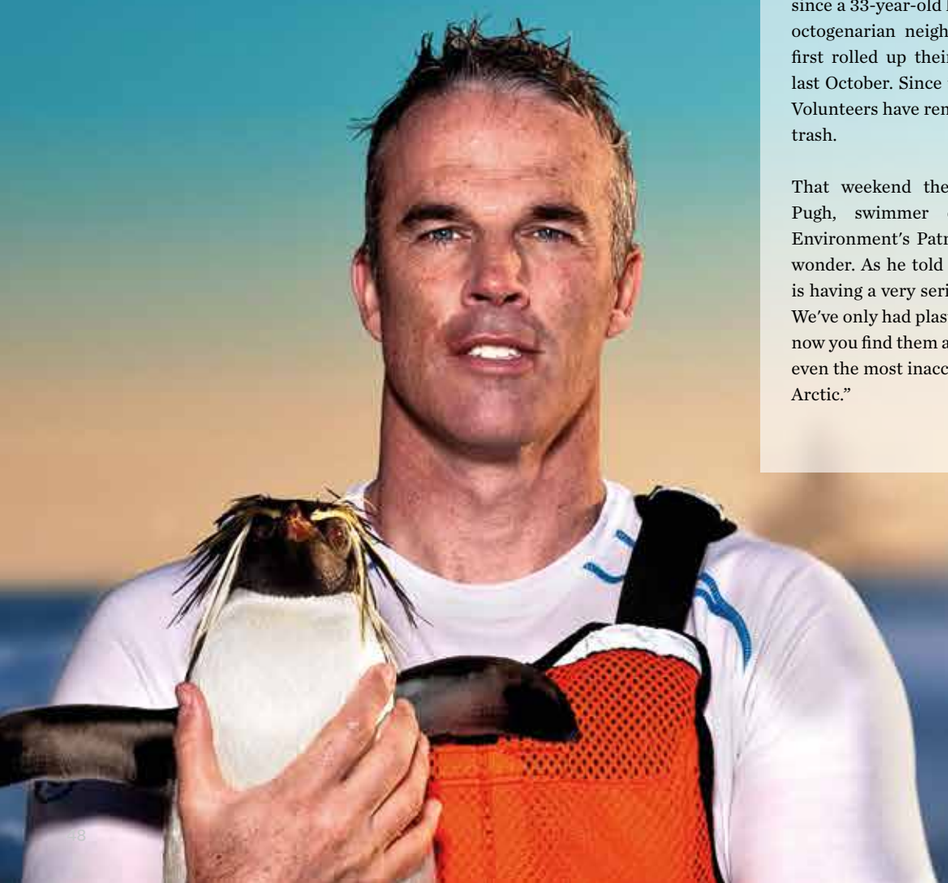
What does a climate leader look like? It is a local government that plans to power all its community's energy needs using renewables in at least one of the three main sectors: electricity, heating/cooling, and transportation.

Photo © CC BY James Moran

Environmental Champion Lewis Pugh

Lewis Pugh – known as the 'Edmund Hillary of swimming' for his extraordinary achievements – has taken part in the biggest cleanup in history





It is the largest peacetime clean-up operation in history. On 6 August, nearly 500 people descended on Mumbai's Versova Beach and removed vast amounts of rubbish.

And it was no flash in the pan, but the 43rd weekend on which local residents have worked to clean one of the world's most polluted strands since a 33-year-old lawyer, Afroz Shah, and his octogenarian neighbour, Harbanash Mathur, first rolled up their sleeves and got to work last October. Since then the Versova Resident Volunteers have removed at least 1,300 tons of trash.

That weekend they were joined by Lewis Pugh, swimmer extraordinaire, and UN Environment's Patron of the Oceans. And no wonder. As he told Our Planet: "Marine litter is having a very serious impact on marine life. We've only had plastics for about 60 years. But now you find them all over the world's beaches, even the most inaccessible beaches in the high Arctic."

Indeed, some 13 million tons of plastics end up in the world's seas every year, and production of the material is due to increase fourfold by 2050. By then, according to one recent study, the amount of plastic in the oceans will outweigh their entire population of fish. Pugh sees it as an "enormous threat".

He first became interested in the environment, he says, because his parents loved to take him to national parks in South Africa, where they had made their home. "It all started there. Nothing brought me greater joy than watching herds of elephants at the nearby Addo Elephant National Park. If you see something so beautiful, you want to protect it."

He was 17 before he had his first swimming lesson, but - just a month later - swam the 7 kilometres from Robben Island (where Nelson Mandela and other freedom fighters were imprisoned) to Cape Town, foreshadowing an extraordinary career which has led to him being dubbed the "Sir Edmund Hillary of swimming".

Starting out as a maritime lawyer, he left his practice in 2003, aged 34, to campaign full-time for ocean protection. In 2006 he became the first person to swim the entire length of River Thames to visit Britain's prime minister in London, so as to call attention to global warming and a severe drought gripping the country. The next year he became the first to swim across the width of the Maldives and, even more adventurously, to swim long-distance across a patch of ice-free sea near the North Pole, both feats again drawing attention to the effects of climate change.

In 2010 he swam across Lake Pumori, a glacial lake 5,300 metres up Mount Everest, to highlight melting glaciers, and four years later completed the first series of long-distance swims in all the earth's "Seven Seas" (its oceans) to campaign for more marine protected areas. He has also undertaken several swims in Antarctica's Ross Sea to press for its protection. Yet, even for his coldest swims, he wears no more than a Speedo costume, cap and goggles.

"I decided to undertake swims in the world's most fragile places to carry a message," he says. "There are so many environmental issues, so I try to focus on ocean ones. If you become a voice for everything, you soon become a voice for nothing."

Perhaps it is no surprise that he has said that the clean-up of Versova Beach "shows us that no challenge is insurmountable". He told Our Planet: "What is inspiring is that it is not a government initiative. It's local residents saying 'we won't allow this to carry on'. Ultimately we all have to take personal responsibility for the health of our Earth."

As UN Environment head Erik Solheim has said, the clean-up was "every bit as important as the global agreements making headlines ... because it reminds the rest of the world that even the most ambitious global agreements are only as good as the individual action and determination that bring them to life." ▲

What is inspiring is that it is not a government initiative. It's local residents saying 'we won't allow this to carry on'.

WILDLIFE CRIME
JUST GOT PERSONAL

GREED, FASHION, IGNORANCE, INDIFFERENCE, INVESTMENT, CORRUPTION, STATUS, PSEUDO MEDICINAL USE OR CULTURAL BELIEFS.
NONE OF THESE SHOULD RESULT IN THREATS TO SPECIES, GREAT OR SMALL.

WILD FOR LIFE

GIVE YOUR NAME TO CHANGE THE GAME
#WILDFORLIFE WILDFOR.LIFE