URBAN LEDS
URBAN LOW EMISSION DEVELOPMENT STRATEGIES

ICLEI Local Governments for Sustainability

UN HABITAT
FOR A BETTER URBAN FUTURE

Urban-LEDS: Cities in Action

Low Emission Development in Brazil, India, Indonesia and South Africa

2012-2016 Final Report

The Urban-LEDS project is funded by the European Union.

Executive summary

The Urban-LEDS project supported local governments in emerging economies to make the right choices when addressing local development. By exploring innovative approaches to involve stakeholders, develop low emissions development scenarios and improve institutional capacity to plan, act and monitor, ICLEI and UN-Habitat have guided first steps in several cities. The underlying principle used was to assess the status of existing policies, regulations, structures and procedures across the municipal government, proposing the fine-tuning or enhancement of sound practices, and creating new approaches where elements were missing. A guidance and support package has been provided to the 37 local governments involved in this project. This includes practical process guidance, technical and policy expertise, advise on vertically integrated climate action between different levels of government, and financing models. In all cases the local and national contexts were considered when developing tailor-made approaches.

This Final Report released in 2016, provides a summary of project highlights and achievements. For a more systematic review of final progress organized according to the Logical Framework and Work Packages, see Urban-LEDS Annual Report 2015-2016 (forthcoming). More information is available on the Urban-LEDS website: www.urban-leds.org

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Gino Van Begin

Secretary General, ICLEI – Local Governments for Sustainability

“Every city and town can and should follow a low emission development pathway. By integrating this approach into every policy and action implemented by local government, from procurement to urban planning, benefits result for the local community, the country and the planet. ICLEI recommends that local governments consistently embed low emission, resilient and sustainable development strategies in all walks of life.”

Joan Clos

Executive Director, UN-Habitat

“Many of the more cost-effective approaches to reducing GHG emissions occur in the urban context. Sustained by the well-structured framework of the Urban-LEDS Project, a number of the participating Model and Satellite Cities have indeed started to transform themselves and chart out pathways towards low-carbon urban development. Together with ICLEI, UN-Habitat stands ready to continue to help cities broaden and deepen their approaches to low emission urban development.”

Urban-LEDS project in numbers

From March 2012 to March 2016, the Urban-LEDS project promoted and supported low emission urban development in 29 local governments in 4 emerging economy countries, with the support of 8 inspiring European cities. The infographic below captures key achievements of Urban-LEDS.

All of the data presented in this infographic has been reported into the carbon*n* Climate Registry (cCR) through the Urban-LEDS project.

- 31 out of the 37 Urban-LEDS cities are reporting in the cCR.
- Total community emissions reported in mega tons of carbon dioxide equivalent ($MtCO_2e$) are for the latest reported year
- Climate commitments include: energy efficiency targets, renewable energy targets and emissions reduction targets.
- Projected GHG emissions reduction resulting from the Urban-LEDS project is estimated to amount to at least 5,918,333 tCO2e, between 2017 and 2030, based on the GHG mitigation commitments made by the 8 Urban-LEDS Model Cities.
- The Transformative Actions Program (TAP) project pipeline was launched in 2015.

Project timeline

Project Milestones
City Milestones
Tools and guidance
International events and advocacy

2012

March: Launch of Urban-LEDS project

December: Urban-LEDS featured at COP 18 in Doha

2013

March; 50 cities apply, 29 are selected (8 Model, 21 Satellite cities)

June: Urban-LEDS presented at the Bonn Climate Talks

June: 8 European cities selected to pool expertise and guidance

September: Nantes Declaration of World Mayors and Subnational Leaders on Climate Change

November: First International Networking Seminar in Nelson Mandela Bay

December: Urban-LEDS Mayors at COP19 in Warsaw

February: South Africa launch with national, provincial, local and private stakeholders

May: Launch in Brazil attended by national representatives and Head of State

July: Launch in Indonesia with national representatives

September: GHG inventory HEAT+ training held in Indonesia

September: India launch at National Urban LEDS workshop attended by EC representatives

December: Steve Tshwete and KwaDukuza release their 1st GHG inventories

2014

April: 13 cities participate in European Study Tour to Almada, Copenhagen and Hannover

December: Release of the first Urban-LEDS project update at COP 20 in Lima

March: Coimbatore, Belo Horizonte and Copenhagen awarded 2014 EHCC National Capitals

May: Steve Tshwete develops LED vision and scenarios with stakeholders

July: GPC open for public comments

August: Recife releases GHG inventory

August: Fortaleza GHG inventory released

September: District Energy in Cities guidance launched

September: Balikpapan, Bogor, Rajkot and Thane release their GHG inventories

November: Bogor embeds LEDS in 5-Year Mid-Term Development Plan

December: V-NAMA guidance released at COP20

December: Official GPC launch at COP20

2015

January: ISOCARP expert submits recommendations to Recife on LED potential

February: Urban-LEDS supports research on low-carbon cities in China

February: Solutions Gateway launched

April: Thane wins 2015 EHCC National Capital

May: Second International Networking Seminar in Bogor

October: KwaDukuza learns from Helsinki - green buildings and energy strategies

September: Pool of Experts grows to 150 experts

November: 22 TAP Urban-LEDS submissions by 11 cities

November: Recife approves LED Action Plan

November: Warsaw welcomes Indonesian delegation interested low carbon public transport

December: Bologna presents energy plan and low carbon initiatives to Steve Tshwete and Recife

December: Fortaleza finalizes LEDS and sends for council approval

December: Urban-LEDS side COP 21 event and release of 2015 project update in Paris

December: Paris Agreement recognizes non-Party stakeholders

December: UN-Habitat's Guiding Principles for City Climate Action Planning launched

2016

January: 13 project cities commit to the Compact of Mayors

January: KwaDukuza approves LED Strategy adopted by council

February: Thane visits Zagreb on staff exchange

February: Steve Tshwete sends LED Strategic Position Statement for council approval

March: GRIP workshop on future energy scenarios in Bologna

March: Balikpapan embeds LED Strategy and Action Plan in 5-Year Mid-Term Development Plan and sends for council approval

March: Bogor finalizes Action Plan and sends to council for approval

March: Urban-LEDS project ends

March: Thane and Rajkot complete LEDS and Action Plan (council approvals expected in April)

The Urban-LEDS Cities Network

Engaging in South-South-North exchange and peer learning

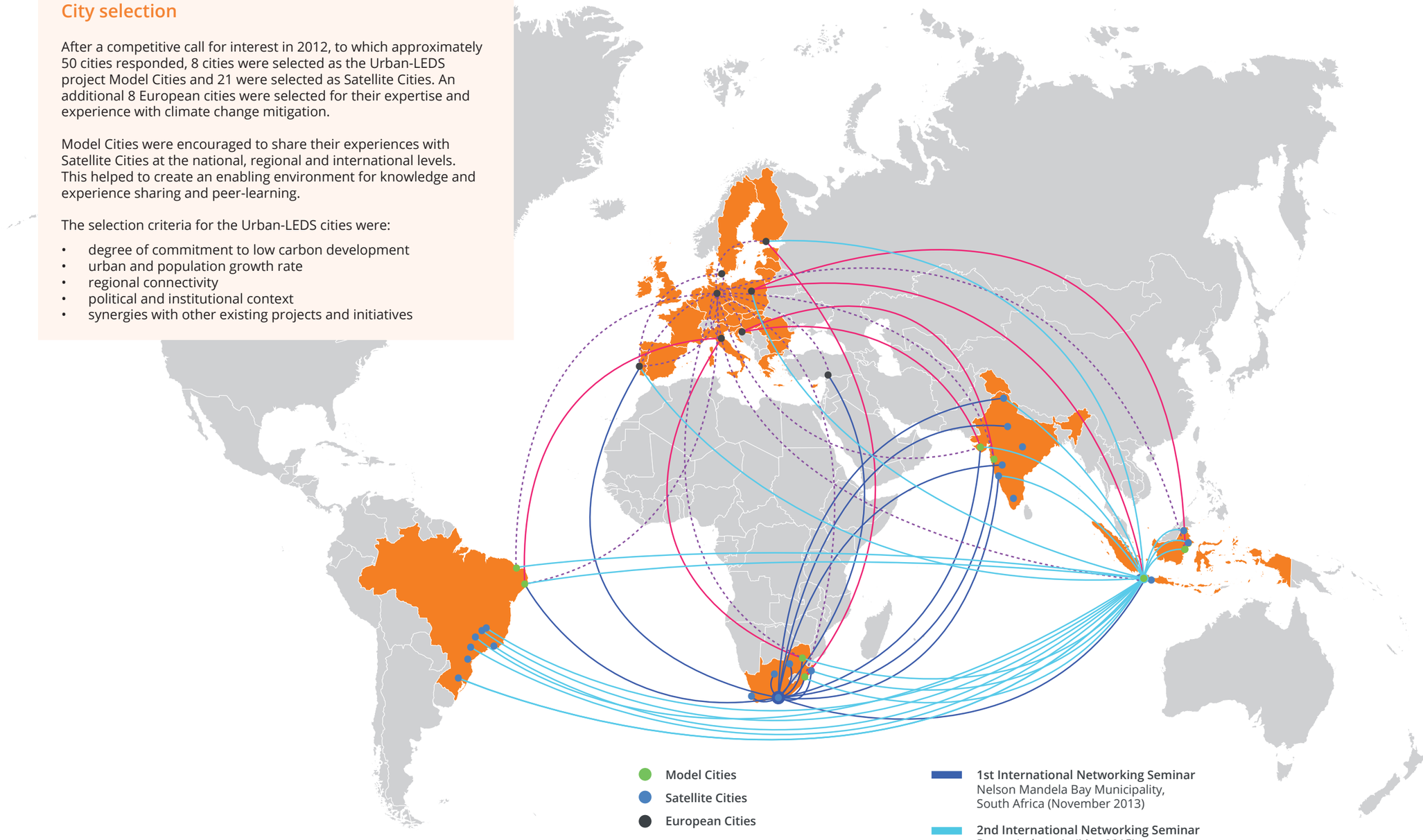
City selection

After a competitive call for interest in 2012, to which approximately 50 cities responded, 8 cities were selected as the Urban-LEDS project Model Cities and 21 were selected as Satellite Cities. An additional 8 European cities were selected for their expertise and experience with climate change mitigation.

Model Cities were encouraged to share their experiences with Satellite Cities at the national, regional and international levels. This helped to create an enabling environment for knowledge and experience sharing and peer-learning.

The selection criteria for the Urban-LEDS cities were:

- degree of commitment to low carbon development
- urban and population growth rate
- regional connectivity
- political and institutional context
- synergies with other existing projects and initiatives



Brazil	Population (millions)
Fortaleza*	**2.5**
Recife*	**1.5**
Betim*	0.37
Belo Horizonte*	2.4
Curitiba*	1.8
Porto Alegre*	1.4
Rio de Janeiro*	6.4
Sorocaba*	0.6

South Africa	
Steve Tshwete*	**0.23**
KwaDukuza*	**0.24**
Mogale	0.36
Nelson Mandela Bay*	1.1
Saldanha Bay	0.1
Sol Plaatje	0.3
uMhlathuze*	0.35

India	
Rajkot*	**1.3**
Thane	**1.8**
Coimbatore	0.9
Gwalior*	1.5
Nagpur*	2.4
Panaji*	0.06
Pimpri-Chinchwad	1.7
Shimla*	0.17

Indonesia	
Balikpapan*	**0.66**
Bogor*	**1.22**
Bontang	0.17
Kabupaten Bogor	4.0
Tangerang Selatan	1.4
Tarakan	0.19

Europe	
Almada, Portugal*	0.17
Bologna, Italy*	0.38
Copenhagen, Denmark*	0.58
Gaziantep, Turkey	1.8
Hannover, Germany	0.5
Helsinki, Finland*	0.6
Warsaw, Poland*	1.7
Zagreb, Croatia*	0.8

Bold: Model Cities
*Committed to the Compact of Mayors

Guidance to cities

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Under the Urban-LEDS project, the implementing partners, ICLEI and UN-Habitat, supported 8 Model Cities in defining their Urban Low Emission Development Strategies, compiling community-scale greenhouse gas (GHG) emission inventories and defining a low emissions development trajectory.

What is an Urban LEDS?

An Urban Low Emission Development Strategy (Urban LEDS) is a pathway for cities and towns to transition to a low emission, green and inclusive urban economy, through its integration into city development plans and processes. By exploring this, local governments can yield immediate, direct, cost effective and scalable greenhouse gas (GHG) emission reductions, while improving livelihoods for their citizens and businesses, also optimizing the use of local renewable energy and other resources.

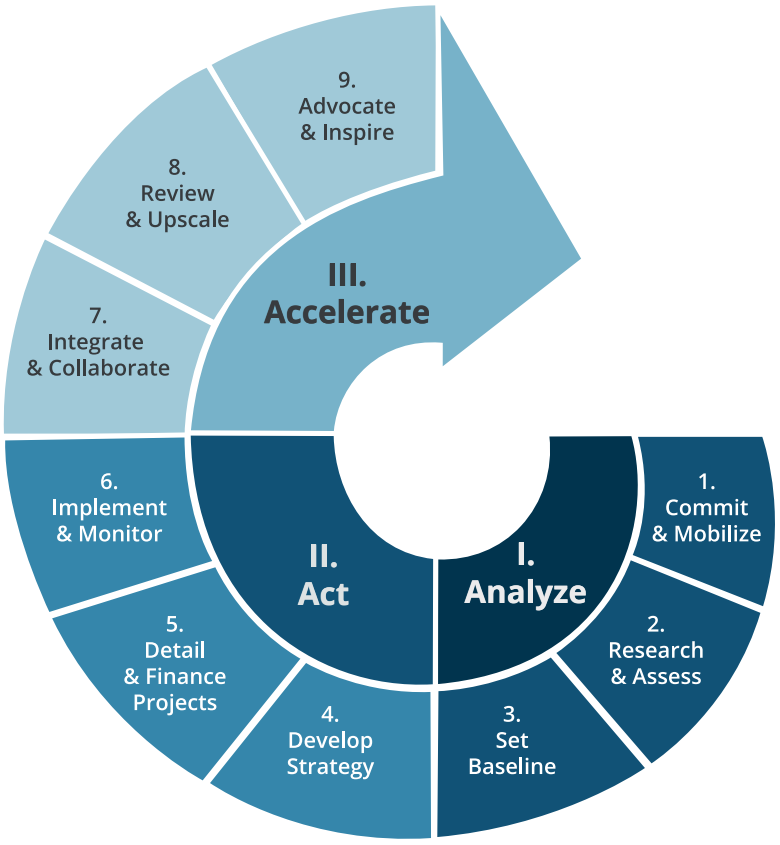
GreenClimateCities (GCC) program and process

Guiding Measuring, Reporting, Verification (MRV) of local climate action to achieve the project objectives of Urban-LEDS, all cities were offered GreenClimateCities (GCC) guidance. The GCC is a process methodology building on ICLEI's 25 years of expertise and experience, which supports local communities on the front lines of climate change in addressing the challenges and opportunities of urban growth, exploring their green economy and green infrastructure, and pursuing a low emission development trajectory.

The GCC offers access to guidance, tools, instruments, best practices and process management support. This methodology can serve any local government in planning and implementing the process in its community. Pictured below are the 3 phases and 9 steps of the GCC process, each step includes substeps not pictured in the graph below.

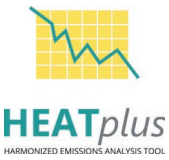
GreenClimateCities
LOW EMISSION. LOW RISK. LIVEABLE!

> "With the GCC we were able to study comprehensively what our stengths are and what issues should be paid more attention. We want to study how the tools that are part of the GCC program and developed by ICLEI can be used to help mitigation and adaptation efforts in the city even further."
>
> **Huuska Petteri, Environment Planner at the City of Helsinki, Finland , one of the GCC Europe Ambassador Cities.**



All elements listed below can support local governments throughout the three phases of the GCC process.

Guidance and technical assistance

	The handbook "From strategy to delivery: Measuring, Reporting, Verification (MRV) of Urban Low Emission Development program" provides a description of each GCC step together with a list of resources, an MRV check, verification criteria and examples from the Urban-LEDS cities. Specific tools and guidance are referenced at every step of the process to facilitate its implementation. www.iclei.org/gcc [Free]
	The Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) is the guiding protocol for local governments for greenhouse gas accounting at community level, ensuring that the results are Measurable, Reportable and Verifiable. It enables cities and communities to consistently measure and report GHG emissions and develop climate action plans. www.iclei.org/gpc [Free]
	The Harmonized Emissions Analysis Tool *plus* (HEAT+) is ICLEI's online GHG emissions inventory tool, helping local governments calculate GHG emissions, Common Air Pollutants (CAP) and other Volatile Organic Compounds (VOC). It helps cities to: (i) record and forecast greenhouse gas emissions, (ii) to identify/review low emission development priority areas, and (iii) lay groundwork for informed decisions and formulate targeted action plans. http://heat.iclei.org/ [Free]
	GRIP is a scenario tool that supports the process of building sustainable future energy scenarios through facilitated dialogue and the engagement of stakeholders in a consensus driven way. www.sustainable-energy.org
	The Solutions Gateway is an online platform providing guidance on Low Emission Development Solutions for local governments. By taking an integrated approach, proposed Solutions include information on the enabling and multiplying actions to optimize their effectiveness and generate synergies. www.solutions-gateway.org [Free]
	The Financing Tool is a decision making map and financing tool database embedded in the Solutions Gateway, which supports local government users to explore possible financing options to realize their low emission development Strategies. www.solutions-gateway.org [Free]
	The Pool of Experts is a global multi-disciplinary network of professionals with expertise on Low Emission Development and Local Governments – from strategies to technical sectoral expertise, to financing guidance and capacity building. It is free and open to recognized experts from business, industry, NGOs, research & academia, and all levels of government. http://tinyurl.com/pool-of-experts [Free]
	The Transformative Actions Program (TAP) aims to support the development and implementation of climate projects by improving access to existing capital flows to cities and regions, catalyzing and accelerating additional capital flows, and maximizing investment in low-carbon and climate-resilient urban development and governance processes. www.tap-potential.org [Free]

Global reporting platform

	The carbon*n*® Climate Registry (cCR) is the world's leading reporting platform to enhance transparency, accountability and credibility of climate action of local and subnational governments. Voluntary reporting of commitments, performance (GHG inventories) and climate action - both mitigation and adaptation - is enhanced by tracking co-benefits as MRV-able climate action. www.carbonn.org [Free]

Global Climate Advocacy

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Under the Urban-LEDS project, global climate advocacy has been a key action area. The focus was drawing attention to low emission development at city level in the international climate talks - towards and at the 21st Conference of the Parties (COP21) of the United Nations Framework Convention on Climate Change in Paris, France.

A key message carried by the Urban-LEDS project at four climate COPs was that cities from emerging economy countries are using climate change mitigation as a "driver" to address a multitude of other development issues, such as energy security; access to affordable, sustainable and local renewable energy; inclusive and multi-level governance; and capacity building.

The exploration of enhanced vertical integration between local governments and their national governments is also important for the successful connection between urban and national.

Recognize - Engage - Empower

ICLEI, as the voice of local and subnational governments in the international climate negotiations – in its capacity as focal point of the **Local Governments and Municipal Authorities (LGMA) Constituency** at the United Nations Framework Convention on Climate Change (UNFCCC) - is also facilitator of **the Local Government Climate Roadmap**. It has been engaged in the international climate negotiation process since 2007. Working with other city networks, there was a call for recognition, engagement, and empowerment of local governments.

At COP21, the Local Government Climate Roadmap was successfully concluded with the recognition of local and sub-national governments as non-Party Stakeholders in the Paris Agreement and COP21 Decision.

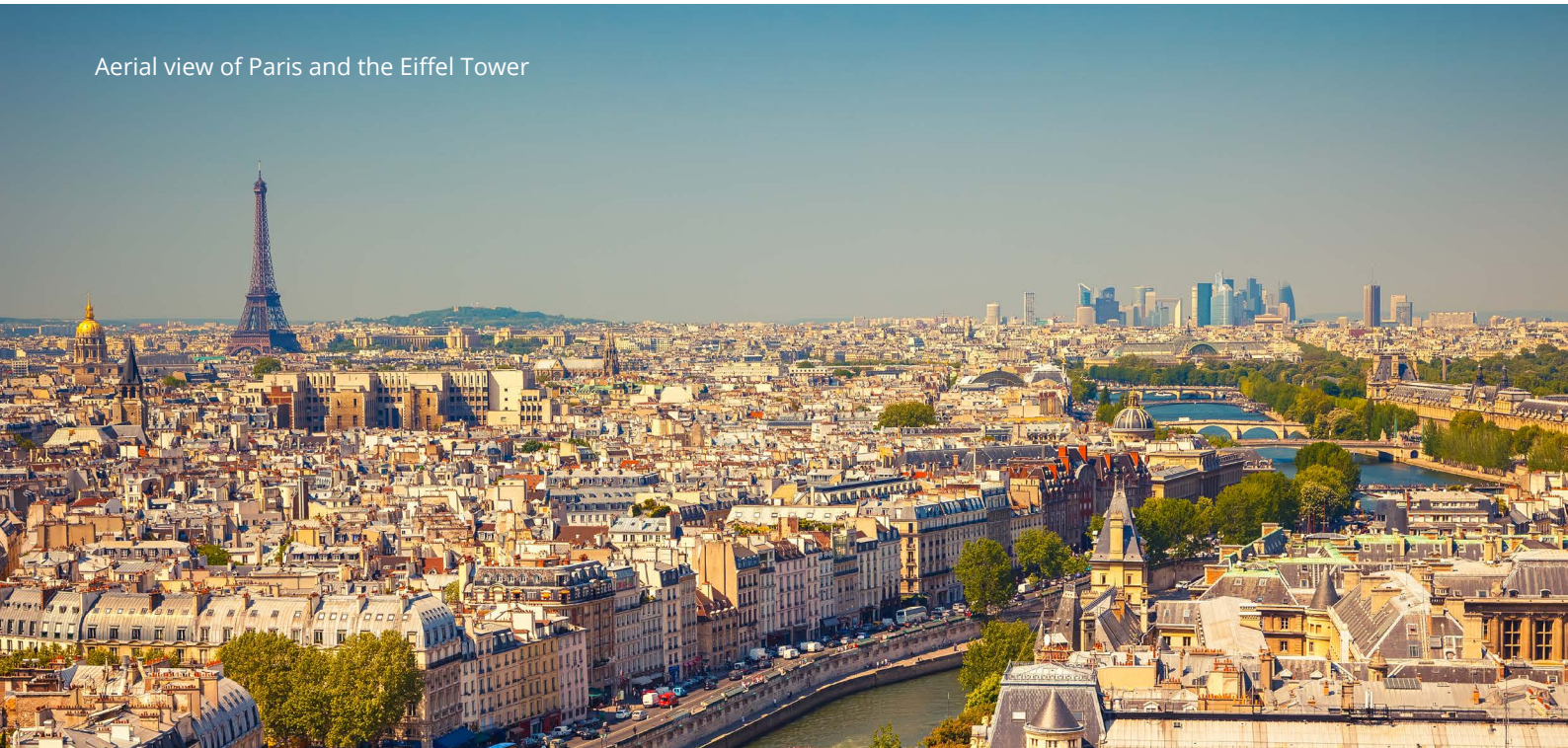
Global Climate Advocacy will now focus on the post-2015 Agenda and the **Sustainable Development Goals (SDGs)** and further encourage national governments to actively support their local governments' climate and sustainable development activities. This includes a request to support them in the preparation and implementation of low emission development strategies and action plans, connected to the Nationally Determined Contributions (NDCs). Nationally Appropriate Mitigation Actions (NAMAs) could also be highly relevant in this context.

Local Government Climate Roadmap

Friends of Cities

The **"Friends of Cities"** at the UNFCCC was established to create an avenue for national governments to engage in pivotal political discussions on local climate action, exploring how substantial progress can be made in the recognition, engagement and empowerment of local and sub-national governments.

Starting a new phase in 2016, co-chairs (Parties) will lead discussions on vertical integration and scaling-up climate action, working closely with the LGMA focal point.



Aerial view of Paris and the Eiffel Tower

Focus on 4 countries and their NDCs

Brazil

200 million inhabitants

Brazil is committed to increasing its use of renewable energy (the current mix includes 40% renewables providing 75% of its electricity supply). Further Brazil is committed to decarbonize its economy by the end of the century and to reduce GHG emissions by 37% below 2005 levels by 2025, and to 43% below 2005 levels by 2030. To do so, in its NDC Brazil acknowledges the important role of local governments and their contribution to tackling climate change.

India

1.21 billion inhabitants

By 2030, India has committed to reduce GDP (Gross Domestic Product) emission intensity by 33-35% compared to 2005; to install 40% cumulative electric power from non-fossil fuel energy sources; and to increase tree cover to create an additional carbon sink of 2.5 to 3 gigatons of CO_2 equivalent. To this end, India is committed to a number of strategies, which are highly relevant to local governments, such as cleaner and more efficient thermal generation stations, reducing emissions from the transport and waste sectors, and promoting energy efficiency in the industrial, transportation, buildings and utilities sectors.

Indonesia

247 million inhabitants

Indonesia is committed to 29% emission reduction from the Business-As-Usual (BAU) emissions scenario by 2030 and an additional 12% reduction from BAU by 2030 subject to the provision of international support. The country is also committed to a mixed energy use policy to bring renewables to 23% of the energy mix by 2015. To this end, Indonesia is committed to capacity building at the local level and enhanced urban waste and wastewater management policies, especially waste-to-energy.

South Africa

51 million inhabitants

South Africa is committed to a "Peak, Plateau and Decline" GHG emissions trajectory from the Business-As-Usual trajectory, starting in 2020, with emissions peaking between 2020 and 2025 and declining in absolute terms to a range of 398-614 megatons of CO_2 equivalent between 2025 and 2030. This commitment applies to all sectors of the South African economy and is expected to have implications for local government policies and actions.

Encouraging Vertical Integration

The built environment (including urban planning), the transport sector, waste and water management – currently all important greenhouse gas emitting sectors - typically are addressed by local governments. Yet, they often do not have a mandate to deal with climate change or energy. Business-as-usual scenarios envisage that emissions in these sectors will continue to rise due to unmanaged energy and resource use, aggravated by urban growth. To effectively address this challenge it is crucial to optimize the impacts of national and local climate strategies. This can be done by creating closer synergies in planning, coordination, implementation and monitoring, between all levels of government, through effective vertical integration approaches.

Also referred to as sub-national integration or multi-level governance, vertical integration means that different levels of government – from national/federal to state/provincial, subnational and local government – regularly exchange, plan and coordinate activities that relate to planning, implementation and reporting. The value lies in a frank, regular and structured exchange between peers that is well-coordinated. This implies not using a top-down approach, but rather considering the specific mandates and responsibilities of each level of government, and structuring a coherent approach.

South-South-North Exchanges

International exchanges have been organized between the Urban-LEDS cities - both for political representatives and technical experts. The aim was to share experiences, deepen their understanding of low emission development concepts, and gain insights from their peers. Most importantly, these events have provided opportunities for capacity building, with inspiring and motivational relationships forming between the Urban-LEDS cities. In total, 43 trips where undertaken by Urban-LEDS cities to 9 different destinations to engage in peer exchanges and capacity development (see map p. 6-7).

International Networking Seminars

Two international networking seminars were organized, respectively in Nelson Mandela Bay Municipality, South Africa (2013) and in Bogor, Indonesia (2015). There cities came together to share achievements, map priorities and identify solutions, tools and strategies.

The first seminar hosted by Nelson Mandela Bay Municipality was attended by 18 Urban-LEDS cities. It combined capacity development, exploring vertical integration and horizontal cooperation with neighboring communities.

The second seminar in Bogor, with 22 Urban-LEDS cities' representatives attending, focused on climate change reporting, emissions commitments and LEDS in the context of future urban growth. Key issues explored included effective strategic planning and stakeholder engagement, embedding measurable, reportable and verifiable (MRV) climate action processes into low emission development. Access to finance and how Urban-LEDS cities may contribute to raising the global climate ambition in the run up to the COP 21/CMP11 in Paris, France and beyond was also a hot topic.

European Study Tour

In April 2014, 13 cities took part in the European Study Tour "Low Carbon Solutions in Europe". Host cities Almada (Portugal), Copenhagen (Denmark) and Hannover (Germany) shared their approaches to waste-to-energy systems, buildings, district energy systems and sustainable transportation solutions. The tour was a successful peer-learning and experience-sharing event. The Mayor of Recife, Brazil, for example was impressed by the green roofs project in Copenhagen, which inspired the city's 2014 Green Roof Law. Bicycle lanes will be an important part of the river restoration program in Recife, also inspired by Copenhagen.

Other regional and global events used for networking, experience sharing and training opportunities included the ICLEI World Congress 2015, Metropolitan Solutions 2014 and the Local Climate Solutions for Africa Congress (LOCS) 2015.

At the United Nations office in Copenhagen

Staff in Copenhagen

City Networking in Nelson Mandela Bay Municipality

A toast to Urban-LEDS

Field visit of a windfarm, Nelson Mandela Bay Municipality

“We have found a common language with our honorable guests from Bogor and Balikpapan, and spent many hours of both professional discussions and pleasant chatting. I hope it is the beginning of more permanent cooperation between Warsaw and Indonesian cities.”

Marcin Wróblewski, Infrastructure Departmenet Chief Specialist at the City of Warsaw on receiving the Indonesian delegation in December 2015.

Staff exchanges

Four European project cities hosted bilateral staff exchanges and received staff delegations from the Global South.

Helsinki receives KwaDukuza

The representative of KwaDukuza visited Helsinki to learn from experiences with green buildings, energy use strategies and the holistic approach to urban, sustainability and environmental planning. The exchange revealed that some aspects of Helsinki’s planning model could be replicated in KwaDukuza, for example by establishing a dedicated unit within the Economic Development and Planning directorate to address sustainability questions.

Bologna receives Steve Tshwete and Recife

Delegates from Steve Tshwete and Recife visited Bologna to learn from the city’s experience with transitioning to renewable energy, where they were introduced to the city’s Sustainable Energy Action Plan (SEAP) and 2007 Energy Plan. They explored the comprehensive approach of the city’s Low Emission Development Strategy, which includes citizen engagement and co-creation activities.

Warsaw receives Bogor and Balikpapan

Two Indonesian Model Cities sent representatives to Warsaw to learn from the city’s low emission strategy and the specific focus of its green growth vision on sustainable transport. Warsaw’s carbon-neutral electric buses greatly inspired the delegates from their two densely populated cities.

Zagreb receives Thane

In Zagreb, the representative from Thane learned about the European city’s energy management, sustainable urban mobility strategy and citizen engagement. Similar challenges were identified throughout the exchange, as well as solutions which could benefit Thane.

Model City Fortaleza

Brazil

Area: 314.93 km²

Population: 2.5 million

City Budget: USD 1.8 billion (2012)

Pop. Annual Growth: 0.75% (2015-2013 per annum)

Vision

Make Fortaleza a **leading eco-efficient and resilient city** able to ally **economic growth** with **environmental conservation** and drastic **GHG emissions reduction**, with the city committed to **renewable energy** and implementing an efficient **waste management policy**.

Commitments

Fortaleza is committed to:

- 10% GHG emission reduction by 2030 (baseline year 2012) (community commitment)
- 30% of public buidlings using only renewable energy (government commitment)

Milestones

04/2014: Creation of the Urban-LEDS Steering Committee by the Mayor of Fortaleza

08/2014: First draft of the GHG inventory available

11/2014: Creation of the Fortaleza Municipal Forum for Climate Change (FORCLIMA)

08/2015: FORCLIMA releases draft of the LED Vision and Strategy

12/2015: Mayor signs the Climate Change Bill and sends it to the City Council for approval.

Strategy

In December 2015, the finalized **Climate Change Bill**, which includes the city's low emission development policy, commitments and action, was sent for approval to the City Council.

Priority actions in Climate Change Bill include:

- A Bus Rapid Transit system
- Developing bicycle lanes
- A bike sharing scheme
- An electric car sharing system
- An energy efficiency scheme for buildings
- Certification for sustainable construction
- A recycling scheme
- Integrated waste management plan
- Recycling scheme
- Methane capture

"Fortaleza aims to develop a municipal governance model based on social inclusion, participation, cooperation, and having transparency and sustainability as the transversal elements in public administration. The Urban-LEDS project offers a platform to help us obtain the leadership, technical know-how and methodologies to implement appropriate policies."

Roberto Cláudio
Mayor of Fortaleza

www.fortaleza.ce.gov.br

Energy and emissions

Main economic activity:

- Tourism
- Industry
- Commerce

Main priority sectors for Low Emission Development:

- Waste
- Mobility
- Urban planning and spatial development
- Street lighting
- Renewable energy

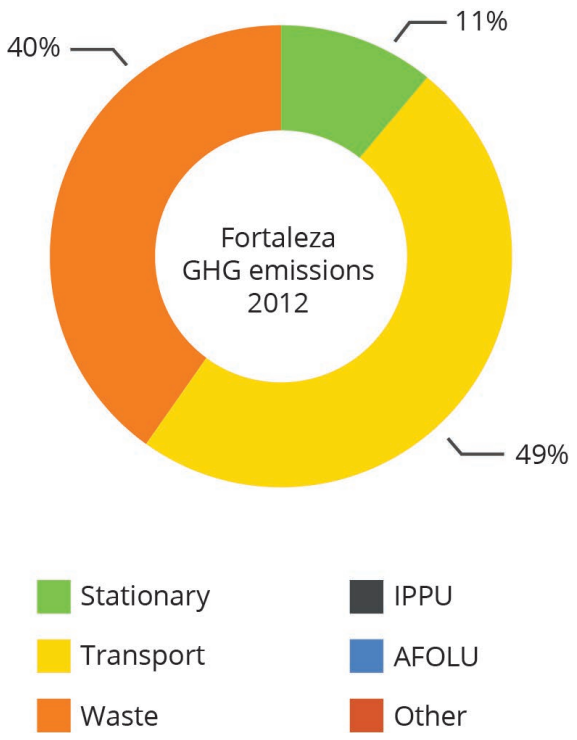
Final energy consumption in the community:

- Data available only for electricity consumption (per inhabitant): 2'794'880 MWh (2007)

Community GHG inventory

GHG emissions from the community:

- 3'827'521 tCO2e (2012)



IPPU: Industrial Processes and Product Use
AFOLU: Agricutlure, Forestry and Other Land Use

Status of GreenClimateCities (GCC) process

completed | in progress | not yet started

1.1	Secure initial commitment
1.2	Set up institutional structures
1.3	Identify & engage stakeholders
2.1	Assess government context
2.2	Assess local context
2.3	Collect energy and activity data
3.1	Develop GHG inventory
3.2	Analyze and forecast
3.3	Compile Baseline Synthesis Report
4.1	Set urban development vision
4.2	Generate & screen potential LED projects
4.3	Prioritize, set targets, & approve strategy
5.1	Detail LED programs & projects
5.2	Test and demonstrate
5.3	Select financing model & secure funding
6.1	Develop enabling policies & regulations
6.2	Implement LED programs & projects
6.3	Monitor and report
7.1	Collaborate and integrate horizontally
7.2	Collaborate and integrate vertically
7.3	Connect with similar cities worldwide
8.1	Refresh data, review assessment & analysis
8.2	Evaluate the LED Strategy
8.3	Update Urban LED Action Plan
9.1	Report achievements & advocate
9.2	Showcase, inspire others & gain recognition
9.3	Advocate globally for local action

Actions in Fortaleza enabled by the Urban-LEDS project

Urban Sustainable Mobility Program

- 129 km additional bus lanes by 2030.
- 526 km of cycle paths by 2030.
- Introduce a bike sharing system (see below).
- Introduce an electric car sharing system of 500 electric cars by 2030.
- Estimated CO_2 emission reductions 7.5 Mt over 15 years.
- **Submitted to the TAP project pipeline in 2015.**

Bike sharing scheme

- Launch of the first bike sharing scheme in December 2014.
- By March 2016, 60 stations are available throughout the city.
- 1'900 users use the system daily
- Saves an estimated 9'520 tCO_2e/year.

Fortaleza Urban Afforestation Plan

- Create green spaces to act as carbon sinks, reduce the urban heat island effect, improve air quality and the overal quality of life.
- 200'000 trees will be planted by 2030 (20'267 already planted) for a total of 14m^2 of green space per habitant.
- Estimated emission reductions are 350 tCO_2e/year in 2015, 1'200 tCO_2e/year in 2020 and 2'400 tCO_2e/year in 2030.
- **Submitted to the TAP project pipeline in 2015.**

Rachel Queiroz Park

- Recover 225 hectares across 14 districts of the city.
- Provide green space for leisure.
- Revisit the road system and improve urban mobility.
- **Submitted to the TAP project pipeline in 2015.**

Aerial view of Fortaleza's coastline © Joao Matos / CC

Municipal Integrated Waste Management Plan

- In 2011, 1'758 million tons of waste were sent to the Caucaia landfill.
- Once fully financed (total cost is approx. USD 372'000) the plan is expected to reduce waste by 137'165 tons every year starting in 2020.

Recycling Attitudes Program

- Environmental education program provided to 377 schools to promote recycling and resource efficiency.
- Creation of 13 local sorting and recycling centers.
- Supporting 39 waste picker cooperatives to improve social equity and support green jobs creation.
- Potential of waste reduction of 6'000 tons a year from 2015.
- **Submitted to the TAP project pipeline in 2015.**

Minha Casa, Minha Vida (My Home, My Life)

- Provides solar thermal systems and photovoltaic panels on low-income households for heating water and electricity

Energy Efficient Schools

- Pilot project to retrofit 13 schools to energy efficient standards.

Other submitted TAP Projects

TAP | Transformative Actions Program

Fortaleza Online

Currently it is difficult for citizens to understand the various procedures governing economic activity in Fortaleza, leading to economic exclusion. This hampers the city's economic development and contributes to dissatisfaction within the public administration. This project will provide automated licensing services for construction to reduce bureaucracy and increase productivity.

City Water Project

Environmental surveys have revealed that illegal dwellings are proliferating on the banks of Fortaleza's 4 rivers, leading to the introduction of untreated sewage to the rivers and the rainwater drainage network. This project will provide 16'000 new connections to the waste water drainage and treatment system to recover water areas for bathing, fishing and leisure activities.

"Trees on my sidewalk" Project

This project donates seedlings to encourage reforestation efforts and address the urban heat island effect. Citizens can apply for seedlings by email, phone or online.

Jangurussu Urban Sustainable Complex

The Jangurussu area was used for many years as an informal landfill, receiving over 3,000 tons of garbage every day. Fifteen years after the closure of the site, groundwater remains contaminated, affecting the nearby rivers . This project will regenerate the Jangurussu region by creating an urban park of approxmately 102 hectares.

For more information on TAP, visit: **www.tap-potential.org**

Model City Recife

Brazil

Area: 218.435 km²

Population: 1.5 million

City Budget: USD 1.5 billion (2012)

Pop. Annual Growth: 0.8 % (2000-2010 p.a.)

Vision

Recife is committed to become a **model of social and economic development** based on **sustainability** and a **Brazilian leader** for the North-eastern region.

Commitments

The City established the following community targets (in the Decree 29.219):

- By 2017: GHG emission reduction of 14,9% against Business-As-Usual levels (baseline year 2012)
- By 2020: GHG emission reduction of 20.8% against Business-As-Usual levels (baseline year 2012)

Milestones

09/2013: Creation of the Climate Change and Sustainability Comittee (COMCLIMA)

04/2014: City Council approves the Municipal Climate Change and Sustainability Bill, basis of the future LED Strategy

08/2014: First draft of the GHG inventory released

09/2014: Earth Hour City Challenge Participant

01/2015: Green roof law passes (Law 18.112/15)

12/2015: Decree 29.219 approves the GHG emission reduction target and LED Action Plan

Strategy

Building on the **Municipal Climate Change and Sustainability Bill**, by 2015 the LED Action Plan and targets were also approved by the City Council.

Priority actions in the Action Plan include:

- Developing bicycle lanes
- A Bus Rapid Transit system
- An electric car sharing system
- Bus fleet fueled by renewable energy
- Green building certification scheme
- Accelerating light emitting diode lighting
- Renewable energy for public installations
- Recycling
- Waste-to-energy schemes

"We have made the commitment to a social and economic model structured on a sustainable basis. The Urban-LEDS initiative is a key factor in helping us to meet our targets."

Geraldo Júlio
Mayor of Recife

www.recife.pe.gov.br

Energy and emissions

Main economic activity:

- Industry
- Services
- Fishery
- Tourism

Main priority sectors for Low Emission Development:

- Transport
- Urban planning and spatial development
- Buildings
- Green spaces
- Waste

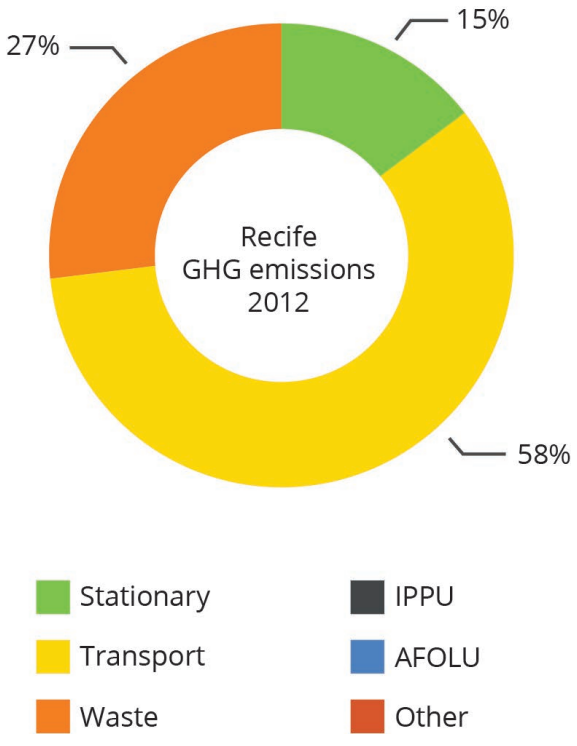
Final energy consumption in the community:

- Data available only for electricity consumption (per inhabitant): 2'794'880 MWh (2007)

Community GHG inventory

GHG emissions from the community:

- 3'115'341 tCO2e (2012)



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AFOLU: Agricutlure, Forestry and Other Land Use

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9.3	Advocate globally for local action

Actions enabled in Recife by the Urban-LEDS project

Capibaribe Park

- Construction of a park along 31km of the Capibaribe River, including extensive citizen engagement for the promotion of non-motorized transport and ecosystem preservation.
- 2 boat routes (11km and 2.9km) will be developed as water-born transport to serve 8'000 passengers every month and a achieve a GHG emission reduction potential of 3'227 tCO_2e/year.
- 2 solar stations for boats, electric cars and bicycles.
- **Submitted to the TAP project pipeline in 2015.**

Green Building

- In December 2014 the Municipal Green Roof Law 18.112/15 passed requiring that roofs of all buildings of more than 4 floors and commercial buildings of more than 400m^2 to be covered in native vegetation.
- A Green Building Certification Scheme for commercial, residential and public buildings will come into force in 2016 with a focus on rainwater capture, energy efficiency, sustainable design, and the segregation of recyclable materials in buildings.

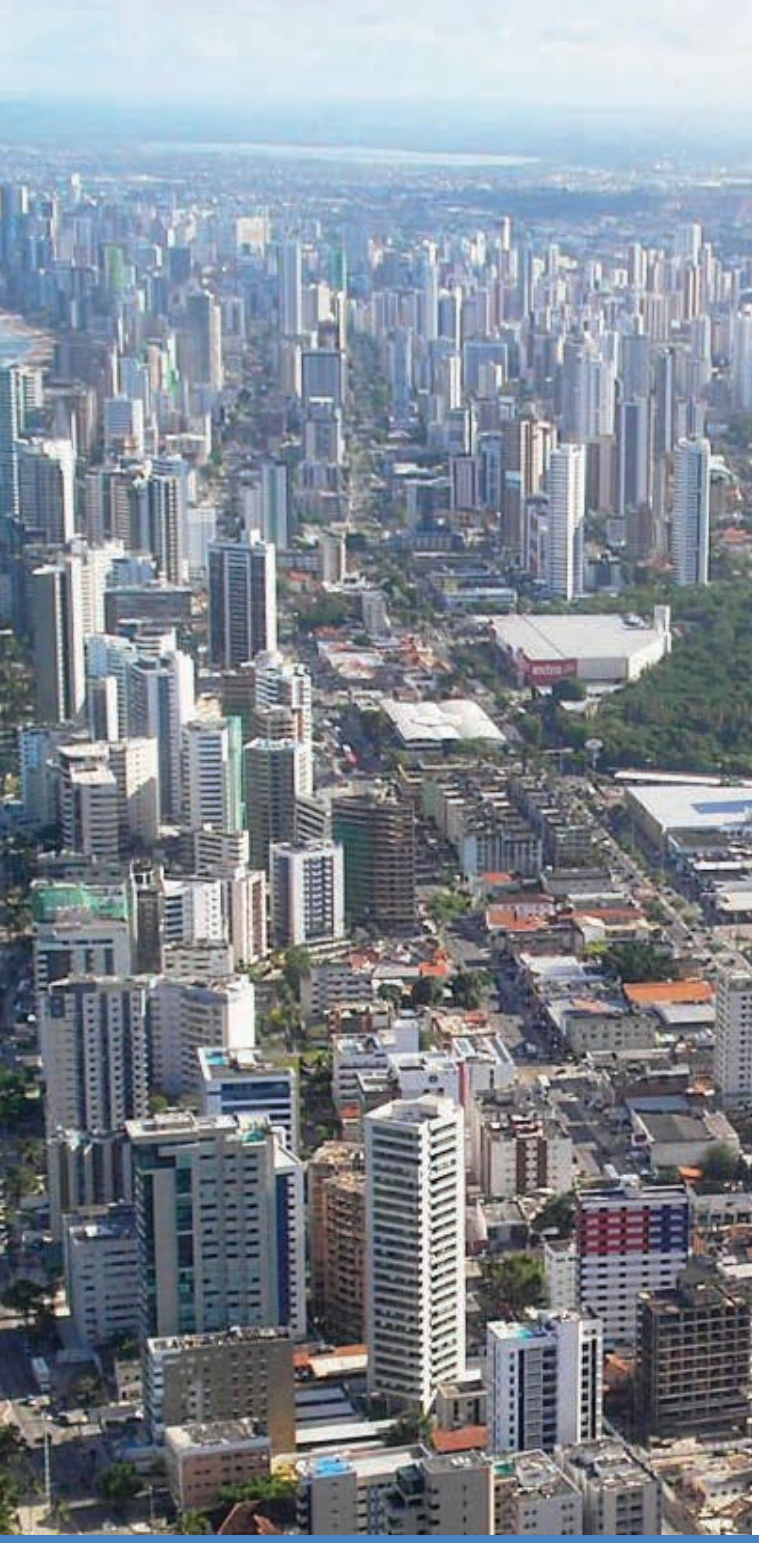
Sustainable Public Building and Environmental Education

- 47 solar panels were installed at the Botanic Garden as a pilot project to inspire the private sector and leverage more resources to retrofit public buildings.
- Promote the Green Building Certification Scheme.

Municipal Integrated Waste Management Plan

- A Municipal Integrated Waste Management Plan was established with the objective to reduce waste by 53'194 tCO_2e/year, by:
  - An electronic waste collection program
  - A domestic composting program
  - In January 2013 a biogas waste-to-energy system was installed in the municipal landfill to avoid 136'000 tCO_2e in 2013 and 140'000 tCO_2e in 2014.

Aerial view of Recife's coastline © Recife



Public Lighting using Light Emitting Diodes

- Street and traffic lights were retrofitted with light emitting diodes in a pilot area of Recife's historical center to reduce energy use by 50-70%. The city is now expanding this program.

Expanding carbon sinks

- 45'000 trees have been planted between 2013-2015 for an estimated GHG reduction potential of 1'200 tCO_2e/year.

Improving Ecomobility

- Cars have been banned from certain streets on weekends to encourage biking.
- 500 Municipal vehicles will be replaced by vehicles running on biofuels (Decree 29.219).
- Exclusive bus corridors will improve daily passenger transit and reduce travel time by 3h on average within Recife and its Metropolitan Region.
- The first electric car sharing scheme in Brazil will be implemented with support of the national government.
- This initiative is estimated to reduce emissions by 41'018 tCO_2e/year.

Spatial Planning Technical Assistance

- Technical assistance was provided by an urban planner accredited at the International Society of City and Regional Planners (ISOCARP). He recommended strategies to improve mobility and urban infrastructure in Recife in the City's Master Plan (due 2016).

Other submitted TAP Projects

TAP | Transformative Actions Program

Vulnerable areas mapping project

To improve the cit'y housing challenge, the municipal administration is mapping 33% of Recife's total inhabited area (4,460 hectares) to identify low-income areas as well as areas of the city with specific social, economic and environmental vulnerability. The objective is to develop an Integrated Sanitation Project.

For more information on TAP, visit: **www.tap-potential.org**

Model City Rajkot

India

Area: 104.86 km²

Population: 1.3 million (2011)

City Budget: USD 338.51 billion (2012)

Pop. Annual Growth: 2.5 % (2014-2015 p.a.)

Vision

Rajkot's vision is to become a **Sustainable, Modern, Affordable, Resilient** and **Technology-driven (SMART)** city which provides **quality infrastructure, efficient services** and actively **engages its citizens** in to improve their lives and the future of the city.

Commitments

Rajkot's Low Emission Development Strategy sets the following cumulative community target:

- By 2019-2020: GHG emission reduction of 25.78% (baseline year 2012-2013)

Milestones

07/2014: First stakeholders consultation to develop the Low Emission Development Strategy

09/2014: Earth Hour City Challenge Participant

09/2014: GHG inventory released

03/2015: Key stakeholder workshop identifies priority actions

03/2016: The finalized Low Emission Development Strategy is approved by the Commissioner and sent to the Council for approval.

Strategy

The **Low Emission Development Strategy** (2019-2020) approved by the Commissioner (March 2016) is expected to be approved by the City Council in April 2016.

Priority actions in the Strategy include:

- Waste-to-energy
- Renewable energy
- Energy efficiency
- Transport, including strategies to reduce emissions from the municipal fleet.

Approved pilot actions include:

- Street lighting retrofits
- Installation of photovoltaic panels on public schools
- Decentralized waste water treatment plant
- Prefeasibility study and business plan for a Public Bicycle Sharing System.

"Rajkot is committed to pursue a low emission pathway and address the emissions from our municipal services. We have identified a set of priority low emission strategies and we are actively undertaking a range of actions to address our local issues and leverage the opportunities that the Urban-LEDS brings to us."

Rakshaben Raghubhai Boliya
Mayor of Rajkot
(in office during the Urban-LEDS project)

www.rmc.gov.in

Energy and emissions

Main economic activity:

- Oil Engine and machine tools
- Foundry Industry
- Engineering and automobile industries
- Castor oil industries

Main priority sectors for Low Emission Development:

- Street lighting
- Sewage
- Water supply
- Transport

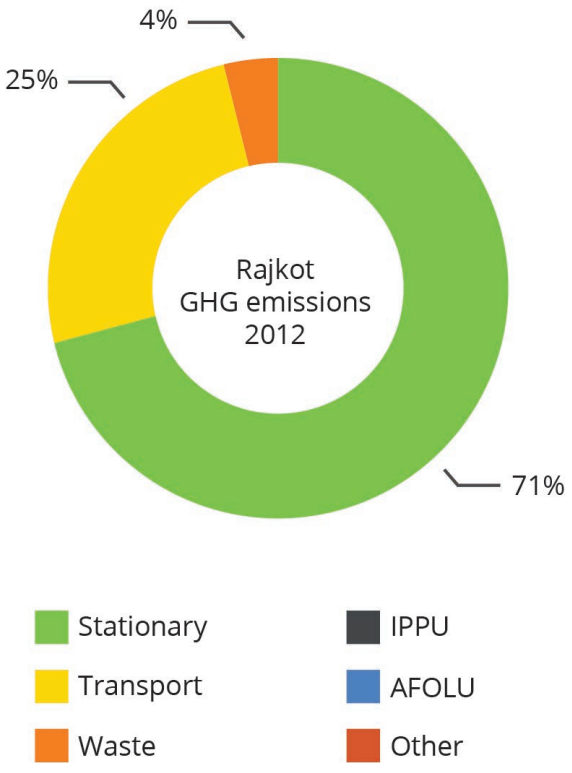
Final energy consumption in the community:

- 16'694'598.66 GJ (2012-2013)

Community GHG inventory

GHG emissions from the community:

- 1'704'380 tCO2e (2012-2013)



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Actions in Rajkot enabled by the Urban-LEDS project

Solar photovoltaic (PV) systems for schools

- A 20kW capacity photovoltaic system was installed at the Sarojini Naidu municipal high school. Peak energy generation potential is 30,000 kWh and a potential GHG emission reduction of 25 tCO_2e annually.

Piloting low-carbon waste water treatment

- A feasibility assessment for a decentralized wastewater treatment system was conducted to reduce emissions from electricity use when pumping in the centralized wastewater treatment system.
- The pilot project of a decentralized wastewaster treatment system with a capacity of 100 kilolitres per day is under construction.

Energy efficient street lighting replacement

- Feasibility study and light emitting diode retrofit of 291 streetlights with expected energy savings of 132,254 kWh and potential GHG emissions reduction of 109 tCO_2/year.
- The co-benefits of this action include increased illumination and safety, security and reduced maintenance costs.
- The City intends to expand this project.

Pre-feasibility Study and Business Plan for Public Bicycle Sharing System in Rajkot City

- With the aim to encourage bicycle usage, a pre-feasibility report is prepared to strengthen non-motorised transport (NMT) system and accelerate a shift towards sustainable transport modes. It is intended to implement this project in a phased manner.

View of Rajkot © Rajkot

Traffic in Rajkot © Rajkot

Submitted TAP Projects

TAP | Transformative Actions Program

Bicycle rental scheme

This Bike Sharing Scheme is located near bus stops and major transportation nodes and presently benefits around 600 to 900 people on a daily basis,. This figure is increasing by five percent each week. With this project, 98'229 daily motorized km travelled can be avoided, resulting in a fuel consumption reduction of 867 KL per year and a reduction of 2'071 tCO_2e of GHG emissions. This intervention contributes to 0.5% of total emissions reductions proposed in the LED strategy.

Smart Housing Society Scheme

This project intends to provide basic and environmentally-friendly infrastructure to the local population through a public private partnership. It will provide a model of sustainable development: wastewater treated at source to reduce costs, with waste segregated in decentralized units. Treated water will be used for gardening, while compost from waste will be used to develop green areas in the city.

For more information on TAP, visit: **www.tap-potential.org**

Model City Thane

India

Area: 128.23 km²

Population: 1.8 million (2011)

City Budget: USD 360.64 million (2014-2015)

Pop. Annual Growth: 3 % (2014-2015 p.a.)

Vision

Thane is moving towards a **low carbon economy** by exploring various **innovative technological solutions** and integrating them into city-wide activities to ensure the **better delivery of services** to its citizens.

Commitments

Thane is committed to:

- GHG emission reduction of 30.9 % by 2019-2020 (baseline year: 2012-13) (community target)

Milestones

02/2014: Stakeholders consultation meetings begin

09/2014: Thane released its GHG inventory

04/2015: Pilot projects are identified based on need and feasibility

04/2015: Thane wins National Earth Hour City Capital for India

2014-2016: Stakeholders meetings are held while pilot projects are implemented.

Strategy

A **Low Emission Development Strategy** addressing local priorities and in consonance with the Smart Cities Proposal for the city has been finalized and sent to the City Council for approval (expected in April 2016).

The action plan includes actions with the total mitigation potential of 624'199.82 tCO_2 in the following priority sectors:

- Residential (36%)
- Commercial/institutional (4%)
- Mobile units - Transportation (1%)
- Waste (54%)
- Municipal operations (5%)

"The Thane Municipal Corporation continues to play a lead role in accelerating the transition to low emission development under the Urban-LEDS project. Our staff has been inspired by the knowledge sharing network offered by this project and we are implementing pilot projects which will provide a platform to scale up similar interventions across the city."

Sanjay Bhaurav More
Mayor of Thane

www.thanecity.gov.in

Energy and emissions

Main economic activity:

- Industry
- Manufacturing
- Metalworking Industry
- Vehicles
- Electrical Equipment
- Chemicals
- Food
- Paper

Main priority sectors for Low Emission Development:

- Renewable energy and energy efficiency in buildings
- Street lighting
- Water supply
- Waste-to-energy

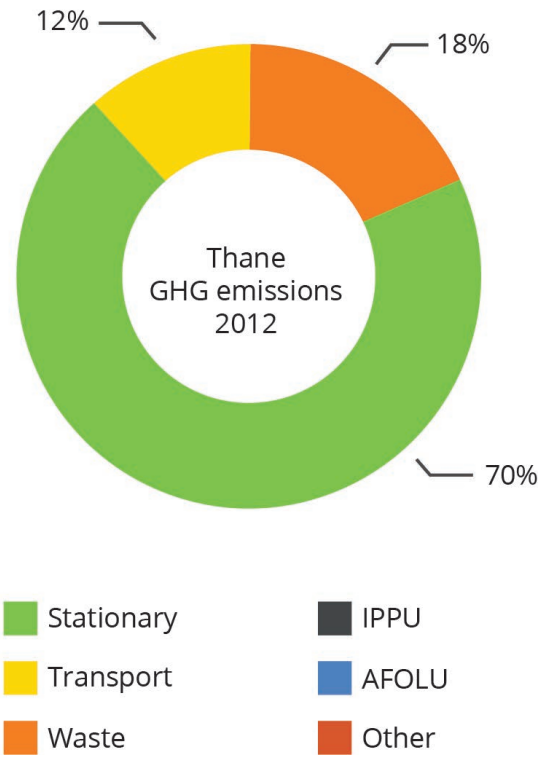
Final energy consumption in the community:

- 11'398'775 GJ (2012-2013)

Community GHG inventory

GHG emissions from the community:

- 2'051'789 tCO2e (2012-2013)



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Actions enabled in Thane by the Urban-LEDS project

Energy-efficient street lighting

- Thane is retrofitting 10'000 streetlights through an Energy Servica Company (ESCO) for an annual energy consumption reduction of 60% (6.42 Million kWh/year). The GHG emission reduction potential is over 5'285.5 tCO2e/year.
- This pilot project will help improve illumination levels, realize large-scale energy efficiency and system modernization for better operation and maintenance of street lighting, while reducing costs for the local government.

Energy efficient street lighting in slum areas

- 522 street were retrofitted with light emitting diodes in selected low income areas of Thane for estimated annual electricity savings of 40% (104792 kWh). The annual GHG emission reduction potential of 86 tCO_2e.
- This pilot action is linked to the larger scale programme for the retrofit of 10'000 streetlights.

WWF Earth Hour City Challenge (EHCC) 2014-2015 National Capital Winner of India

Thane was awarded EHCC National Capital for India for its ambitious community commitments to increase renewable energy by 6%, to increase energy efficiency by 7% between 2010 and 2015, to reduce emissions from buildings and curb traffic congestion.

Light-emitting diode lamps in Thane by night

Low Emission Solutions for the Vartak Nagar School

- This Municipal School has committed to become a 100% energy self-sufficient laboratory of low emission solutions for students and other schools.
- An interactive solar PV system of 15 kW was installed on its roof.
- The building's lighting equipment was retrofitted to increase energy efficiency.
- Smart meters were installed to monitor energy use and consumption.
- The project is estimated to reduce energy grid consumption by 54'000 kWh annually and to reduce GHG emission reduction by 44 tCO_2e.

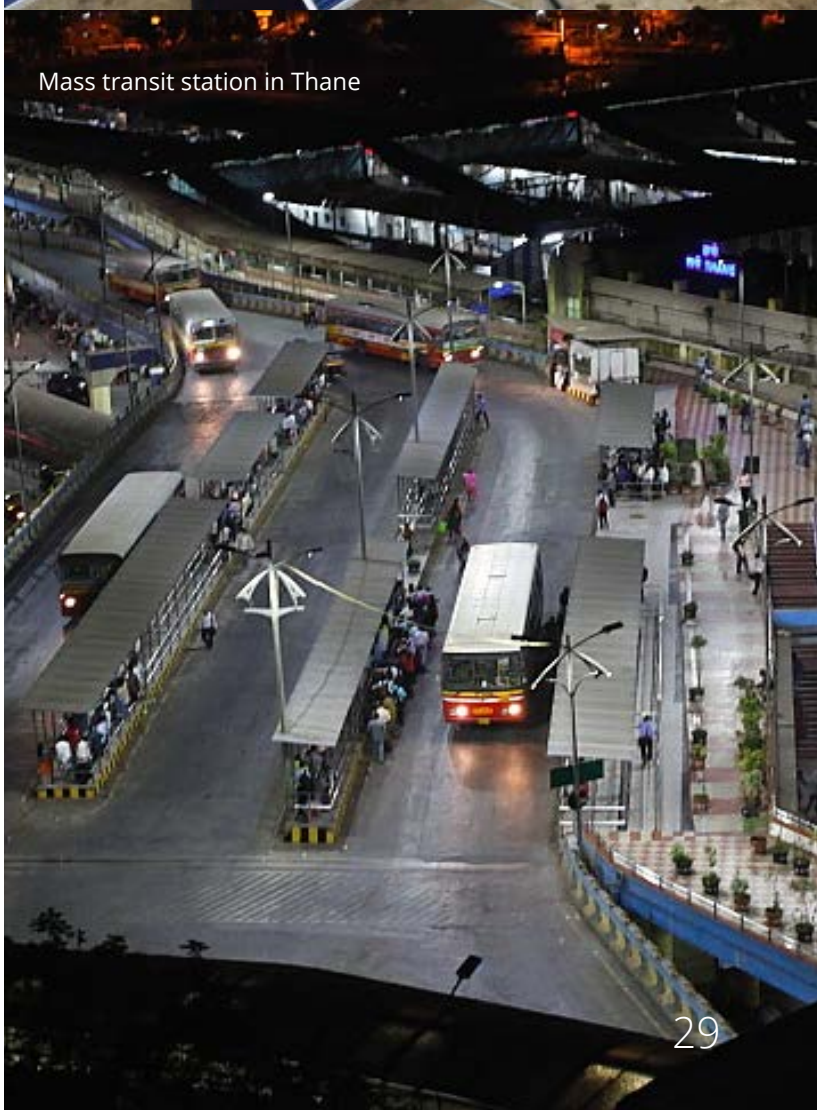
Climate Change Low Carbon Practices Awareness Program

- This pilot project was implemented in 15 schools for a total of over 2000 students and will be exended to 20 schools.
- The program consists in teaching the basics of climate change and linking it to aspects of urban lifestyles (energy consumption, transport, solid waste management, waste and wastewater treatment, etc).
- Sustainable practices for energy efficiency and sustainable waste management were presented.
- Teachers were trained to replicate this awareness program.

Municipal Drivers Training Program

- 100 drivers were trained on good driving practices by the Thane Municipal Transport Department, the Petroleum Conservation Research Association (PCRA) in association with ICLEI South Asia.
- The training helps realize financial savings and improve road safety.
- Preliminary assessments indicate potential fuel efficiency improvements of nearly 13%.

Solar PV panels on the roof of the Vartak Nagar School



Mass transit station in Thane

Model City Balikpapan

Indonesia

Area: 503.3 km²

Population: 0.66 million (2014)

City Budget: USD 258.33 million (2014)

Pop. Annual Growth: 7% (2001-2011 p.a.)

Vision

Making Balikpapan a **livable** and **environmentally sound** city with a **green economy**.

Commitments

The Low Emission Development Action Plan includes the following GHG emissions reduction target:

- 25.82% reduction by 2020 (baseline year 2010) (community target)

Milestones

2013: HEAT+ training on GHG inventory development

09/2014: Earth Hour City Challenge Participant

09/2014: Balikpapan releases its GHG inventory and identifies the transport sector as the highest emitting sector as well as huge carbon sink potential from the city forest and open green spaces.

04/2016: Balikpapan's Low Emission Development Strategy, Action Plan and Target are embedded in the city's 5-Year Development Plan (RPJMD) which was finalized and sent to the City Council for approval in April 2016.
The RPJMD allocates 30,000 USD of the City Budget to the implementation of the LED Strategy

Strategy

The **City 5-Year Development Plan**, which includes a **Low Emission Development Strategy** has been finalized and submitted for a Council approval in April 2016.

The Action Plan includes actions with the total mitigation potential of 1'133'904 tCO_2e by 2020 (a reduction of 25,82%) in the following priority sectors:

- Energy (20%)
- Transport (10%)
- Waste (71%)

"Balikpapan City is very optimistic regarding the achievement of its emission reduction target by 2020 as a contribution to the national emission reduction target to reduce emissions by 25.82%. We must and will make it. The ICLEI GreenClimateCities program will help us to get there."

Rizal Effendi
Mayor of Balikpapan

www.balikpapan.go.id

Energy and emissions

Main economic activity:

- Trade
- Services

Main priority sectors for Low Emission Development:

- Transportation
- Commercial and institutional buildings
- Waste management
- Waste water management
- Resilience

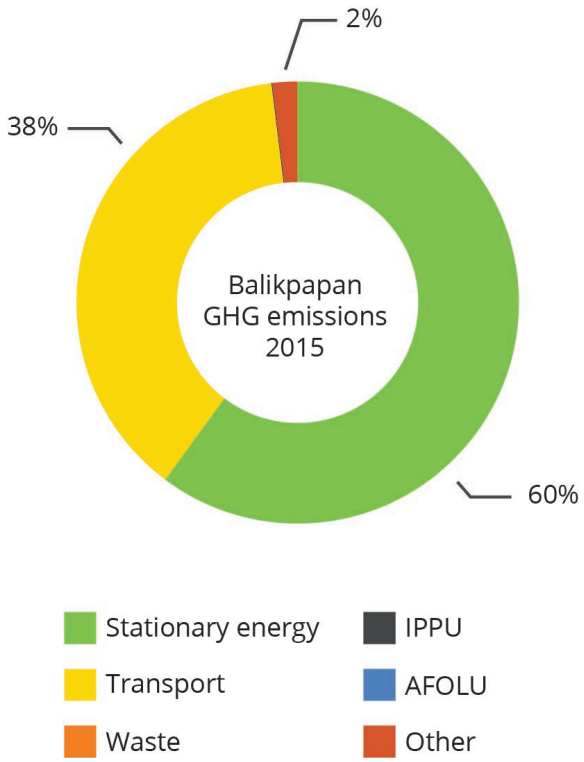
Final energy consumption in the community:

- 1'321'557 GJ (2011)

Community GHG Inventory

GHG emissions from the community:

- 1'480'438 tCO2e (2013) *Scope 1 emissions



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Actions enabled in Balikpapan by the Urban-LEDS project

First GHG inventory and identifying LEDS activities

- Balikpapan finalized its first community GHG emissions inventory with the support of Urban-LEDS and the guidance of an expert recruited through the Pool of Experts for direct technical assistance.

Carbon sinks

- The protection and expansion of protected forest area in Balikpapan city will tap into the significant potential of local carbon sequestration from the city's forest and open green spaces. In addition, the City supports the importance of agro-forestry, offering environmental and forestry education in two schools.

Energy efficient lighting

- Energy-efficient lighting is a primary LEDS focus in Balikpapan, including:
  - Scaling-up energy efficient street lighting to main and secondary roads
  - Retrofitting facilities, starting with the retrofit of government and public buildings.

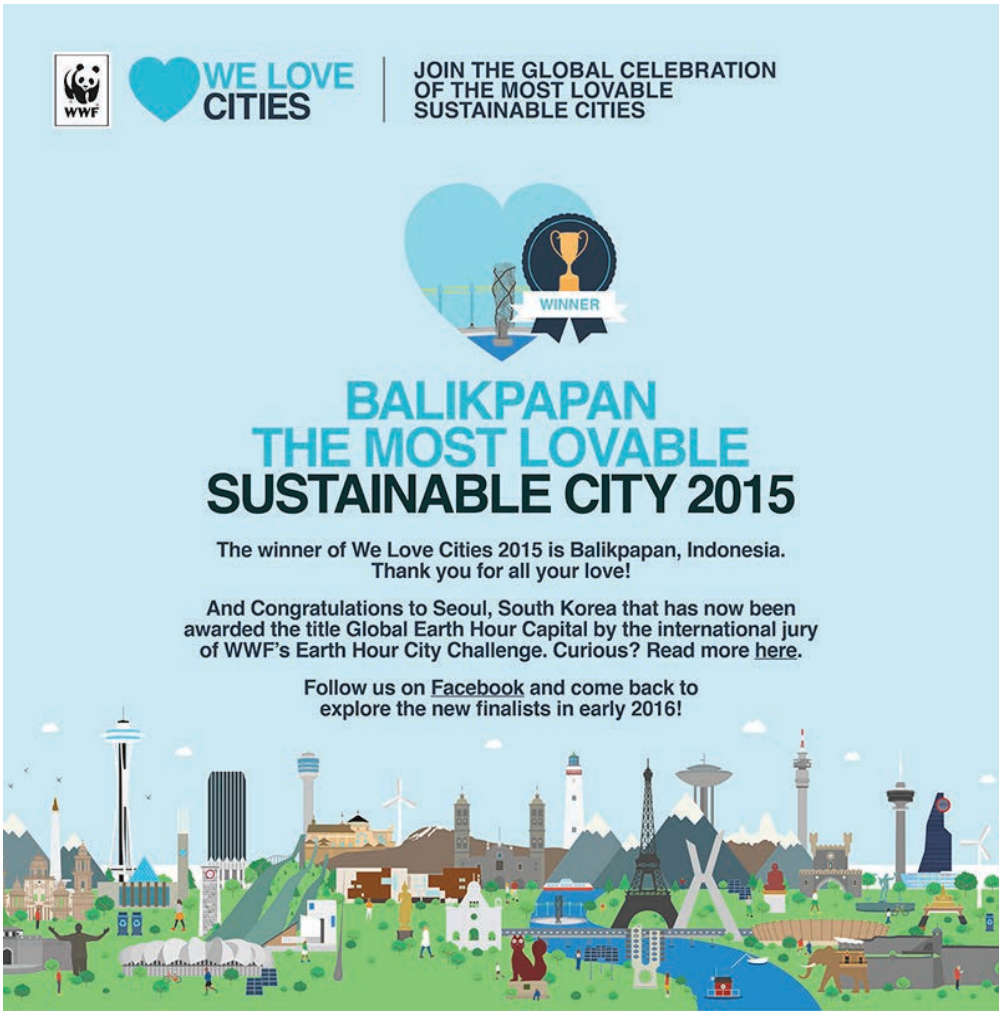
Waste-to-energy: low carbon waste management

- Detailed engineering feasibility studies were developed to equip the Pandansari Market and Marga Sari waste treatment facilities with carbon capture and storage systems.
- Budget has been allocated for this action in the city budget for 2016. The regulations to implement this project will be enacted in June 2016.

Corporate Social Responsibility

- The Corporate Social Responsibility (CSR) Forum is a group of companies in Balikpapan City that have committed to dedicate part of their budget to support social and environmental issues in the city, coordinated directly by the Government of Balikpapan.
- Funds have already been allocated through the CSR Forum to the Manggar Waste Management Facility to develop a methane capture pipeline. The facility will electrify 40 households.

Tropical forest © Jennifer Gergen /CC



Balikpapan was awarded with the WWF Earth Hour City Challenge title: "Most Lovable Sustainable City 2015". This award recognizes the greatest citizen engagement in the EHCC's social media campaign WeLoveCities 2015 campaign.

Submitted TAP Project

TAP Transformative Actions Program

Balikpapan Monorail and Tram

This project will introduce public transport to the city with a monorail and tram. Indeed, there is currently no public transport system in Balikpapan. The Monorail and Tram Project will meet the demands of the 700,000 inhabitants and especially of young people, the elderly and women. The monorail and tram will pass through the most densely populated districts of the city where around 75% of city population reside. In addition, the central point of the new routes is a trade and service area in Balikpapan; it is therefore expected that the new infrastructure will increase mobility from the suburbs to the city center.

For more information on TAP, visit: **www.tap-potential.org**

Model City Bogor

Indonesia

Area: 118.5 km²

Population: 1.22 million

City Budget: USD 11.79 million (2014)

Pop. Annual Growth: 2.79 % (2014)

Vision

Realize a **clean** and **environmentally sound** city based on developing a **green economy** with an emphasis on services that optimize the use of existing **natural resources**.

Commitments

Bogor is committed to the following emission reduction target:

- 29% GHG emission reduction by 2020 (baseline year 2010) (community target)

Milestones

09/2013: Bogor participates in HEAT+ training for GHG inventory development
01/2014: Bogor participates in GPC training
11/2014: The City enacts the 5-Year Development Plan
09/2014: Bogor Participates in the 2014-2015 Earth Hour City Challenge
09/2014: Bogor releases its GHG inventory
2014: The City Strategic Environmental Assessment Document is finalized
12/2015: Bogor announces its emissions reduction commitment of 29% by 2020 at the COP21 in Paris (baseline year 2010)
02/2016: Urban-LEDS expert begins to advise Bogor on Bus Rapid Transit roadmap
2016: LED Action Plan has been finalized and will be approved by the City Council in the course of 2016.

Strategy

Bogor's **5-Year Development Plan (RPJMD)** adopted in November 2014 recognizes climate change mitigation, adaptation and disaster risk reduction as strategic priorities for the period 2014-2019.

The RPJMD maps emission reduction efforts in the following priority sectors:

- Spatial planning
- Air pollution control
- Public transportation
- Pedestrianization
- Green building standardization
- Integrated waste management
- Energy efficient streetlights retrofits

"To shift Bogor City towards a low carbon development trajectory, the city will reduce GHG emissions by developing a set of environmental and low emission city regulations and policies. The city priorities are: to improve the quality of spatial planning and implementation; promote mass transportation, pedestrians and cyclists; and encourage urban development responsiveness to disaster risk and climate change impacts."

Bima Arya Sugiarto
Mayor of Bogor

www.kotabogor.go.id

Energy and emissions

Main economic activity:

- Trade
- Tourism
- Services
- Industries

Main priority sectors for Low Emission Development:

- Transportation
- Energy efficiency
- Waste management (recycling and waste-to-energy)

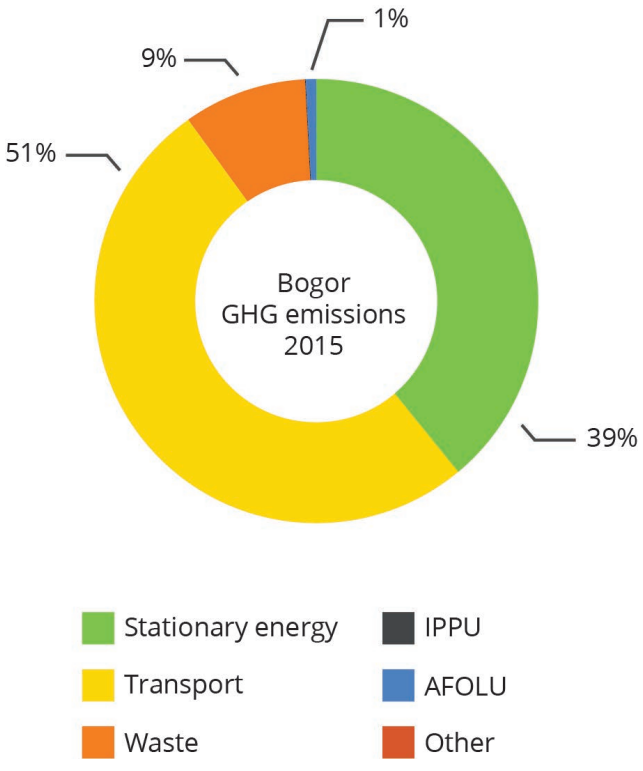
Final energy consumption in the community:

- 5'550'235 GJ (2014)

Community GHG inventory

GHG emissions from the community:

- 4'970'635 tCO2 (2013) *Scope 1 emissions



IPPU: Industrial Processes and Product Use
AFOLU: Agricutlure, Forestry and Other Land Use

Status of GreenClimateCities (GCC) process

completed | in progress | not yet started

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7.3	Connect with similar cities worldwide
8.1	Refresh data, review assessment & analysis
8.2	Evaluate the LED Strategy
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9.1	Report achievements & advocate
9.2	Showcase, inspire others & gain recognition
9.3	Advocate globally for local action

Actions enabled in Bogor by the Urban-LEDS project

Methane capture from communal sanitation plant

- The communal sanitation plant of Bogor's residential area was equipped with a bio-digester to capture emissions of methane from domestic wastewater and converted it into a source of renewable energy for domestic use in cooking.
- In 2014, the system served 47 locations.

Bogor's Walkability Campaign

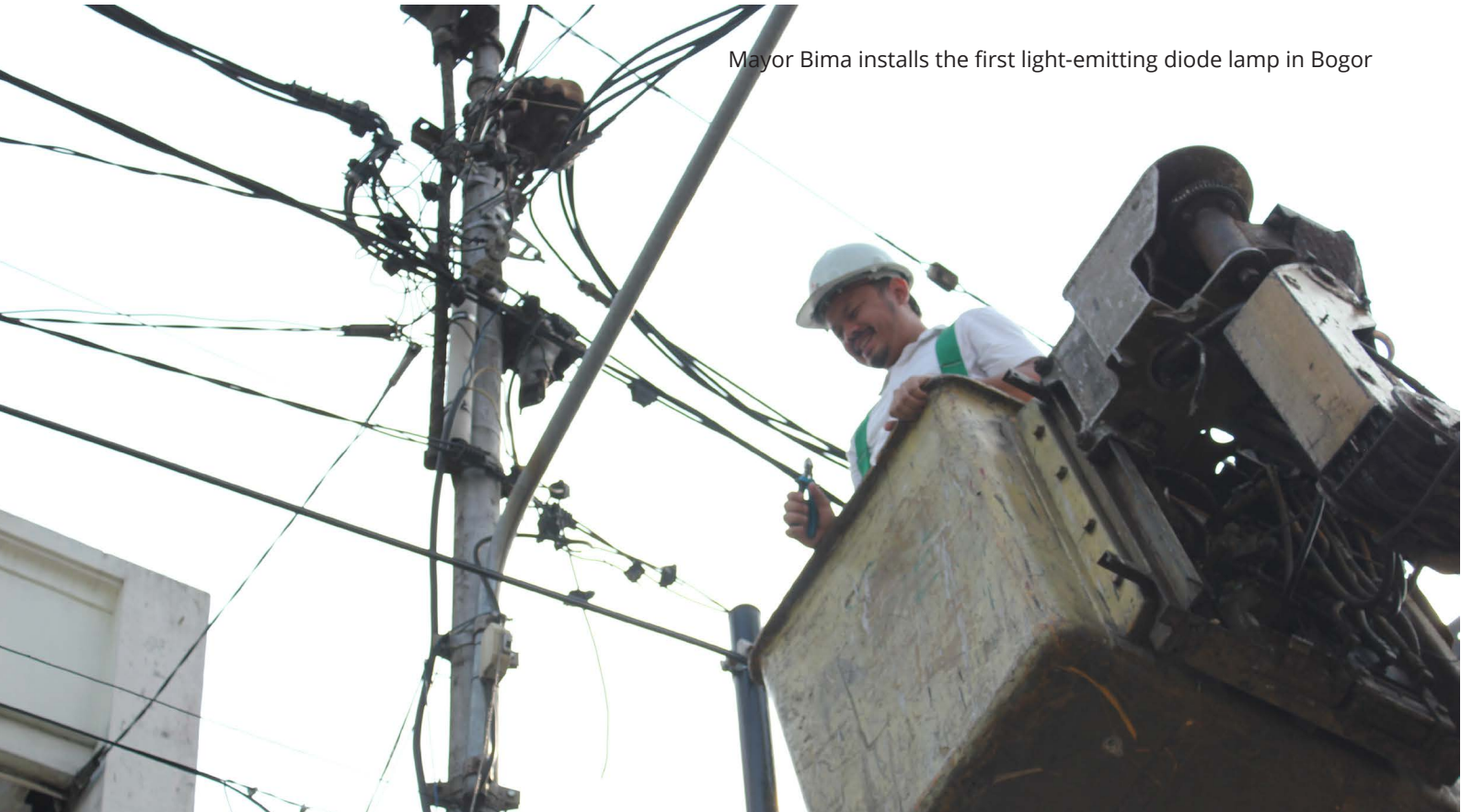
- Bogor has committed to building 22.5 kilometers of pedestrian and cycle paths by 2020.
- The first phase of the project has been concluded.
- The newly built paths are equipped with tag tiles, bicycle lanes, green areas and are completely integrated with public transport stations and public places of interest.
- A park-and-ride system is also planned.

Green Building Concept

- Bogor has enacted a Green Building Regulation and Coding.
- Funds are allocated in the annual budget to build the new energy-efficient House of Representative Building.
- Several more heritage buildings have been identified for retrofitting in the next 5 years.

Smart street-lighting

- In November 2014, Mayor Bima inaugurated a program of streetlight conversion to light-emitting diode (LED) lamps by installing the first lamp himself.



Mayor Bima installs the first light-emitting diode lamp in Bogor

Sustainable transport budget

- The city council decision of November 2014 allocated about 12 million USD to improve sustainable low emission transport in the city, including the revitalization of the Bus Rapid Transit (BRT system) and switching part of the city's microbuses to cleaner fuels.

Bus Rapid Transit (BRT) System

- In 2016 one new corridor will be added to the City's BRT system, "The Trans Pakuan", which currently stretches over 3 corridors and 14km.

Microbus fuel swtich

- 1000 microbuses will run on liquified natural gas and 50 microbuses on will run on electricity by 2019
- To implement this, the city will provide converter kits or devices.
- In 2016: 200 buses have already been retrofit to liquified natural gas.
- Benefits of this action include the reduction of emissions from transport and the improvement of air quality.

Used-cooking oil program

- Used cooking oil from the food industry is converted to biodiesel and used by the City to operate its Bus Rapid Transit, the Trans Pakuan.
- With the support of Urban-LEDS Bogor has been exploring converting used cooked oil as heating fuel in commercial buildings. The mitigation potential of this action is 278 tCO_2/year or cumulatively 1,529 tCO_2 in five years. The project will start in the course of April 2016.

View of Bogor

Model City KwaDukuza Municipality

South Africa

Area: 734.971 km²

Population: 0.24 million (2012)

City Budget: USD 103.101 million (2012)

Pop. Annual Growth: 3.2 % (2001-2011 p.a.)

Vision

By 2030 KwaDukuza will have achieved its **transition to low carbon development** and will be a distinctive urban launch pad for the Richards Bay / uMhlathuze Corridor, a **job-rich green manufacturing, renewable energy and logistics hub**, a **thriving tourism destination**, a model of **integrated resource management** and **climate change adaptation**, and a "Shaka[1]-inspired interface" with its traditional hinterland.

Commitments

The following aspirational comunity target was proposed for inclusion in the Strategy:

- 42% emissions reduction in line with the national peak, plateau and decline long-term mitigation scenario (baseline, 2012, target 2030).

The target is aligned with the following national commitments: the Climate Change Response Strategy committed to reduce GHG by 34% by 2020 and 42% by 2025 against BAU, the National Development Plan and the Renewable Energy target (to install 5'395 MW).

Milestones

12/2013: First GHG inventory released
02/2014: Stakeholders define scenarios and targets
02/2014: Stakeholders draft the municipality's Low Carbon Vision
03/2015: GHG training to update the inventory
01/2016: The City Council approves the Low Emission Development Strategic Framework and Action Plan
02/2016: The Green Building Guidelines are approved

Strategy

In January 2016 the Municipality approved the **Low Emission Development Strategic Framework and Action Plan.**

They include the following priority actions:

- Developping green industries, supporting the creation of green jobs and the diversification of the tourism industry to become a green economic and tourism hub
- Increasing energy efficiency, promoting renewable energy and enhancing the access to safe, reliable and affordable energy for all
- Reducing energy usage and increasing energy efficiency in municipal operations
- Promoting a compact, resource and energy efficient built environment by implementing priority public transportation and offering non-motorized transportation infrastructures and choices for all
- Protecting and enhancing local natural assets (especially water and waste)
- Protecting the biodiversity and raising the profile of ecosystem services in municipal planning.

1 Shaka Zulu was a great Zulu warrior and king who united his people and showed leadership at a key moment in history.

"Climate change is the most serious global challenge of our time. Being one of the local municipalities in the country to pitch for Compact of Mayors status is a re-affirmation of our commitment in the fight against climate change. Our vision statement holds true of our successful interventions on the climate challenge. There is a clear indication that we are a progressive city in the making, on our path towards a low carbon economy. Together we can do more!".

Ricardo Mthembu
Mayor of KwaDukuza Municipality

www.kwadukuza.gov.za

Energy and emissions

Main economic activity:

- Commerce
- Service sectors
- Agriculture

Main priority sectors for Low Emission Development:

- Green economy
- Green building and spatial planning
- Energy poverty

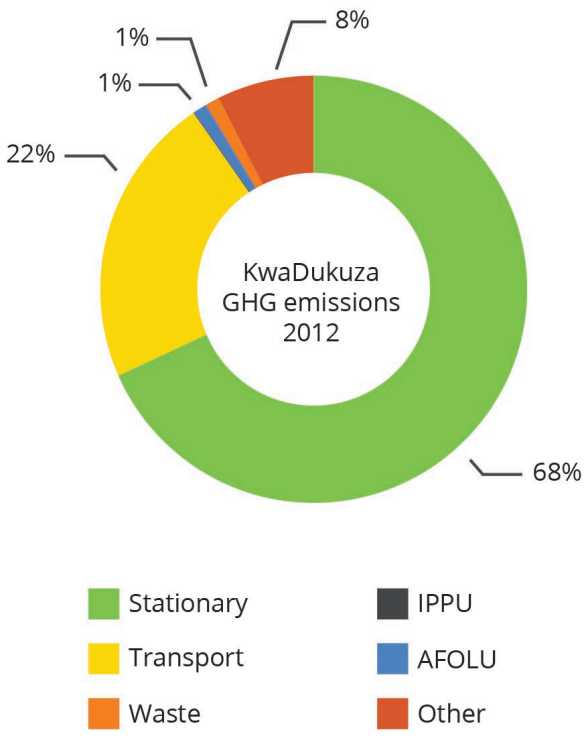
Final energy consumption in the community:

- 5'316'698.57 GJ

Community GHG inventory

GHG emissions from the community:

- 1'008'657.49 tCO2e (2012)



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Actions enabled in KwaDukuza Municipality by the Urban-LEDS project

Mayoral Leadership Showcase

- Mayor Masina has taken part in the on-going Urban LEDS Leadership Mentoring Program organized through the project in South Africa.
- This involves one-on-one mentorship calls and visits by a trained sustainability leadership facilitator, encouraging reflection on the role of the Mayor in enabling sustainable development locally.
- It has led to increased engagement and interest by political leadership.
- Mayor Mthembu leads by example: he "walked-the-walk" and completed an eco-audit for his house.

Leadership Mentoring Program

- This program supports the Model City Mayors to understand their leadership potential for sustainability, and seeing tangible increased enthusiasm and involvement as a result.
- This program completes the Mayoral Leadership Showcase

Green Building Guidelines

- A brand new set of green building guidelines has been developed with municipal and local developer involvement.
- The guidelines are to be used by all stakeholders to encourage greener building and spatial development practices.
- The Green Buildings Guidelines for KwaDukuza were approved by the City Council through a Council Resolution in February 2016.

Horizontal Integration of LEDS Framework

- The objectives and actions of the LEDS framework have been integrated into the upcoming City Development Strategy, the 2015-2016 Integrated Development Plan, and Electricity Master Plan.
- This integration ensures low emission development principles are carried through into statutory requirements and reporting in the longer term.

The KwaDukuza Estuary

Municipal staff training and skills development

- Municipal staff have been actively engaged in capacity building opportunities, including international exchanges and study tours in Europe and Indonesia, domestic learning exchanges on green buildings with the City of Tshwane, attendance at the LOCS conferences.
- Municipal staff members have also completed a professional development course on sustainable urban energy in 2013 and 2014, and direct training from ICLEI Africa staff on GHG data collection and analysis.
- This has raised understanding and awareness among a large number of different municipal staff.

Hotbox roll-out to households

- Hotboxes are passive insulated cookers. Their roll-out is aimed at reducing poverty, decreasing energy use and fire risk, and to promote gender empowerment.
- Some hotboxes were distributed to Ward Councilors who act as "train-the-trainers". Train-the-trainer sessions were organized.

Paper recycling system in municipal buildings

- Recognising that leadership starts internally, the municipality has implemented a paper recycling system in a number of municipal buildings – involving a local contractor to remove and recycle collected waste.

Community showcase project

- In the Groutville Community, 20 orphanage homes of the the Stanger Child Welfare Association managed by women were chosen to benefit from small-scale technologies to promote sustainable living,. This includes insultation cookers to reduce energy for cooking, light emitting diode mobile lights and compost containers.
- They also received support to create their own food gardens and the municipality sponsored the planting of trees.
- Solar streetlights will also be installed to increase street illumination levels.
- Solar water heaters will be installed in each home to reduce costs and energy use.

Community members participate in the Community Showcase Project in KwaDukuza

Model City Steve Tshwete Municipality

South Africa

Area: 3986.99 km²

Population: 0.23 million (2011)

City Budget: USD 99,435,212 (2011)

Pop. Annual Growth: 4.8 % (2011)

Vision

To become the best **community-driven local municipality** in the world for the provision of **sustainable services** and **developmental programs**. In 2030, Steve Tshwete will be an **integrated, harmonious** and **green locality**, with an **empowered, prospering community** surrounded by **natural and fresh air**, and enjoying **crystal-clear, safe** and **clean water.**

Commitments

The following aspirational target was recommended for inclusion in the Low Emission Development Position Statement:

- 42% emissions reduction in line with the national peak plateau and decline long-term mitigation scenario (baseline, 2012, target 2030).

The target is aligned with the follwing national government commitments: the Climate Change Response Strategy committed to reduce GHG by 34% by 2020 and 42% by 2025 against BAU, the National Development Plan and the Renewable Energy target (to install 5'395 MW).

Milestones

2013 - 2014: Municipal staff completed a professional development course on sustainable urban energy and direct training on GHG data collection and analysis.

02/2014: The municipality's 2030 vision is designed following a future scenario planning process.

12/2015: The Green Building Guidelines are finalized and sent to the City Council for approval (expected April 2016).

02/2016: The Low Emission Development Position Statement is sent to Council for approval

Strategy

The Steve Tshwete **Low Emission Position Statement** was finalized and sent to the Municipal Council for approval in February 2016.

The priority action sectors are:

- Local Economic Development & Job creation
- Electricity Services
- Municipal & Community Facilities
- Spatial planning & land-use management/human settlements
- Roads and stormwater
- Environmental management/solid waste management
- Water/water & sanitation
- Parks and playing equipment
- Human Resource Management
- Performance management
- Public Participation & communication

"I do not have adequate words to describe how it has been working with ICLEI. We have just unveiled the Doornkop off-grid solar system, and we have seen how the community stands to benefit. If you see the infrastructure that has been installed, if you see the lights on, the refrigerator can be used...you see that this is possible. So I can describe it as a very exciting experience."

Councillor Mike Masina
Executive Mayor of Steve Tshwete Municipality

Energy and emissions

Main economic activity:

- Coal Mining
- Manufacturing

Main priority sectors for Low Emission Development:

- Energy efficiency
- Community egagement
- Integrated planning
- Green building
- Spatial planning

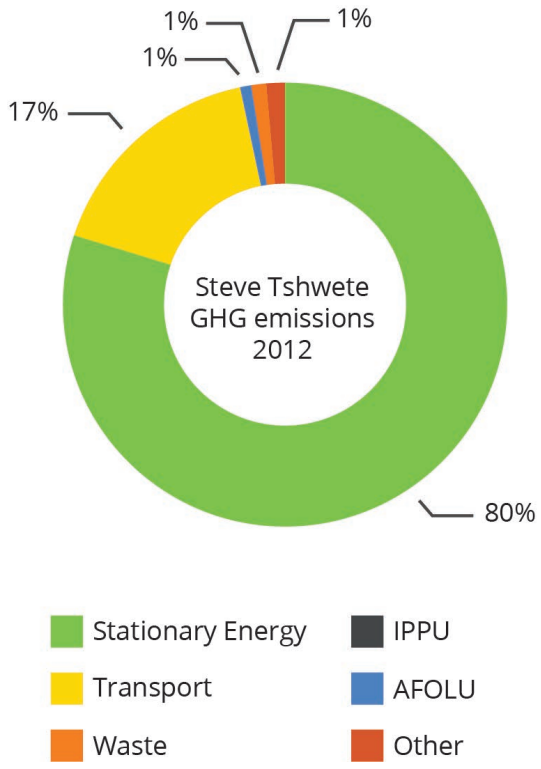
Final energy consumption in the community:

- 19'810'709 GJ (2012)

GHG inventory

GHG emissions from the community:

- 3'773'288 tCO2e (2012)



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Actions enabled in Steve Tshwete Municipality by the Urban-LEDS project

Participatory scenario planning process

- A participatory future scenario planning process was used for to craft the Municipality's 2030 vision and objectives involving municipal staff and stakeholder.
- The outputs are being packaged into the Steve Tshwete 2030 Low Emission Development Position Statement with accompanying flagship actions.

Municipal staff training and skills development

- Municipal staff have been actively engaged in a number of capacity building opportunities, including international exchanges and study tours in Europe and Indonesia, domestic learning exchanges on green buildings with the City of Tshwane, attendance at both Local Climate Solutions Congresses in 2013 and 2015.
- Municipal staff members have also completed a professional development course on sustainable urban energy in both 2013 and 2014, and direct training from ICLEI Africa staff on GHG data collection and analysis.
- This has raised understanding and awareness among a large number of different municipal staff.

Mayoral Leadership Showcase

- Mayor Masina has taken part in the on-going Urban-LEDS Leadership Mentoring Program organized through the project in South Africa
- This involves one-on-one mentorship calls and visits by a trained sustainability leadership facilitator, encouraging reflection on the role of the Mayor in enabling sustainable development locally.
- It has led to increased engagement and interest by political leadership.
- Mayor Masina leads by example: he "walked-the-walk" and completed an eco-audit for his house.

Leadership Mentoring Program

- This program supports the Model City Mayors to understand their leadership potential for sustainability, and seeing tangible increased enthusiasm and involvement as a result.
- Mayor Masina joined the delegation at COP21 in Paris where he actively participated and presented the Urban LEDS project.
- This program completes the Mayoral Leadership Showcase.

Mayor Masina at the Doornkop Community Center

Men install PV panels on the roof of the Doornkop Community Center

Doornkop Community Center Renewable Energy Expo and Community Solar Solution

- As part of the Urban-LEDS Community Showcase in Steve Tshwete, the following infrastructure solutions have been installed at the Doornkop Community Center:
  - 18kWp solar photovoltaic (PV) system
  - 70 watt-peak (Wp) poly crystalline light emitting diodes (LED) solar streetlight
  - Two low-pressure evacuated tube solar water heaters (150 litres)
  - Ceilings were installed in the children day care and old age centres to help to regulate the temperature in buildings and provide some insulation (many buildings in South Africa do not have ceilings)
- Simple solutions were also provided, including:
  - Portable light emitting diode lights
  - Insulation cookers
  - Composting buckets
- This Expo has galvanized significant interest and excitement politically and in the community.
- The Doornkop Community further adopted a LED Strategy to guide its development.

Green Building Guidelines

- A brand new set of Green Building Guidelines has been developed by experts for Steve Tshwete with municipal and local developers involved.
- The guidelines are to be used by all stakeholders to encourage greener building and low emission spatial development practices.
- The Green Building Guidelines were finalized and approved in principle in December 2015. The Municipal Council will formally adopt them in the course of April 2016.

Highlights from the Satellite Cities

Reporting by all Satellite Cities in the carbonn® Climate Registry

Brazil	South Africa	India	Indonesia
Betim	Mogale	Coimbatore	Bontang
Belo Horizonte	Nelson Mandela Bay	Gwalior	Kabupaten Bogor
Curitiba	Saldanha Bay	Nagpur	Tangerang Selatan
Porto Alegre	Sol Plaatje	Panaji	Tarakan
Rio de Janeiro	uMhlathuze	Pimpri-Chinchwad	
Sorocaba		Shimla	

South Africa

While strategy development is critical, it is important to show at community-level the range of solutions available for low emission development. Such "community showcase projects" were developed in each of the South African Satellite Cities. A small budget was available to implement sustainable energy solutions. The technology interventions were implemented in partnership with the local governments.

A library in **uMhlathuze**, a school in **Mogale** and an environmental education centre in **Nelson Mandela Bay Municipality** all received a full lighting retrofit and solar PV panels, which reduced their energy consumption and provides a renewable source of electricity. Solar water heaters were installed on the environmental education centre and school. The environmental education centre also received a rainwater harvesting and grey water system, while the school in Mogale received support to build food gardens, install a solar water pump, a vegetable tunnel and irrigation system.

In total the South African Urban LEDS community showcase projects provided:

- 800 light-emitting diodes lamps
- 33,6 kWh of solar PV panels
- 38 solar street lights
- 24 solar water heaters
- 530 insulation cookers and training
- 40 portable solar lamps with light-emitting diodes
- Over 80 trees planted

With these interventions, the environmental education centre in Nelson Mandela Bay Municipality achieved 50% energy savings, while with the PV and rainwater harvesting systems it can run totally off-grid, with both municipal water and electricity used only as back-up.

The library in uMhlatuzhe achieved a 60% energy saving and is now fully functional during energy outages.

Solar panels and water heaters installed for the Community Showcase Project

India

The city of **Panaji** received direct urban planning technical assistance through Urban-LEDS via ISOCARP expert advice on how to streamline sustainable development and Low Emission Development principles in the city's urban growth strategy. This was formalized in the City Development Plan.

The Urban-LEDS project also provided support for techno-commercial feasibility studies and tender preparation for the city to undertake energy efficiency and infrastructure upgrades in its street lighting facilities and for the municipal vegetable market, including:

- Infrastructure upgrade using smart information communication technologies (ICT) and energy efficient light emitting diode retrofit for 5,600 street lights to potentially reduce energy use by 57%.
- Upgrade of the electricity distribution network and installation of stand alone solar lighting and energy efficient light emitting diode lighting for 75 kW of lighting load at the Panaji Vegetable Market to potentially reduce energy use by 66%.

Brazil

The Urban-LEDS project has supported the implementation of the following actions in the Brazilian Satellite Cities:

- PV panels and other renewable energy solutions were installed on municipal buildings, such as schools and environmental education centers in: **Belo Horizonte, Betim, Porto Alegre** and **Rio de Janeiro,** as a way to leverage more actions and disseminate the importance of climate change policies to the local population.
- Street lights were retrofitted with energy-effifficient light emitting diodes at the Municipal Biodiversity Square in **Sorocaba** and addressing one action of the Climate Action Plan.
- One of the 13 sustainability stations (made from recycled materials) of **Curitiba** was sponsored by Urban-LEDS. These are environmental education centers for the local community to learn about climate change and sustainable practices, such as recycling. The station contributes to the city's effort to enhance positive waste management behaviours, increase waste collection rates and encourage recycling.

> *"The ISOCARP expert has indicated how Low Emission Development planning should be integrated as a cross-cutting perspective in all of our plans. His recommendations are helping to strengthen the City Development Plan."*
>
> Sanjit Rodrigues, Commissioner
> Corporation of the City of Panaji

Municipal vegetable market in Panaji

Botanical garden in Sorocaba © Eugeni Dodonov /CC

Indonesia

From March to August 2015, technical support services were provided to the Indonesian Satellite Cities by a technical expert (refer to the Urban-LEDS **Pool of Experts)**.

Through a series of workshops addressing GHG inventories the cities were presented with initial emissions data. Data gaps were also discussed and addressed. Stakeholders such as local utilities were involved in collecting relevant data.

As a result, community-scale GHG inventories were compiled following GPC guidance in **Bontang, Kabupaten Bogor, Tangerang Selatan** and **Tarakan.**

To consult the profiles of all Satellite Cities including some GHG inventories please visit: www.urban-leds.org

Urban-LEDS European cities in focus

Bologna and Helsinki: ICLEI GreenClimateCities Europe Ambassadors

The GCC Europe Program is based on the global GCC methodology, but was custom-made for the European context. This comprehensive program was developed for local governments in Europe for integrated climate change mitigation and adaptation planning.

As GCC Europe Ambassador Cities, Helsinki and Bologna committed to test the program, provide feedback, and represent GCC Europe in their country and globally. They help facilitate links and provide support to other local governments wishing to use the GCC methodology to create a global community and network of peers.

Warsaw: Building Energy Efficiency and District Energy Systems

Warsaw is leading the way in two areas of energy efficiency: buildings and district energy systems. The City's District Energy System (DES) provides energy to Warsaw's 1'720 km heating network, serves 70% of Warsaw's 1.7 million inhabitants, and covers 78% of the City's heating demand. This is Europe's largest heating network. The DES is energy efficient and also costs 70% less than conventional systems in Poland. The next step for the City is to increase the share of renewable energy in the energy mix.

Copenhagen: Road revitalization for enhanced public transport and bicycle use

The Nørrebrogade road stretches over 2 km from the center of Copenhagen to its suburban periphery. The narrow design of the road places public transport users, cyclists and pedestrians in direct competition with private vehicles which results in regular traffic jams and reduces road safety. To address this, the City launched the Nørrebrogade Project to revitalize this major transportation corridor, increase cycling and public transportation ridership, while reducing private automobile use by 50% in the area. The results of this first phase are inspiring: road transport has reduced by 45% and bicycle ridership has increased by 10%.

Copenhagen by night

Hannover: Klima-Alliance

In order to reduce greenhouse gas emissions by 40% by 2020, Hannover has united with citizens, companies, energy suppliers, and organizations to form the Klima-Alliance. This diverse group of stakeholders have identified various activities and implementation measures at the local level, including renovation, modernization, and construction of energy efficient buildings, and promotion of intelligent energy use and sustainable power generation.

Almada's Low Emission Development Portfolio

Almada's climate portfolio is extensive, and the City created the Low Carbon Climate Fund in 2009 to support further municipal investment in energy efficiency. Since being established, the Fund has financed numerous projects including a tele-management system for public lighting, solar water heaters in public sports facilities, LED traffic lights and efficient lighting in municipal buildings and public space, electric vehicles for the municipal fleet, energy certifications for municipal buildings, and the utilization of biomass from parks for heat production.

Zagreb: ZagEE energy initiative

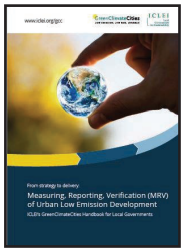
As part of a comprehensive range of projects led by the City of Zagreb, the innovative ZagEE initiative was developed to realize energy savings for public buildings and the street lighting system, through economically viable and energy-efficient technologies and measures. This ambitious project has demonstrated that energy-efficient public buildings can be replicated elsewhere to achieve significant energy and financial savings while catalyzing economic development and commercial opportunities.

Gaziantep: implementing energy and transportation solutions

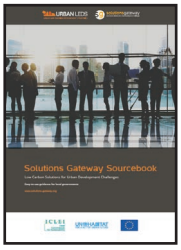
With a population of 1.7 million people, Gaziantep is one of the largest urban clusters in Europe. Since developing a Climate Action Plan in 2010, Gaziantep has focused on decreasing emissions by insulating houses across the city and increasing access to public transport. The pre-existing train and tram infrastructure is of increasing importance to local commuters, while the purchase of 50 municipal buses and plans for a cycle highway will increase low-impact urban mobility in the city center.

Bikers in Bologna

Additional resources

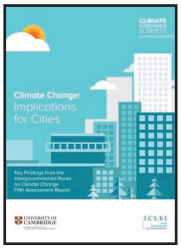


From strategy to delivery: Measuring, Reporting, Verification (MRV) of Urban Low Emission Development program (ICLEI, 2016)
This GreenClimateCities® handbook for local governments offers step-by-step support for defining and adopting a Low Emission Development Strategy. It also offers an MRV process (Measuring, Reporting, and Verifying) to track progress.
http://www.iclei.org/gcc_guidebook.pdf

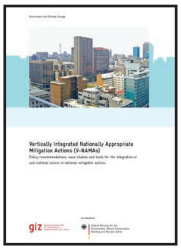


Solutions Gateway Sourcebook: Easy to use guidance for local governments (ICLEI, 2016)
This guidance includes policy recommendations, case studies and tools tools aimed at strengthening the involvement of sub-national governments in national mitigation strategies and actions.
http://www.iclei.org/solutions_gateway_sourcebook.pdf

Case Studies
To browse the complete series of Urban-LEDS Case Studies, please visit:
www.iclei.org/casestudies/urban-leds



Climate change: Implications for Cities (ICLEI, University of Cambridge, 2014)
This document synthesizes the most pertinent findings for cities from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report.
www.iclei.org/ipcc_ar5_summary_cities.pdf



Vertically Integrated Nationally Appropriate Mitigation Actions (V-NAMAs) (GIZ, Ecofys, ICLEI, 2014)
This guidance includes policy recommendations, case studies and tools tools aimed at strengthening the involvement of sub-national governments in national mitigation strategies and actions.
www.iclei.org/vnama_guidance.pdf

Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (WRI, C40, ICLEI, 2014)
The Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) provides a robust framework for accounting and reporting city-wide greenhouse gas emissions (including all 7 Kyoto Protocol gases).
http://ghgprotocol.org/files/ghgp/GHGP_GPC.pdf

Project in Brief

- **Title:** Promoting Low Emission Urban Development Strategies in Emerging Economy Countries (Urban-LEDS)
- **Objective:** To enhance the transition to low emission urban development in emerging economy countries
- **Duration:** 01 March 2012 – 31 March 2016 (48 months)
- **Total Budget:** 6'700'000 € / Funding mechanism: European Union (EuropeAid/DCI-ENV/2011/269-952)
- **Implementing partners:** UN-Habitat and ICLEI
- **Keywords:** local climate action; greenhouse gas accounting; low emission development; MRV process (Measurable, Reportable, Verifiable); stakeholder involvement; vertically integrated NAMAs (Nationally Appropriate Mitigation Actions); Local Government Climate Roadmap.

In each country, two Model Cities were assisted in formulating and adopting their Low Emission Development Strategies, and shared their experiences with Satellite Cities, which observed, learned and shared their own experiences. Experienced European Cities supported the process, sharing their own experiences and know-how.

Implementing partners

UN-Habitat: The United Nations Human Settlements Programme (UN-Habitat) is the United Nations' agency for sustainable urban development. Through its World Urban Campaign, normative activities and technical support, it promotes the development of more compact, better integrated and connected cities that foster equitable, sustainable and low-emissions urban development, and that are resilient to climate change.

Contact: urban-leds(at)unhabitat.org

ICLEI – Local Governments for Sustainability (ICLEI): Established in 1990, ICLEI is the world's leading network of over 1,000 cities, towns and metropolises in 88 countries, committed to building a sustainable future. By helping its Members to make their cities sustainable, low-carbon, resilient, biodiverse, resource-efficient, healthy and happy, with a green economy and smart infrastructure, it impacts over 20% of the global urban population.

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Funder

The **European Union** is funding the Urban-LEDS project. In 2011 the European Union (EU) has outlined its Agenda for Change, guiding its development and cooperation activities. This supports actions that address poverty reduction and good governance, as well as inclusive and sustainable growth. All these issues are directly related to tackling climate change and transitioning towards sustainable energy. The Urban-LEDS project illustrates how the EU supports urban low emission development as an effective approach that brings together key stakeholders, working together under the leadership of local governments, to explore a better future for all.

The Urban-LEDS project is funded by the European Union. The views expressed in this publication can in no way be taken to reflect the official opinion of the European Union.

Credits:

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Urban-LEDS: Cities in Action, 2012-2016 Final Report

Low Emission Development in Brazil, India, Indonesia and South Africa

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