Photo: NASA. Global view of Earth at night, compiled from over 400 satellite images.

Global Cities Covenant on Climate | SECOND ANNUAL REPORT 2012

GLOBAL CITIES COVENANT ON CLIMATE
THE MEXICO CITY • PACT

SECOND ANNUAL REPORT 2012

The Fundación Pensar, PlaneTa, Política, Persona

is a non-profit organization, dedicated to promote two main activities: on one hand, it has a diplomatic role aimed at creating local and global linkages with international organizations, governments, representatives of civil society and business leaders in order to promote sustainable and equitable societies; on the other hand, the Foundation is a space for intellectual innovation that explores the links between different knowledge areas such as: the environment, economics, psychoanalysis, sociology, psychiatry, politics, art, neuroscience, and culture in general.

The Fundación Pensar is headquartered in Mexico City, and also operates a European chapter from its London offices. It is an international institution given its geographical scope and the nature of the projects it develops. It is governed by a Board which involves members from different professional disciplines who take over strategic areas of the Foundation. Most board members have over 20 years of professional experience in each of their areas of expertise.

In 2010, the Foundation organized the World Mayors Summit on Climate where the Global Cities Covenant on Climate or “Mexico City Pact” (PCM) was signed by mayors from five continents. The institution currently serves as the international Secretariat of the Covenant, performing actions to increase the number of cities in the fight against climate change, promoting linkages amongst them, and publishing, both digitally and in printed version, an annual report in Spanish and English of the climate actions performed by the signatories of the Pact.

In this document we present the Second Report of the Global Cities Covenant on Climate, “Mexico City Pact”.
GLOBAL CITIES COVENANT ON CLIMATE

THE MEXICO CITY • PACT

Compiled, edited and published by The International Secretariat

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# Introduction

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| Christiana Figueres | Executive Secretary  
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| Rajendra K. Pachauri, President | Intergovernmental Panel on Climate Change (IPCC) and General Director of The Energy and Resources Institute (TERI) |
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| James Nxumalo, Vicepresident | ICLEI-Local Governments for Sustainability |
| Arab Hoballah, Chief | Sustainable Consumption and Production (UNEP) |
| Martha Delgado Peralta | General Director  
Global Cities Covenant on Climate  
Fundación PENSAR, Planeta, Política, Persona |

The original texts used for the creation of this report were summarized and adapted according to the report's editorial guidelines, based on information provided by cities and local authorities.

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  - Rosario
  - Santa Fe de la Vera Cruz

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  - Melbourne
  - Subiaco

- **Austria**
  - Graz

- **Belgium**
  - Brussels

- **Belize**
  - Belmopan

- **Bhutan**
  - Thimphu

- **Bolivia**
  - La Paz

- **Brazil**
  - Belem
  - Contagem
  - Curitiba
  - Diamante
  - Porto Alegre
  - Rio de Janeiro
  - Sao Carlos
  - Sao Paulo

- **Canada**
  - Delta
  - Edmonton
  - Metro Vancouver
  - North Vancouver
  - Surrey

- **Chile**
  - Lautaro
  - Quillai
  - Santiago
  - Santiago Metropolitan Region

- **Chinese Taipei**
  - Kaohsiung
  - Taipei

- **Colombia**
  - Bogota

- **Costa Rica**
  - San Jose
  - San Rafael De Heredia

- **Croatia**
  - Kopriwinica

- **Denmark**
  - Copenhagen

- **Ecuador**
  - Cuenca
  - Pichincha
  - Quito

- **El Salvador**
  - San Salvador
  - Santa Ana

- **France**
  - Brest Metropole
  - Grenoble
  - Mellac
  - Nantes Metropole
  - Orleans
  - Paris
  - Plaine Commune

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  - Dettingen
  - Freiburg

- **Guatemala**
  - Guatemala

- **India**
  - Nagpur

- **Japan**
  - Kyoto
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- Global Cities Covenant on Climate Signatory City/Local Governments Home Nations
- Photo and Picture Index
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INTRODUCTION

The Fundación PENSAR, Planeta, Política, Persona, which serves as the Global Cities’ Covenant on Climate (GCCC) International Secretariat, is pleased to present its 2012 report on Mexico City Pact signatory cities’ documented mitigation and adaptation actions in the fight against climate change. It is the second report that the Foundation has published—the first was released in 2011—in compliance with one of its numerous responsibilities as International Secretariat: specifically, informing the global community about cities’ climate-related advances.

This publication is possible thanks to a commitment on the part of mayors and their cities to inform the Fundación PENSAR about climate-change-related activities they have undertaken. In the present report we have added two factual considerations: one, the total financial outlay that cities have dedicated to their climate-change agendas; and two, mention is made of the commercial, international and civil-society organizations that have collaborated on public policy designed to reduce carbon emissions. When cities’ provided financial information in local currencies rather than in dollars, we used exchange rates as of 30 November 2012—the report’s closing date—to make the required currency conversions.

We additionally used the abovementioned date as a reference for publishing photos of mayors who were in office at that time. The city reports feature the mayor’s name and photo and include population, territorial extension, city seals and illustrative photographs of the documented mitigation and adaptation actions. Furthermore, we also include a technical appendix prepared by carbonn Cities Climate Registry which, based on information from its own participating cities, calculated signatory cities’ 2012 carbon-dioxide equivalent mitigation in metric tons. The carbonn logo appears as part of the information that corresponds to each city, in cases where the city reported its respective carbon reductions.

A measure of the GCCC’s success and reach has been the number of cities that reported actions as well as increased participatory membership. This second publication, compared with the first report, doubles the number of cities that documented their actions with the Covenant Secretariat, for a current total of 104 cities in forty countries on five continents world-
wide. The total number of signatories has increased more than 100%, from the 138 mayors who signed the GCCC in 2010 to the 286 cities whose mayors are committed to the Covenant today.

With regard to editorial considerations, it should be stressed that all information contained in this report was provided by signatory cities. Received information is edited for considerations of style and extension, but faithfully respects basic reported data. The report is published in English as well as Spanish, in both print and digital formats.

For all of the above, we wish to reiterate our thanks to cities, mayors and pertinent authorities involved for their compliance with Pact guidelines; for the energy they bring to bear on the execution of effective climate-related actions; for their commitment to reporting on actions; and as such, for making those actions transparent and universally known. Similarly, we expand our thanks to include the corporate, international and civil-society organizations that have supported cities in these efforts to resolve one of the twenty-first century’s greatest challenges, climate change. As well we wish to thank the foundation’s partners for their support of the present initiative: ICLEI – Local Governments for Sustainability, the World Mayors’ Council on Climate Change, UCLG – United Cities and Local Governments, Metrópolis and the Club of Madrid. Their networks have helped expand the signatory cities roster as well as publicize their achievements in their fight against global warming.

Finally we are grateful for support from global institutions and personalities that have both accompanied and advised us in this initiative’s formation process, including: Christiana Figueres, Executive Secretary of the UN Framework Convention on Climate Change; Rajendra Pachauri, Nobel Peace Prize 1995 and President of the Intergovernmental Panel on Climate Change; Mario Molina, Nobel Chemistry Prize 1995; Marcelo Ebrard, Chair of the Global Network for Safer Cities of UN Habitat; James Nuxmalr Mayor of Durban and ICLEI’s Vicepresident; and Arab Hoballah of the UN Program for the Environment.
Little more than two years out from the signing of the Global Cities Covenant on Climate (also known as the Mexico City Pact) this global climate accord has positioned itself as a strategic climate-related instrument for local governments acting in the international arena. By means of voluntary actions, Mexico City Pact (MCP) signatory cities have deployed a large variety of public policies that manifest themselves in relevant greenhouse-gas-mitigation and community climate-change-adaptation actions and investments. MCP signatory cities have demonstrated political leadership fighting global warming within a context where international negotiations for taking on greenhouse-gas-emissions commitments are immersed in a complex environment that has impeded more definitive advancements. Alongside other city-based climate-related instruments, the example of the GCCC has begun to set the pace for national governments and spearheads initiatives in which cities attest to the fact that energy efficiency, green economies and political will for climate-related action are indeed possible.

The 2012 Global Cities Covenant on Climate Second-Annual Report, edited and published by the Fundación PENSAR, Planeta, Política, Persona in its capacity as the Pact’s International Secretariat, documents a vast array of projects and initiatives that signatory cities have undertaken—in quite innovative ways—to change development

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1 With the colaboration of Ana Romero Salcedo.

2 Such as the EU Covenant of Mayors; the US Mayors Climate Protection Agreement; or the Durban Adaptation Charter for Local Governments
paradigms in favor of low-carbon, climate resilient models for urban efficiency. As such, cities’ mitigation and adaptation strategies reflect a wide variety of ideas, processes and opportunities, developed on the local level, that seek to meet emissions-reduction and adaptation goals.

As of this writing, the Mexico City Pact includes 286 signatory cities in 60 nations from every corner of the planet, representing some 270 million inhabitants.

<table>
<thead>
<tr>
<th>Continents</th>
<th>Signatory Cities</th>
<th>%</th>
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<tr>
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<td>Europa</td>
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<td>6</td>
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<td><strong>Total</strong></td>
<td><strong>286</strong></td>
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In this 2012 Second-Annual Report, 104 signatory cities in forty nations reported on their advances, more than double the number of cities that submitted information for the 2011 First-Annual Report. The cities documented in the present report represent a population of nearly 180 million individuals (177,975,246) who live on five continents:

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<td>5.77</td>
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<td>Asia</td>
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<tr>
<td>Europa</td>
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<td>4.85</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>104</strong></td>
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</table>

These cities have documented a wide range of climate-change mitigation as well as other, separate, adaptation actions; but they have also documented hybrid policies that mitigate greenhouse gas emissions at the same time they present a potential for climate-change adaptation, and thus when implemented imply readily apparent co-benefits.³

Using the Intergovernmental Panel on Climate Change (IPCC)’s⁴ Fourth Report as a reference, fourteen categories have been devised to allow for an identification of different policies that cities are currently developing:

1. Energy
2. Transportation and Mobility
3. Water
4. Carbon Finance
5. Soil use/Zoning

³ For the GCCC International Secretariat, the term co-benefits is defined as “benefits accorded the local-level environment via the implementation of city-based adaptation and mitigation actions designed to confront climate change,” using terminology defined by the Intergovernmental Panel on Climate Change, Working Group III: Mitigation, Technical Summary, 7.2.1 Co-Benefits and Costs and Ancillary Benefits and Costs. <http://www.ipcc.ch/ipccreports/tar/wg3/index.php?idp=33>

6. Urban development
7. Public policy
8. Biodiversity
9. Air Quality and Greenhouse Gas Emissions
10. Wastes
11. Education
12. Health
13. Studies, Plans and Inventories
14. Agriculture

Signatory cities reported a total of 542 climate-related policies of which 327 relate to mitigation and 215 to adaptation. It should be noted that the three main categories into which city-developed policies fall are Energy (119), Studies, Plans and Inventories (78) and Water (63).

The GCCC clearly affirms that numerous world cities are developing ambitious actions to combat climate change. In contrast to voices that continue to question the phenomenon’s anthropogenic nature, or a lack of political will on the part of world nations whose greenhouse gas emissions are greatest, the world’s cities have taken on an enormous responsibility by recognizing their own role and by putting technical, human and financial resources into play in order to help resolve climate related issues.

Two elements from the present Report’s introduction are to be highlighted: city financing as well as acknowledgement of commercial, international and civil-society organizations’ participation in the development of climate-related actions. Starting from its inception as it organized the World Mayors Summit on Climate in Mexico City in November 2010, the Fundación PENSAR has understood the GCCC as a multilateral...
climate-change-related effort in which mayors, the private sector, international organisms and civil society organizations participate. As of the present time we are able to announce that as the GCCC’s International Secretariat, the Fundación PENSAR is undertaking efforts to include private enterprise as a fundamental agent for combating climate change.

The Pact benefits from attributes that make it a rich and inspiring mechanism:

• Cities that vary widely in terms of governed population participate in the MCP. Small communities and megacities alike have learned that other cities’ successful undertakings can be replicated in their own territories.

• Cities that vary widely in terms of biodiversity, geographical situation, climate and atmospheric conditions participate in the MCP. As such, their reported portfolio of actions and policies reflect a range of different realities that help us understand the complexity of both problems and solutions.

• Every city advances at its own pace, but progress toward goal compliance is required for Pact participation. As such, rather than pressing communities to comply with goals as might be applied to every city, each city establishes its own objectives and is required to make yearly advancements in its individual climate-related agenda.

• Cities report their emissions reductions and related activities to the carbonn Cities Climate Registry, which will in turn compile all cities’ information to build an MRV (i.e., “measurable, reportable and verifiable”) database in the near future.

The 2012 Second-Annual Global Cities Covenant on Climate Report is an exchange medium for actions between cities, a transparency mechanism for compliance with commitments cities take on when they ratify the Pact, and, naturally, is a recognition of local authorities’ efforts and achievements. It is also a testament to the viability of successful-climate-change-projects that lends support to other official entities currently deciding how to implement policy or investment-strategy changes. At the same time it represents a clear example of a new international diplomacy undertaken not only among nation states, but as well among other governments that dialogue, exchange, support one another and offer feedback that transcends the borders of our globalized world.
“Since its entry into force in 2010, the Mexico City Pact has been playing a key role in scaling-up local climate action and engaging cities in the global climate regime. ICLEI is proud to support the Mexico City Pact so that measurable, reportable and verifiable local climate actions can enable us to advance sustainability of our cities and help to raise the global level of ambition on climate action.”

The local climate actions reported by cities in this Second Annual Report of the Mexico City Pact are indeed an expression of a successful synergy between the Mexico City Pact (MCP) and the Carbonn Cities Climate Registry’s (cCCR) to report yearly on concrete climate actions made.

As a co-founding partner of the Mexico City Pact, ICLEI – Local Governments
for Sustainability commends all Mexico City Pact Signatories with their impressive achievements as notified in this report, prepared under the excellent leadership of Fundacion Pensar, Mexico City.

Since 2010, ICLEI has supported the promotion and signing of the Global Cities Covenant on Climate, the 'Mexico City Pact', and has worked towards ensuring that the Mexico City Pact is recognized as an important local tool for commitment to local climate action by global agencies such as the UNFCCC, UN-Habitat and UNISDR. We have been very pleased to share the progress made by the signatories of the Mexico City Pact with the global climate community, also during the 2012 UNFCCC negotiations or with UN Secretary General Ban Ki Moon at ICLEI’s Global Town Hall at the occasion of the Rio+20 Conference.

By now, the Mexico City Pact signatories and the ICLEI Membership share a strategic relationship, in as far that over 70% of signatories of the Pact are ICLEI Members and that Martha Delgado, General Director of the Mexico City Pact, is also ICLEI’s First Vice President. For example, the ICLEI World Congress 2012 allowed the signing of 20 new signatories, including large cities such as Seoul. Also in the future, we are strongly committed to continue encouraging our Members and other cities to sign up to the Mexico City Pact.

Furthermore, ICLEI views climate reporting as an important means to move towards a “Low Carbon Agenda” and “Resilient City Agenda” for cities. The linkage between the Mexico City Pact and the Carbonn Cities Climate Registry’s (cCCR) is therefore a welcoming mutual benefit. Indeed, the Mexico City Pact acts as a key driver for commitment and concrete achievements whilst the cCCR provides a consistent international process for climate reporting on such achievements.

In conclusion, the Mexico City Pact and ICLEI share a number of mutual goals – most importantly to assist cities in becoming low carbon. In this regard, we look forward to further strengthening our joint work with the Mexico City Pact signatories.
World Mayors Summit on Climate, held in Mexico City on 21 November 2010, upon the invitation of Mayor Ebrard in his capacity as Mayor of Mexico City and Chair of World Mayors Council on Climate Change, is recognized as an excellent demonstration on the value of the synergy between an ambitious local political leader and the support of global networks of local governments.

The Global Cities Covenant on Climate – the Mexico City Pact, as the key outcome of the summit, is of historical importance pursuant to 3 main merits; the goal for a global acceleration of local efforts based on past achievements, the vision to ensure transparency and accountability through continuous reporting and creation of a permanent secretariat and partnership to support the progress.

2012 Annual Report of the Mexico City Pact, presents an impressive compilation of the progress and achievements of signatory cities and Mayors worldwide.

At a time when the global climate community is suffering from inaction and lack of political leadership for ambitious climate action, signatories of the Mexico City Pact demonstrate the power of local political leaders and their administrations to shift human societies into a low-carbon and climate-resilient pathway through opportunities laid out by sustainable urban development policies and practices.

In my capacity as the Chair of World Mayors Council on Climate Change since 2012, I would like to hail both my predecessor, Mayor Marcelo Ebrard, for his important leadership, as well as all Mayors and staff of signatory cities for fulfilling their commitments under the Mexico City Pact.

I am particularly happy to observe the increase in the number of members of the World Mayors Council on Climate Change as becoming signatory to the Mexico City Pact. Similarly, I also would like to address the syn-
nergy that enhances the effectiveness of the WMCCC as a result of its active engagement and support to the Mexico City Partnership with other global partners.

Based on the analysis on the value of the importance of this global partnership in the first couple of months of my leadership in the Mayor’s Office after my election in 2011, I signed the enrollment form of Seoul Metropolitan Government to become a signatory to the Mexico City Pact during the ICLEI World Congress in Belo Horizonte in June 2012.

Becoming a signatory to the Mexico City Pact creates a perfect synergy and ensures a global recognition and dissemination of the vision of Seoul Metropolitan Government to create a more sustainable Seoul in close collaboration with its citizens. 2012 Annual Report captures details of Seoul’s goal to achieve “One Less Nuclear Power Plant” that ensures an energy transition in a greener economy through energy savings and renewable energy investments that will reduce 7.3 million tCO₂e of GHG emissions, save US$1,8 million and create 40,000 new jobs by 2014.

In terms of further action, I am happy to inform that City of Nantes, the 2013 Green Capital of Europe, led by Councilor Ronan as the fellow member of the World Mayors Council on Climate Change will host 2013 World Mayors Summit on Climate on 27-28 September 2013. This Summit will enable us to revisit our achievements and strategy since Mexico City Summit in 2010, with a view to provide a positive input to United Nations Warsaw Climate Conference on the way to a new global climate regime by 2015 where cities and local governments are more actively engaged and resourced.

In my capacity as the Chair, I am happy to announce the continuation of the contribution of World Mayors Council on Climate Change in the Mexico City Pact Partnership to ensure collective leadership of local governments in achieving sustainability at the global level.

In my capacity as the Chair of World Mayors Council on Climate Change, I am happy to continue to leverage the spirit and mission of the Mexico City Pact. The adoption of the 2012 Seoul Declaration of Local Governments on Energy and Climate Mitigation on 19 October 2012 is an important step in this regard. I personally believe, the 2012 Seoul Declaration is an excellent tool to fulfill in particular, Articles 1., 2., 9. and 10. of the Mexico City Pact. Thus, I am happy to announce the commitment of Seoul Metropolitan Government to reduce fossil and nuclear energy consumption in municipal operations by 30% in 2020 compared to 2010, as a supplement to Seoul’s “One Less Nuclear Power Plant” campaign.
“A new development agenda will imply acknowledging that the development model as we have known it, with the same levels of consumption and the same use of resources might no longer be sustainable. It will be our collective responsibility to promote behavioral changes contributing to a new understanding of the use of resources and the preservation of our common goods. This is the reason Istanbul has signed the Mexico City Pact”

Kadir Topbas
Mayor of Istanbul and Chair of UCLG – United Cities and Local Governments

The international municipal movement is celebrating its 100 anniversary in 2013 and few things have become clearer or most broadly accepted, than the notion that cities are resilient and have a great transformative nature.

Many of our global challenges will be won or lost in cities, conceiving them as a complex systems linked among them and going beyond the urban area. In this trend
the sustainability of our planet is closely intertwined with using the full potential of local and regional authorities and calling them to commit to contribute to global targets through concrete local actions.

The Mexico City Pact is a clear example of this kind of commitment and allows us to monitor challenges and achievements.

Mayors, Presidents of Regions and their associations are tirelessly advocating for the international community and national governments to seriously address the challenges of climate change and develop an international framework that will provide the tools to protect the citizens they serve.

Active participation in the Mexico City Pact is not only an important international advocacy tool that enables us to show the efficiency of local authorities but a practical instrument to monitor progress of our policies.

Looking for new ways to reduce CO₂ emissions is both beneficial for cheaper more sustainable cities, and allows us to create synergies between local actors. It can help us raise awareness within the communities and foster collective thinking about renewed more egalitarian and resilient societies that build on all the aspects of sustainability: social, cultural, environmental and economic.

We are privileged to live in a world were technological tools allow us to share and process data in ways never imaginable before. It is now up to the political will and vision to utilise this knowledge in a meaningful way for humanity.

Thanking those that are already active as can be seen in this report, we call on the international community to support the implementation of the Mexico City Pact and our members to sign up and transform ideas into action.
At the end of 2010, the Club of Madrid, represented by our Member Cassam Uteem (President of Mauritius, 1992-2002), supported the launch of the Global Cities Covenant on Climate Change – the Mexico City Pact and the carbonn Cities Climate Registry.

Now, more than two years after, we are pleased to see that cities around the world continue their work in the fight against climate change and towards sustainable cities through this important initiative.

Today, we very much welcome the launch of the Second Annual Report of the Global Cities Covenant on Climate Change based on the compilation of data through the carbonn Cities Climate Registry, which clearly states the important role of the local level in the global fight against climate change. This series of annual reports clearly show how local climate action is making a difference in global mitigation and adaptation actions through this initiative lead by Mexico City, ICLEI – Local Governments for Sustainability and United Cities and Local Governments (UCLG).

Cities and local governments around the world, through voluntary actions are leading by example, and through signing...
the Mexico City Pact are putting in place ambitious climate actions as well as reporting its results in mitigation and adaptation, also facilitating exchange of best practices in the field and the analysis of where low hanging fruits lie. All of these efforts are helping cities to move forward in their pursuit of a more sustainable city, which at the end will attract more investment and build also the case for direct international finance cooperation for cities.

This initiative is essential because the real climate mitigation and adaptation potential in the world lies in cities, is at the local level where the real implementation takes place. The sum of these actions at the city level, from all the cities in a particular country supports enormously the achievement of the national climate commitments. In conclusion, focusing at the city level is a key entry point to combat climate change.

The potential of cities to reduce greenhouse gas emissions is enormous. It has been estimated that approximately two thirds of the set of policies available to a country to reduce emissions are actually implemented at the city level. Local authorities have a great opportunity to influence energy management both directly and indirectly, through decisions taken in their daily processes of public services and policies such as transport, sanitation, or water. In addition, local authorities have a comparative advantage when combating climate change. They are much closer to citizens and are usually better prepared to implement and adapt national and international guidelines and regulations to local realities, provided they have adequate funding and competencies for doing so.

The Club of Madrid is proud to support cities in this process. Cities have not been waiting for a comprehensive and global climate deal to emerge or for ‘instructions’ from national governments to act. Local authorities have already acted on climate change as the present report clearly shows; nevertheless, to continue with this fight in an effective way, local climate action deserves full recognition.

Both, the effective potential of cities to reduce emissions and their proximity to local realities support the rationale for engaging cities in the fight to climate
“Metropolis’ commitment to the Mexico City Pact reflects the will of the leaders of major metropoles to take action on a daily basis to reduce the environmental impact of urban development. They achieve this by continuously innovating in order to address the challenges of climate change. The members of Metropolis act with pragmatism and determination to ensure they offer the citizens under their responsibility a healthy living environment that meets their daily needs.”

Jean Paul Huchon
President of the Regional Council of Île-de-France and President of Metropolis - World Association of the Major Metropolises

At a time when the international community – under the guidance of the UN – is considering how to reshape the MDGs post-2015, local governments have an unwavering commitment to the fight against poverty and to climate change adaptation. The Mexico City Pact, of which Metropolis is a signatory, is a clear testimony of the efforts made by local leaders to develop our cities in the context of truly sustainable development.

The members of Metropolis are among the most active in this movement for a new urbanisation, consistent with reducing polluting emissions, committed to...
recycling effluents and waste and supporting a green, more environmentally friendly economy.

Rio+20 highlighted the contradictions carried by governments and the failure of the Doha Conference confirmed their incapacity to combat climate change.

However, local authorities, which work in close contact with territories on a daily basis, demonstrate that they know how to anticipate the many challenges posed by climate change.

By implementing local “climate” plans, cities adapt their mobility policies, upgrade their vehicle fleets, scale up soft modes of transport – pedestrian areas, cycle lanes – and transform the development of their territory. They show that solutions do exist. Many of them implement “energy” plans, combined with financial incentive mechanisms for both businesses and residents, to promote the refurbishment of old buildings to make them more energy-efficient and better adapted to climate conditions, and to ensure that new constructions are positive-energy buildings.

The activities of local authorities are important and it is essential to disseminate their expertise in order to stimulate new commitments from cities to support sustainable development. Indeed, the world of tomorrow will be urban and over 70% of the world’s population will be urban dwellers by 2050. Yet today, cities generate 80% of CO₂ emissions and consume almost 75% of global energy. The playing field is therefore at the local level and local authorities are responsible for action.

This may go without saying in rich countries and seem perfectly normal, but in poor countries, it is obviously essential to fully exploit solidarity. It is necessary to bring in financing from official development aid. This is the role of governments. But it is also necessary to transfer technology and provide technical training for the largest possible number of employees. This is the role of local authorities in the framework of decentralised cooperation. Metropolis fully plays its role by providing customised training via its International Training Institute in Seoul and its offices in Paris, Mexico City, Cairo and Mashhad. Furthermore, Metropolis’ initiatives give cities opportunities to develop concrete projects in cooperation with the partners of Metropolis: other city networks, companies and universities, meaning experiences are shared and benefit all.

It is with partnerships such as the Mexico City Pact that local authorities’ action to support sustainable development takes on all its meaning and paves the way for a promising future.
The city is a concept that is fundamental to the human experience. Throughout history, cities have provided distinct benefits to our society as intentional constructs that promote social interaction, wellbeing, commerce and growth. Increasing numbers of people are attracted to the space of opportunity that cities create and over the coming decades, more and more people will move to urban settlements. UN-HABITAT projects that by 2030; around 60 per cent of the world’s population will live in urban areas, the majority of them in developing countries, and this growth in urban population will occur in the context of the global fight against climate change.

There is no doubt that addressing climate change is the greatest challenge that humanity has ever faced. It is also one of our greatest opportunities, in particular in urban areas. Cities are simultaneously at the vanguard of climate risk and at the forefront of opportunities that arise from climate response.

Taking advantage of these opportunities hinges on the development of a new model of low-carbon growth that provides city dwellers with a sustainable growth practices that endure for generations. The provision of sufficient food, safe water, clean energy and transportation, as well as sound waste management are paramount to any city and can only be guaranteed in the long term if they are designed and implemented without depleting natural resources. When cities transition to low-carbon and climate-resilient development, a new model of competitiveness emerges. This new model is sensitive to the political,
geographic and economic identity of each distinct urban area. Policies and practices that address climate impacts construct a network of adaptation and mitigation that spreads resiliency across the globe.

City-level response represents the essential fundamental transformation of our way of life that is needed to successfully overcome climate change. This transformation has the power to reverberate upward, with national and global policy response built on an evolution in municipal planning, building and management, an evolution that is created and supported by citizens.

Creating a city-level response requires as many tools as possible. A wide variety of tools give city-level policymakers more options as they seek to exercise strong leadership on the problem of how to manage a metropolis in a way that simultaneously responds to the climate threat, stimulates local growth and provides flexibility that meets the needs of the community, while integrating into the larger context of national and international systems.

Perhaps the best tool we have is our ability to share knowledge, learning from each other’s experience and implementing policy with a proven track record in other cities with similar identities. This is why the Global Cities Covenant on Climate is crucial to the climate challenge. The more than 280 cities that have signed on to the Mexico City Pact can share their experiences with other cities looking to effectively address climate change. This growing network, which has added 148 cities in two years, can share policies, programs and studies that build resilience, decrease greenhouse gas emissions, and increase sustainable development and clean energy use.

The human experience is undergoing a complete transformation as technology advances and global development accelerates. It is up to citizens of the world to determine the course of this transformation, and forward thinking cities are proactively creating change instead of reacting to climate change.

I challenge cities in the Global Cities Covenant on Climate to strengthen the network through action that determines your future. And, I challenge cities outside the Pact to broaden the network, join the action, enter the dialogue and define your future.

Broadening and strengthening a city-level network of climate change resilience across the globe is the best way to ensure cities will continue to exist and thrive as they have throughout human history. It is the best way to ensure social progress, sustainable commerce and growth continue unabated. As the earliest settlers banded together to protect each other from threat, so must we band together and protect each other from the emerging threat of climate change.
“The Second Annual Report of the Global Cities Covenant on Climate (Mexico City Pact) is extremely valuable. It not only carries the views and experiences of leaders from across the globe, but is a source of encouragement for those who feel motivated to take action at the level of cities to deal with the challenge of climate change. It is becoming increasingly obvious that towns and cities have a major role in dealing with climate change on the basis of scientific knowledge provided by the Intergovernmental Panel on Climate Change (IPCC)”

The Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC) very clearly stated that warming of the climate system is unequivocal. It also amplified that most of the warming that has taken place since the middle of the last century was very likely on account of increase in the anthropogenic concentration of greenhouse gases. The term ‘very likely’ conveys a probability of over 90 percent. Hence, it is clear that human actions in increasing the concentration of greenhouse gases are overwhelmingly responsible in accounting for climate change which has taken place since the middle of the last century.

In fact, depending on specific conditions in different parts of the world, cities are directly or indirectly responsible for a very large share of greenhouse gas emissions. It is, therefore, important that those responsible for decisions in towns and cities take steps by which emissions can be reduced adequately and early. In the case of adaptation there is a much stronger rationale for cities to take the lead, because while mitigation is essentially a global challenge, adaptation would have to be tailored to specific realities at the local level. This is based on the extent of exposure and vulnerability in different cities and a range of economic, social, geographic, demographic, cultural, institutional, governance and environmental factors. Individuals and communities are differentially exposed and vulnerable based on inequalities linked with levels of wealth and education, dis-
ability and health status as well as gender, age, class and other social and cultural characteristics.

One reason why early adaptation measures are required is on account of extreme events linked with climate change. It is very likely that the length, frequency and/or intensity of warm spells or heat waves will increase over most land areas. Based on some specific scenarios of future emissions a 1-in-20 year hottest day would likely to become a 1-in-2 year event by the end of the 21st century in most regions, except in the high latitudes of the northern hemisphere where it is likely to become a 1-in-5 year event. This poses a major challenge for towns and cities, because some sections of society would be particularly vulnerable to these hottest days and heat waves, which would require local adaptation measures, so that morbidity and mortality can be prevented. The leadership of cities would need to devise measures and possibly invest in infrastructure by which the exposure of vulnerable sections of society can be minimized or prevented. Another change that would require local responses would be on account of an increase in the frequency of heavy precipitation. It is projected that the proportion of total rainfall from heavy falls will increase in the 21st century over many areas of the globe. This is particularly the case in the high latitudes and tropical regions, and in winter in the northern mid-latitudes. Heavy rainfalls associated with tropical cyclones are likely to increase with continued warming. Effective local governance, the establishment of early warning systems and possibly investments in appropriate infrastructure are areas that would be important as part of appropriate adaptation measures.

For mitigation activities, cities will have to focus on improving energy efficiency of buildings, greater use of public transport, higher fuel efficiency in automobiles and all vehicles as well as some changes in lifestyles. These would require leadership at the local level of cities, which in several situations would also create substantial local benefits in the form of lower levels of air pollution and, therefore, significant health benefits.

In essence, the scientific findings of the IPCC provide a robust basis on which the leadership of towns and cities across the world can devise both adaptation and mitigation measures. It would also be very helpful for leaders to get the assistance of scientific organisations which have the ability of project location-specific impacts of climate change using climate models suitably downscaled. This capability has grown in several parts of the world and expertise in this area would make it possible for cities to come up with precisely targeted plans and actions as part of adaptation measures. Mitigation would exhibit greater uniformity in types of actions to be taken, although the extent of action would vary depending on a range of local conditions. Policies such as a price on carbon would be an important driver of mitigation actions.
Cities are among the most important drivers of the response to climate change. They are the maximum expression of human development and the most efficient way of attending to the daily needs of thousands of individuals. As the most viable locus for building bridges between public policy and science, cities must take a major role in the fight.

Cities are responsible for more than two-thirds of all greenhouse gas emissions; their impacts transcend territorial borders and are responsible for immediate global and local repercussions. Thus cities must become increasingly efficient about energy consumption and natural resources use. They must point the way toward ever more concentrated and interconnected urban development, where soil-use is maximized, city services energy use is more efficient and the distance between individuals and their needs is minimal.

Besides an obligation to reduce energy-use intensity, cities must also respond to the risks of climate change, since they are home to the vast majority of populations that are vulnerable to extreme events exacerbated by this phenomenon. As a first response, cities must understand the risks that threaten them, to orient their growth and design resilient infrastructure.

This endows real relevance on the Global Cities Covenant on Climate. Greenhouse gas emissions mitigations already undertaken reflect a new awareness on the part of cities about their key role in climate change. Adaptation measures instigated in light of rising losses from extreme climate events also point to the formation of societies that are better prepared and more strongly unified in support of their most vulnerable communities.

Such steps should be further consolidated through measures that turn cities into resilient, low-carbon-intensity structures where intensive soil use, regional energy efficiency and sustainable natural resource management will take a leading role in the transition to a new model of human development.

Participation from more than 286 Mexico City Pact signatory cities is a clear example of success along these lines. Global action networks must be further strengthened—as must financing mechanisms and low-carbon-emissions technology transfers—as a means of both expanding on achievements thus far and establishing the bases for enhanced responses to climate change and its consequences.
Two decades have passed since 1992, when the UN Framework Convention on Climate Change was established in Rio de Janeiro. At the time, the world’s nations recognized—though not without some degree of scepticism—that greenhouse gas emissions were causing global warming. Since then, international efforts to reduce greenhouse gas atmospheric concentrations have been exceedingly difficult to organize and carry out.

A large-scale scientific debate with regard to climate change’s anthropogenic causes impeded a first impulse to establish worldwide emissions-reduction and carbon-capture-protections commitments. The Kyoto Protocol, signed in 1997 as a “tryout” designed to spur carbon credits trading, has not prospered. The UN has invested its entire technical and negotiation capacities into efforts to convince nations to assume responsibility with regard to the issue as well as to ratify such commitments; yet only the EU has managed to sketch out ambitious goals and advance as a unit toward a low-carbon economy.

Faced with such a scenario, local governments have emerged as essential drivers in the fight against global warming. In almost every nation on Earth, it is local governments whose executive jurisdictions include powers directly related to greenhouse gas mitigation and climate-change-related community adaptation: such powers as sustainable transport policy, energy-efficiency and sustainable-construction incentives, water-treatment, drinkability and distribution systems operations, household solid wastes management, civil-protection and disaster-prevention structures, street lighting, and forest/biodiversity conservation constitute just a portion of the authority that resides with the world’s mayors.

In light of this opportunity, 138 mayors from around the world signed the Global Cities Covenant on Climate (GCCC), in November
2010, in Mexico City, committing ourselves to not only undertake mitigation, adaptation, awareness and financing activities, but as well to report our advances on a yearly basis as a means of certifying our progress. The GCCC has become an indispensable global mechanism of commitment, verification and local shared experience for international climate-related negotiations.

Today that pact includes the commitment of 286 cities on five continents who use this second report to demonstrate the most important actions they have taken—as well as their desire to take action—in light of one of the most serious threats that humankind faces in the twenty-first century: global warming. The Mexico City pact has become an obligatory reference to on-the-ground efforts undertaken by local authorities, citizens and the private sector to help cities meet their goals.

The Report documents more than 500 actions carried out by Pact signatories, everything from Climate Action Plans to the elaboration of financial strategies for achieving low-carbon economies based on re-channeling subsidies, devising fiscal incentives and green purchasing. According to the Report, in 2012, cites have reduced carbon-equivalent emissions by more than 500 million metric tons, a highly significant contribution to the fight against global warming.

Throughout the present year, we at the UN Global Network for Safer Cities will strive to enrich urban security, an area that must stress a need for communities to be resilient with regard to climate change. The world’s mayors occupy the front lines of citizen demand and response when disasters and contingencies occur in communities. A safe city is not just one where crime is prevented and kept under control; it is also a place where disaster-prevention strategies have been established, and above all, is somewhere that is prepared to resist the negative consequences of meteorological, climatic and biological change. As such, cities’ climate-change adaptations, just like their mitigation efforts, must be key components of a safe city’s overall strategic plan.

We at the Global Network for Safer Cities congratulate each and every one of the Pact’s signatories, the initiative’s partner organizations and the Fundación Pensar—in its capacity as the GCCC’s International Secretariat—for the tremendous effort that the publication of this Report represents.
As one of the first signatories of the Mexico City Pact in 2010, on behalf of eThekwini Municipality and City of Durban, it gives me a great pleasure to praise the Secretariat, partners and all signatory cities on the release of this Second Annual Report of the Mexico City Pact.

The Durban Local Government Convention: adapting to a changing climate – towards COP17/CMP7 and beyond was convened on 2–4 December 2011, by a Local Government partnership, made up of the South African Local Government Association (SALGA), the South African Cities Network (SACN), eThekwini Municipality, South African Department of Environmental Affairs (DEA), Department of Co-operative Governance and Traditional Affairs (COGTA) together with ICLEI – Local Governments for Sustainability.

I was proud to present the Durban Adaptation Charter, adopted by 107 mayors and elected officials representing over 950 local governments as the key output of the Convention, at the UN Durban Climate Conference and in the First Annual Report of the Mexico City Pact. Thus, it gives me a great pleasure to further contribute in this Second Annual Report of the Mexico City Pact with a brief update on the progress achieved so far.

JAMES NXUMALO
Mayor of eThekwini (Duban) and Vice-president of ICLEI

“The Durban Adaptation Charter complements existing local government climate change initiatives, such as the Mexico City Pact”

1www.durbanadaptationcharter.org
The Durban Adaptation Charter complements existing local government climate change initiatives, such as the Mexico City Pact. Together, they provide a holistic vision for transforming the world’s cities and local governments and making them more ‘climate smart’. The natural alignment of the Charter with the Mexico City Pact has been further confirmed with the extended invitation to the WMCCC and UCLG to join the Charter as partners. The response was very supportive and enthusiastic, and confirmed the commitment of the leaders of these organisations to the implementation of the Durban Adaptation Charter.

By signing the Durban Adaptation Charter, cities pledge to strengthen local level adaptive capacity to climate change, and committed local governments around the world to urgent and decisive climate adaptation. As such, when I addressed the High Level Segment of UN Durban Climate Conference on behalf of the signatories, I urged the national governments to acknowledge the critical need for adaptation, especially in the developing world, and to focus on the importance of urbanising the global climate agenda.

Ethekwini Municipality and partners are advancing on the Durban Adaptation Charter with the commitment of the ICLEI Africa Secretariat to become the long term secretariat of the DAC with the Resilient Cities Congress as the platform for the annual review. Through the Implementation Guidance Workshop to be held in March 2013, we will further identify potential governance mechanisms, the need for support for the implementation and appropriate mechanisms for documenting progress.

I am confident that the fruitful synergy between the Mexico City Pact and the Durban Adaptation Charter will enable local governments around the world to scale up and advance diverse, bold and impressive actions on urban adaptation reported by signatories of the Mexico City Pact.
In a rapidly urbanizing world, cities are increasingly becoming the focus of international sustainability efforts. Up to 80 percent of the world population is expected to reside in cities by 2050. Indeed, this ‘second wave’ of urbanization is projected to see over 3 billion additional people living in cities in a time-span of just 80 years, primarily in Africa and Asia.

Today, urban areas account for 50 % of all waste, generate 60-80 % of all greenhouse gas emissions and consume 75 % of natural resources, yet occupy only 3 % of the Earth’s surface.

Yet water savings of 30%, and energy saving of up to 50 % can be achieved in cities with limited investment and encouraging behavioral change. Moreover, the economic opportunities associated with making cities more sustainable are numerous. As centres of technology, cities can spearhead the creation of green jobs in sectors such as renewable energy. Projections show that some 20 million people could be employed in the wind, solar and biofuel industries by 2030, for example.

In order to respond to the needs of an increasingly urbanizing world, UNEP supports cities in emphasizing interventions that have both local and global benefits. Built environment activities promote resource-efficiency at city level within the context of sustainable development and poverty alleviation. Furthermore, they provide a global platform for the building sector stakeholders to discuss and develop the role of sustainable buildings in combating climate change, drawing on UNEP’s capacity to facilitate collective action.

Extensive work in the sector has led UNEP to the conclusion that resource efficiency is key for cities to contribute to local and global sustainability and offer at the same time high potential for financial savings. For this reason, UNEP launched the Global Initiative for Resource Efficient Cities (GI-REC) last June 2012 at Rio+20. Activities under the Initiative encourage cities to combine greater productivity and innovation with lower costs and reduced environmental impacts.

"Cities offer multiple opportunities for resource efficiency as major contribution to climate action"
Decoupling economic growth from unsustainable resource use and environmental impacts—especially in urban areas—underpins the transition to a low-carbon, resource-efficient green economy. The new Global Initiative for Resource Efficiency Cities aims to provide cities with a common framework for assessing environmental performance and encouraging innovative sustainability measures. In the context of rapid urbanization and growing pressures on natural resources, there is an urgent need for coordinated action on urban sustainability. This is essential both for preventing irreversible degradation of resources and ecosystems, and for realizing the multiple benefits of greener cities, from savings through energy-efficient buildings, or the health and climate benefits of cleaner fuels and vehicles.

The GI-REC aims at working with local and national governments, the private sector, civil society groups and the academia to promote energy efficient buildings, efficient water use, sustainable waste management and other activities. It is a platform for consultation and for sharing best practices among city practitioners. It develops common metrics for sustainable cities, (e.g., for greenhouse gas emissions, city environmental performance assessments, Common Carbon Metric in the building sector, etc). It also promotes a holistic approach to resource use and consumption in cities.

Ongoing activities of the GI-REC include (1) a review of existing methodologies for assessing resource efficiency, their applicability at city level and, and use this to inform the development of practical tools and policy recommendations to promote efficiency improvements in cities, (2) a global survey targeting more than 100 cities around the world to gather city’s initiatives on resource efficiency and their needs, (3) a mapping exercise of stakeholders’ organizations on resource efficient cities.

In summary the GI-REC will assist city practitioners in:

- Accessing an extensive network of technical expertise, knowledge and information on effective approaches to resource efficiency across sectors.
- Accessing support to build the capacity of cities to integrate resource efficiency at the local level. This includes potential assistance to pilot strategic activities that will promote resource efficiency in cities.
- Participating in and benefiting from research on resource efficiency. The GI-REC is committed to supporting its partners in translating research products into practical tools that will allow decision makers to promote and integrate resource efficiency at the city level.

Cities offer multiple opportunities for resource efficiency as major contribution to climate action, mitigation but also adaptation, through decoupling and sustainable consumption and production. Hubs for innovation, cities can drive the new green investment wave, through an appropriate life cycle material flow assessment, demonstrating the business case for resource efficiency in various sectors and at various stages of the supply chain, hence provide badly needed additional resources for other important investments towards sustainability.
Beginning on 21 November 2010 with support from the Mexico City government, we at the Fundación PENSAR, Planeta, Política, Persona—in strategic alliance with the World Mayors Council on Climate Change, ICLEI Local Governments for Sustainability, United Local Cities and Governments (UCLG) and the Club of Madrid—organized the World Mayors Summit on Climate in Mexico City, from which the Global Cities Covenant on Climate emerged. This instrument, originally endorsed by 138 mayors, has now doubled its roster of signatory cities and has produced two annual reports that document outcomes from efforts these cities have undertaken to combat climate change, in addition to conceiving a strategic document that define the character and vision of the Global Cities Covenant on Climate (Mexico City Pact).

In November 2011, as part of the ZERO Emissions Conference held annually in Oslo, the First-Annual Mexico City Pact report was presented featuring outcomes from 217 then signatory cities. In December 2011, during the UN Conference of the Parties on Climate Change Summit in Durban, South Africa, Pact-affiliated organizations designated Mexico’s Fundación PENSAR, Planeta, Política, Persona as the Global Cities Covenant on Climate International Secretariat. Later at the UN RIO + 20 Conference in Brazil, the World Association of Major Metropolises joined the initiative’s roster of partner international organizations.

In December 2012, the Fundación PENSAR, Planeta, Política, Persona honored me with an invitation to direct the Global Cities Covenant on Climate.

“Our goal is to expand the number of cities involved in the Pact, and project the leadership and compromise the world’s mayors have in their fight against global warming”
Covenant on Climate Secretariat, a mechanism that today includes participation on the part of 286 signatory world cities and their concrete, measurable actions for combating global warming. We have prepared this Second Annual Report throughout 2013 based on reported results from Pact cities as well as through the design of an ambitious action plan that can greatly increase the number of involved cities as it brings attention to world mayors’ leadership and commitment in the fight against climate change.

In the course of coming years the Secretariat will be pursuing the following objectives:

1. Expand the signatory cities roster with an emphasis on Latin America, the United States, China and Europe;

2. Expand visibility for local government initiatives designed to mitigate greenhouse gas emissions and adapt communities to climate change;

3. Involve NGOs and the academy to create powerful communications processes that raise awareness and expand responsibility with regard to climate-change issues;

4. Invite other international organizations to ally with the project and thus achieve greater awareness and more wide ranging participation from cities and local governments;

5. Invite businesspeople and the private sector to undertake actions that contribute to greenhouse gas emissions reductions; and

6. Identify direct-financing resources to enable world cities’ access to funds, thus expediting clean-technology introduction and supporting the feasibility of public policy that incentivizes energy efficiency, greenhouse gas mitigation and adaptation projects.

I would also like to thank the Fundación PEN-SAR, Planeta, Política, Persona for offering me the opportunity to lead this initiative, as well as thank all our strategic partners for their trust and support. We are certain the efforts we undertake in coming years will have a real, concrete impact not solely on local-level climate-change mitigation and adaptation issues, but will also serve as a necessary inspiration to other societal sectors and branches of government, moving them to pick up the pace and take stock of the urgency this enormous challenge implies.
## Major Greenhouse Gas-Mitigation Actions

- **The Casa Ambiental: Environmental Information and Training Center (the “CIFA”)**
  
  **Timeframe:** January-September 2012
  **Investment:** US$ 170,940
  
  The CIFA is an environmental/clean energy innovation and technology awareness and training center. As part of efforts to make the center the first energy-autonomous government building, 36 photovoltaic panels and two solar collectors for hot-water-heating were installed. As part of the city’s Public Buildings Energy Efficiency program, sensors were installed to carry out an energy assessment and establish energy-use optimization targets.

- **Sustainable Mobility Plan: The Buenos Aires Bicycle Program and New Metrobus Corridor Studies**
  
  **Timeframe:** January-September 2012
  **Investment:** US$ 2,218,709
  
  The objective of this program is to promote bicycle use as an ecological, healthy and rapid medium of transportation. The protected bike path network has been expanded and the bicycle public transport system was improved through an expansion of the free bike-lending program as well as additional shared-bike stations. In parallel, studies were made with regard to new dedicated-lane-bus (Metrobus) corridors.

- **Urban Solid-Waste Management: Citywide Containment Advances**
  
  **Timeframe:** January-September 2012
  **Investment:** US$ 1,503,510
  
  Double (dry and humid wastes) containment was achieved in the city’s micro and macro downtown areas, leading to a 55% city-wide containment rate. In July 2012, efforts to incorporate 2000 blocks in the city’s northeast and containment of on-street dumpling in densely populated neighborhoods such as Belgrano, Palermo, Flores and Caballito (3500 additional blocks) was completed. The goal is to reach 100% double containment citywide by March 2012.

## Major Climate-Change Adaptation Actions

- **Monitoring the French y Beruti School Green Roof**
  
  **Timeframe:** January-September 2012
  **Investment:** US$ 42,735
  
  Monitoring was undertaken of the green (i.e., vegetation-covered) roof at public school number six, French y Beruti. The green roof extends 200 m² and is of the “simple extensive” variety. Monitoring activities have centered on the green roof’s capacity for reducing the urban heat-island effect, increased rainwater capture and enhanced thermic balance for the building in winter as well as summer.

- **Severe Rain Adaptations: Long-Tunnel Improvements at Arroyo Maldonado, Rainwater Runoff Systems and Lakes as Flood Buffers**
  
  **Timeframe:** January-September 2012
  **Investment:** US$ 14,407,890
  
  A new relief canal (in the form of an elongated tunnel) was constructed for Arroyo Maldonado using the hydrofraise technique, a Latin American first. The improvements directly benefit 267,000 individuals and benefit the entire city indirectly by preventing floods in its largest basin. Adaptation to increasingly severe rains was completed via the use of lakes as reservoirs as well as permanent improvements to drainage-system cleaning and maintenance.

- **Urban Green Corridors as Part of Buenos Aires’s Territorial Model**
  
  **Timeframe:** January-September 2012
  **Investment:** US$ 213,675
  
  In December 2011, the State policy for humanizing the city of Buenos Aires—the Modelo Territorial de la Ciudad de Buenos Aires 2010-2060—was presented. In it, urban green corridors are used to connect city environmental units via green connectors (medium-height forestation), green corridors (planted boulevards or medians) and linear parks designed to transform 50% of the city to public space.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Passenger Public Transport-Only Corridors Installation**
  Timeframe: January-February 2012 (phase 1); July 2012 (phase 2)
  Investment: US$ 180,000
  Dedicated lanes were established to lend priority movement to public transportation and discourage private-vehicle use on selected arterial thoroughfares. Proposals also call for consolidating a Public Transit Corridors network that—by means of dedicated lanes—increases superior operating velocities and a consequent service improvement in support of more sustainable mobility and reduced fossil-fuels consumption. The network extends along 9.4 km of routes.

- **Bike-Path Plan**
  Timeframe: April-August 2012
  Investment: US$ 550,000
  During the indicated phase, 7.2 km of bike paths were constructed to reach 42 km citywide. Awareness campaigns on bike-path use were additionally realized. Currently network expansion and infrastructure renovations continue to advance in order to be integrated into the overall public transportation system. The plan supports bicycle participation as a mode of transport and is a fundamental element for sustainability/mobility articulation in non-motorized transport strategies.

- **Edict 8784 on Solar Energy-Capture Systems in Public Buildings**
  Timeframe: September 2012
  Investment: N/D
  In order to drive measures that reduce non-renewable energy consumption, regulations stipulating obligatory incorporation of low-temperature solar energy-capture systems for sanitary hot water in all city public buildings or other state entity new construction or expansion were put into place. Regulations also apply to recreational, educational or social centers and housing plan community infrastructure.

**Participating Organizations:** Taller Ecologista (an NGO that works to promote renewable energy) and the Universidad Tecnológica Nacional.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **2012 City Forestation Plan**
  Timeframe: July-September 2012
  Investment: US$ 215,000
  The plan calls for planting 10,000 trees for public greenspace preservation, upgrade and expansion. One thousand units were dedicated to parks and promenades and nine thousand were destined for walkways, of which four thousand were planted by neighborhood and institutional organizations and another two thousand handed over to neighborhood residents. Active citizen, social organization, business and institutional participation in carrying out the project is a core characteristic. This plan’s actions supplement the Cutting and Pruning Plan.

**Participating Organizations:** Grassroots organizations (neighborhood associations, schools and community centers).

- **Dengue Prevention Larvae Monitoring**
  Timeframe: May-November 2012
  Investment: US$ 10,000
  As part of entomological vector control, starting in 2009, a twice-yearly larva survey is realized. This year it took place in May and will be repeated in November. Controls include house, container and Breteau indices. This is a cross-category task that surveys 450 city houses in the course of the week. Focused control actions are also undertaken in high-risk zones, including awareness, manned container clearing and larvicide application.

**Participating Organizations:** The Universidad Nacional de Rosario and neighborhood institutions.
### Major Greenhouse Gas-Mitigation Actions

**Plastic Bag Phase-Out**
- **Timeframe:** Starting June 2009
- **Investment:** US$ 63,200

It is estimated that in the city of Santa Fe an average of 1.5 plastic bags are consumed per inhabitant per day—one of the main causes of storm sewer blockage. Therefore a timetable has been established for eliminating free distribution of plastic bags in Santa Fe's supermarkets, big-box stores and self-service retail outlets. To date a 50% reduction in bag distribution has been achieved at checkout counters at businesses that simultaneously operate four or more such points of service.

**Remedial Forestation Based on City Activities and Events Carbon Footprint Calculation**
- **Timeframe:** November 2011 to date
- **Investment:** US$ 5200

Based on carbon footprint methodology calculations, the adverse environmental impact of various city activities and events was analyzed. Based on results, the number of tree individuals needed to create compensatory forestation in various city public spaces was also evaluated. The local government is carrying out studies and calculations with regard to the carbon footprint that city street-sweeping and garbage collection causes.

**Separated Household Garbage Collection Expanded to the Entire Urban Area**
- **Timeframe:** October 2011 to date
- **Investment:** US$ 45,000

Following the successful implementation of the city's separated household garbage collection program's first phase, covering 2700 metro area blocks, it was decided to expand the strategy's staging area to the entire city. To do so, phase-1 outcomes were studied during which compliance percentages less than 82% were never registered among city inhabitants; since the phase-2 kickoff, percentages have held at 78% or greater.
MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

■ 2012 Urban Reforestation Plan Implementation
Timeframe: December 2011 to date
Investment: US$ 220,000
With an eye to the implementation of a reforestation plan, a strategy was developed to determine the number of tree individuals needed to affect a beneficial environmental impact alongside a major climate-change adaptation advance. A tree planted for every child born in the city in 2011 was programmed. To date, not only have projected results been satisfactorily achieved (a minimum of 6000 plantings) but it is additionally estimated that projected results will be exceeded on the course of 2012.

■ Sustainable Mobility Strategies Implementation
Timeframe: August 2012 to date
Investment: US$ 1,100,000
In August, two new units were added to the city articulated bus fleet that serves numerous zones throughout the metro area. At equivalent motorization and fuel consumption (and therefore GHG emission) levels these new vehicles provide transportation for twice as many passengers as regular vehicles. Since the new vehicles are 0 KM units, the local government guarantees their optimum functioning in conjunction with minimized GHG emissions.

■ Clean-Energy Based Technologies Incorporated in Government Buildings
Timeframe: December 2011 to date
Investment: US$ 100,000
“Santa Fe Solar” ordinances have been implemented that promote solar energy use citywide, based on a number of strategies. The most notable advance was achieved with the enactment of local ordinances establishing that all municipal child-care centers (opened since 7 December 2011) are to feature solar-powered water-heating in bathroom facilities. Necessary studies are currently underway to exploit city-sanitary-landfill-generated biogas

PARTICIPATING ORGANIZATIONS

Universidad Nacional del Litoral, Cliba S.A., Urfafe S.A, Milicic S.A., Fundación “Habitat y Desarrollo”, Cámara de Supermercados y Autoservicios de la Ciudad de Santa Fe, Colegio de Farmacéuticos de la Provincia de Santa Fe, Compañía Cervecerías Unidas, Cervecería Santa Fe, Asociación de Dirigentes de Empresas de Santa Fe, Mc Donald’s Santa Fe, Arcos Santafesinos, Jerárquicos Salud, CAM Construcciones, Hospital de Niños de la Ciudad de Santa Fe Dr. Orlando Alassia, Mercado de Productores y Abastecedores de Frutas, Verduras y Hortalizas de Santa Fe, Asociación Protectora de Animales de Santa Fe de la Vera Cruz, Asociación de Defensa de los Derechos de los Animales.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

■ Climate Change Fund Rebates
Timeframe: July 2007-September 2009
Investment: US$ 7,616,511
The New South Wales (NSW) State Government Office of Environment and Heritage (OEH) Climate Change Fund provided rebates for rainwater tanks, climate-friendly hot water systems, ceiling insulation, water-efficient washing machines, and dual-flush toilets. Lake Macquarie City rated first in NSW for total uptake of Climate Change Fund rebates with 14,363 rebates (ranking first for uptake of both hot water systems and dual-flush toilets, and ranked second for uptake of insulation). Residents also received support from Hunter Water for showerhead exchanges, OEH for Fridge Buyback Scheme, and OEH and the Federal Government Department of Climate Change and Energy Efficiency for solar photovoltaic installations.

■ Solar Photovoltaic Installations
Timeframe: October 2010-September 2012
Investment: US$ 131,041 (Council investment), US$ 15,538,500 (private investment)
In 2008, Council established targets to reduce Council’s GHG emissions by 3% per annum (p.a.) and to facilitate a reduction of city-wide GHG emissions by 3% per capita p.a. During the 12-month period, Council installed 39.52 kilowatts of solar photovoltaic across three sites, including the Council’s Works Depot, Charlestown Library, and the Headquarters of the State Emergency Service. The solar photovoltaic installations have made Council more resilient to rising energy prices, and saves Council $12,750.00 p.a. while also reducing its carbon footprint by 62 62 tCO2eq. In March 2011-March 2012, the Lake Macquarie local government area recorded residential solar photovoltaic capacity at 4.4 megawatts, an estimated savings of US$ 1.2 million p.a. while reducing the city’s carbon footprint by an estimated 6,800 tCO2eq.

■ Council Vehicle Fleet Fuel Savings
Timeframe: June 2011-July 2012
Investment: US$ 155,385
An overall decrease in fuel burn equated to a 210 metric ton decrease in carbon emissions. Initiatives included: continued use of an in-line diesel fuel filtration system (to improve fuel quality and minimize consumption); fleet evaluation resulting in the implementation of a 100% four-cylinder light commercial fleet, a passenger fleet with four-cylinder vehicles accounting for 81% and hybrid vehicles representing 10%; the trial of an electric vehicle and installation of the Hunter region’s first public electric vehicle charge point at Council’s Customer Service Center; and the replacement of 24 trucks (20% of the truck fleet) with the new Euro V compliant engines.
MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- Lake Macquarie Waterway Flood Risk Management Study and Plan
  Timeframe: June 2011-June 2012
  Investment: US$ 160,264
  The effects of sea level rise on lake flooding and foreshore inundation were estimated using computer modeling calibrated against recorded flood events. Planning to manage increased flood risk in 2050 and 2100 was based on maintaining current risk threshold of the 1-in-100 year average recurrence interval flood level. The study covers a majority of land and settlements in the City likely to be affected by sea level rise to 2100. It sets out management measures to ensure there is no increase in risk to people and property from flooding and permanent tidal inundation, and ascertained through sensitivity testing that other possible climate changes (including increased storm surge and rainfall) were not considered significant when compared to the impact of sea level rise.

- Lake Macquarie Waterway Flooding and Tidal Inundation Policy
  Timeframe: June 2012-July 2012
  Investment: US$ 3,108
  This policy complements Council policies regarding flood-prone land and replaces the 2009 Sea Level Rise Preparedness Adaptation Policy to identify and respond to emerging sea level rise hazards and risks to foreshore properties. Council continues to undertake flood studies, floodplain risk management studies and plans for major catchment areas in the City, has also reviewed its current flood information dissemination practices, and is implementing improvements in its flood information management system.

- Lake Macquarie Coastal Hazard Study
  Timeframe: 2012
  Investment: US$ 90,641
  To update an earlier 1996 study, Council completed this study of coastal hazards in Lake Macquarie City and incorporated the NSW Government’s sea level rise benchmarks: a rise of 0.4m by 2050 and 0.9m by 2100. The study includes a risk assessment, and used a more sophisticated model to predict the effects of underlying foreshore recession, storm cut, beach rotation, and other coastal processes. It also provides a suite of management actions to be considered for inclusion in the draft Lake Macquarie Coastal Zone Management Plan.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **1200 Buildings Program**
  Timeframe: January 2009 to date
  Investment: US$ 200,000 per year
  The 1200 Buildings Program is catalyzing retrofit of 1200 commercial buildings by 2020. The retrofits will improve energy and water efficiency, reduce GHG emissions, build economic resilience and increase resilience against the expected effects of predicted climate change. The program also aims to support the delivery of 400 megawatts of distributed power generation in the municipality. The world’s first Environmental Upgrade Agreements for existing commercial buildings have been signed in Melbourne enabling secure private finance to flow to building owners and be repaid through a statutory charge levied by City of Melbourne.

  **Participating Organizations:** Sustainable Melbourne Funde

- **Carbon Neutral Council**
  Timeframe: July 2012
  Investment: TBD
  Melbourne City Council has approved a strategy to achieve carbon neutrality in council operations through emissions reductions and offset purchase. The Council is currently undergoing certification as carbon neutral under the National Carbon Offset Standard (NCOS). The Council has already reduced emissions by 34% against 1996/97 levels and is rolling out programs to further reduce this level.

- **CitySwitch**
  Timeframe: January 2010 to date
  Investment: US$ 105 (2011/12)
  CitySwitch is a national energy management program led by local government in capital cities that supports organizations who implement energy-efficiency actions. Up to $90000 in funding is available per organization (depending on tenancy size) applicable to the cost of a NABERS energy assessment. Metropolitan Melbourne currently has 144 signatories and achieved a total kg/CO2eq savings of 13,489,435 in FY 2011/12.
  **Participating Organizations:** City of Sydney

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Stormwater Harvesting in Fitzroy Gardens**
  Timeframe: July 2011-September 2012
  Investment: US$ 6,592,446
  The installation of a stormwater harvesting project in Fitzroy Gardens is part of the City of Melbourne’s Total Watermark strategy. The strategy is improving water security across the city by reducing flood risks, reducing watercourse pollution, and improving drought resilience in the city’s parks and gardens. The Fitzroy Gardens project will see 121 million liters of recycled water used in place of potable water per year.

- **Urban Forest Strategy**
  Timeframe: July 2011 to date
  Investment: US$ 300,000
  The City of Melbourne’s Urban Forest Strategy seeks to address the impacts of urban heat island effect, loss of biodiversity and protect against future vulnerability by providing a robust strategic framework for the evolution and longevity of Melbourne’s urban forest.

- **ArtPlay White Roofy**
  Timeframe: January 2012
  Investment: US$ 16,000
  The City of Melbourne has begun testing a white roof on a council building. The white roof reflects light and keeps the building up to 4 degrees cooler on extreme heat days. The trial has been conducted in partnership with Melbourne University and is being used as a showcase to encourage other building owners to install white roofs.
  **Participating Organizations:** Melbourne University
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Solar Panels for City of Subiaco Community Library**
  Timeframe: July 2012
  Investment: US$ 44,374
  The City installed a 20 kW solar panel array on the Subiaco Community Library. It is expected to produce 33,645 kWh per year, which equates to 22% of the library’s annual electricity consumption. A computer display in the library allows community members to view real-time energy production and consumption.

- **Building Energy Management Plan 2012-2016**
  Timeframe: May 2012
  Investment: US$ 36,572
  The City has completed a detailed energy audit of all Council owned buildings and facilities, to identify major areas of energy consumption and opportunities for improved energy efficiency. Actions have been scheduled in an Energy Management Plan 2012-2016 and will be implemented over a five-year period. As part of year-one actions, the city is in the process of retrofitting buildings with energy efficient lights.

- **Solar Lights for Parks and Reserves**
  Timeframe: November 2011
  Investment: TBC
  The City completed the third stage of its sustainable lighting trial by installing solar powered lights at Charles Stokes Reserve, Harvey Road Reserve, Park Street Park and Redfern Street Park.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Rosalie Mini-Park Stormwater Harvesting System**
  Timeframe: November 2011
  Investment: US$ 211,595
  A stormwater harvesting system was installed within the park in November 2011 to harvest rainwater to be used for park irrigation. Rosalie mini-park occupies 650 m² and consumes approximately 600 kL of groundwater per annum for irrigation purposes. The 200 kL capacity stormwater storage cells are currently being connected to the irrigation system and will supply the park during summer 2012/13.

- **Managing Park and Open Spaces in a Drying-Climate Policy**
  Timeframe: December 2011
  Investment: N/A
  A drying-climate policy was prepared and adopted by council in December 2011 to reduce the use of non-sustainable water sources, where possible, within the municipality. It allows for the City to investigate and implement alternative water sources for irrigation, such as stormwater and treated wastewater. It also outlines the City’s Water-Sensitive Urban Design approach, including the development of ‘blue corridors,’ defined as vegetation areas designed to detain and infiltrate stormwater runoff.

- **Key participant in the Cities as Water Supply Catchment Program**
  Timeframe: August 2012
  Investment: US$ 30,950
  The National Cities as Water Supply Catchments program is lead by Monash University in Melbourne. The City is one of a consortium of 20 organizations that support the program. The program will research ways to better manage water in a water-sensitive city and overcome water shortages, reduce urban temperatures, improve waterway health and improve urban landscapes. Trial sites will be established in the City as part of the research program.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- District Heating Promotion
  Timeframe: 2011-2012
  Investment: US$ 3,655,000
  The city of Graz offers financial benefits for building owners who switch their heating to district heating systems. For heating installations within apartments, subsidies between 30 and 100% of recognized investments are provided according to beneficiary income. Standard single-family residential installations including water heating are also subsidized regardless of owner income.

- Solar Collectors and Photovoltaic Promotion
  Timeframe: 2011-2012
  Investment: US$ 979,000
  The city of Graz subsidizes solar collector installations that provide hot water for household heating and use, offering 100 per m² of installation costs up to 30 m². To find out their roofs' solar potential, citizens use Graz's online solar roof app. Photovoltaic installations are subsidized at € 500/kWp up to 5 kWp.

- District Heating Development Program Implementation
  Timeframe: 2011-2012
  Investment: N/D
  In July 2011, Graz's city council approved a “District Heating Implementation Plan” (Communal Energy Concept 2011), part of the City Development Concept (4.0 STEK; §21(3) lit 5 StROG 2010). It allows the city of Graz to make district heating compulsory under certain conditions and move toward long-term air quality health in a particularly polluted area. As a consequence, two areas have been legally designated for compulsory connection to the district heating system.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- Graz Rivulet Program Implementation
  Timeframe: 2011-2021
  Total investment: US$ 65,000,000
  Frequent floods (e.g., 2005 and 2009) led to the assumption that climate change in general is increasing heavy rainfall in Austria. The “Graz Rivulet Program” seeks to provide the best possible flood protection over a ten-year period at the same time it sets up ecological and recreational benefits. In 2012, the previous ten years' flood protection work continued on specific Graz area rivers.

- Smart City Graz
  Timeframe: 2012-2016
  Subsidy amount: US$ 5,470,000
  Climate-change adaptation measures require farsighted, intelligent planning for the future. The “Smart City Graz Mitte” Project seeks to demonstrate new urban energy concepts as part of innovative, sustainable city development. A mixed-use 400-hectare urban quarter is to be transformed into an environmentally friendly, livable and intelligently developed neighborhood. In 2012, task forces for key project phase-1 areas and milestones have been defined; in-detail planning is underway.
  
Brussels

**Mayor**  
Evelyne Huytebroeck

**Population**  
1089538

**Territorial extension**  
161 km²

**Total climate-change-related budget**  
US $ 426 000 000 (annual)

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**MAJOR GREENHOUSE-GAS MITIGATION ACTIONS**

- **New Energy Efficiency Regulations for Buildings**  
  **Timeframe:** 2012 Final application decrees adoption  
  **Investment:** N/D  
  The Brussels region established Europe’s most ambitious structural energy efficiency regulations, requiring passive-system buildings as the norm (maximum 15kWh/m²/year for heating needs) in all new buildings and low-to-very-low-energy consumption requirements in the case of major renovations starting 1 January 2015. The same requirements are in place since 2010 for all public buildings (housing, social housing, offices, city industrial buildings).

- **Energy House**  
  **Timeframe:** 2011-2012  
  **Investment:** US$ 6.4 million/year  
  The Energy House’s main mission is to support households and is organized in terms of two intervention levels: the central structure that guarantees coordination and support, and local structures whose main goal is at-home information assessment and support with regard to energy and ecological construction. These local structures enjoy a direct relationship with Brussels households. The Brussels region will have six “Energy Houses” distributed by zone.

- **Energy Bonuses**  
  **Timeframe:** starting 2004 (currently ongoing), but the plan was modified in 2012 to reflect an annual budget increase as well as bonus amount increase.  
  **Investment:** more than US$ 103 million between 2004 and 2011; more than US$ 23 million/year starting in 2012.  
  Energy bonuses are financial incentives made available to individuals and businesses for renovation projects. From the program’s inception, these bonuses have generated a 600 energy savings and renewable energy investment.

  ✔ The policies applied by the Brussels-Capital region since 2004 to reduce GHG emissions and energy consumption have been a patent success; total per-capita GHG emissions have been reduced by 18% from 2004 to 2010

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**MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS**

- **Brussels-Capital Region Climate Change Adaptations**  
  **Timeframe:** January-July 2012  
  **Investment:** US$ 85,760  
  The Brussels region is subject to particular climate change vulnerability given its high population density as well as its regional infrastructure/goods clusters. Starting immediately, adaptation measures should be adopted; their importance will not diminish. As such, a study was carried out to evaluate the most pertinent measures as well as the relevance of resilience measures Brussels has already taken. The study, concluded in July 2012, will allow the region to determine its adaptation plan in 2013.

  **Participating Organizations:** Factor-X, Ecores, TEC

- **Brussels-Capital Region Water-Management Plan**  
  **Timeframe:** adopted by the government in July 2012; published in the official national gazette in September 2012  
  **Investment:** more than US$ 256 million over five years.  
  The water-management plan's objective is to minimize human-pressure impacts on aquatic ecosystems (pollution prevention and reduction, improving aquatic ecosystem conditions, flood-effect mitigation, etc.). It calls for an agenda of measures along eight organizational axes. The fifth axis calls for the management of an active rainfall-flooding prevention policy. Given that flooding has been identified as one of the most important risk factors related to climate change in Brussels, the rainfall plan takes on crucial importance among adaptation issues.

- **Bois de Soignes Arboreal Health Monitorings**  
  **Timeframe:** 2010-2012  
  **Investment:** US$ 64,000/year  
  The region is committed to meticulous follow-up and proactive management at the Bois des Soignes. Various studies have been undertaken to follow evolutions in the woods’ health, identify causes of forest decline, predict evolutions in terms of the aforementioned health status and adopt adaptive management measures:

  1. Bois de Soignes tree health evolution monitoring  
  2. Bois beech-tree reactions to “extreme” weather phenomena  
  3. Arboreal development potential at the Bois Soignes in 2100  
  4. Establishment of a partial-woods regeneration strategy

  **Participating Organizations:** the Free University of Brussels, the Catholic University of Louvain, the Gembloux Agronomy faculty, Chimay Agro-Forestry Development Center
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

■ Traffic Safety Enhancement
Timeframe: September-December 2011
Investment: US$ 60,000
The City installed bollards at four key intersections to improve traffic flow at corners previously subject to congestion, leading to exhaust-based GHG emissions reductions.

■ Waste Management
Timeframe: Since February 2011
Investment: N/D
The City purchased fifty acres of land and began site preparation to mitigate GHG emissions by means of improved waste management flooding due to climate change. Drains were improved to discharge increased water volumes.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

■ Improved Drainage
Timeframe: May-July 2011
Investment: US$ 125,000
Certain Belmopan areas are subject to more frequent flood
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- Free Saplings for Schools, Organizations and the Public
  Timeframe: Ongoing annual effort
  Investment: N/D
  Thimphu encourages citizens to plant more by supplying free saplings, seeking to lessen negative environmental impacts such as GHG emissions while expanding city greenspaces and enhancing urban beautification. The city encourages students to plant trees by awarding cash prizes to three schools with the highest survival percentages, motivating schools to take good care of their saplings.

- Pedestrian Day
  Timeframe: May 2012
  Investment: N/D
  The government declared all Tuesdays pedestrian days throughout the country, starting June 5—World Environment Day. Central Thimphu was transformed into a pedestrian zone from 8 am to 6 pm, with only emergency and service vehicles, such as ambulances, fire trucks, military vehicles, buses and bicycles allowed on the city’s main roads. Exceptions were also made for electric and hybrid vehicles as well as taxis, in alternating weeks (as stipulated by odd or even license plates).

  Participating organizations: National Environment Commission Secretariat, Thimphu Thromde, Road Safety and Transport Authority, Thimphu Traffic Division and Bhutan Post.

- Gas Ventilation Pipes at Memelakha Landfill
  Timeframe: August 2012
  Investment: US$ 13,194
  Thimphu Thromde invited 3 solid waste experts—professors from Fukuoka University, Japan, along with 2 experts from the Japan Environment Sanitation Center—to introduce and implement the Fukuoka Method: ventilation gas pipes installed in landfills to reduce the accumulation of harmful gases such as carbon dioxide, hydrogen sulfide, methane, nitrous oxide, etc., which are fire and greenhouse-gas hazards. Four ventilation pipes have thus far been installed and there are future plans to install 5-10 more.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- Woodsnipe Habitat Protection/City Park Construction
  Timeframe: June 2011 to date
  Investment: US$ 200,000 to date
  To protect important woodsnipe habitats, an ecological and recreational park, Thimphu’s largest, is currently under construction.

- Thimphu Structure Plan
  Timeframe: 2002 – 2027
  Investment: N/D
  According to the Thimphu Structure Plan, no development or structure will be permitted within 30m of city gully waterfronts, nor within 15m of all natural rivulets/gullies and natural drainage channels. This area is part of the E1 (Environment Conservation) zone. Similarly, inclines greater than 30% are protected as part of an E4 (agri-based environmental) zone where minimum required plot size is 1000 sq. m with 20% allowable ground coverage and maximum 2-story structures allowed.

- PET Bottle Plant
  Timeframe: April 2011
  Investment: N/D
  Thimphu Thromde and the Royal Society for the Protection of Nature constructed a PET bottle plant where all such plastic bottles are collected, crushed and sold by weight. As PET bottles now command considerable cash refunds, the general public and local schools collect the bottles in bulk for sale to the plant. The initiative has helped drastically reduce PET landfill load as well as generalized littering; recycling plastic bottles saves twice the energy burning requires.
### Major Greenhouse Gas-Mitigation Actions

- **Earth Hour**
  - **Timeframe:** March 2012
  - **Investment:** US$ 3000
  - Earth Hour is an international event sponsored since 2008 by the World Wildlife Fund that calls for voluntary one-hour blackouts the third Saturday in March, designed to raise societal awareness about the need to reduce or minimize energy consumption. The La Paz local government organized a march to support the campaign on 31 March 2012 that attracted 5000 city residents as participants. The city’s historical monuments and landmarks were switched off as well, leading to a 26-circuit public-lighting shut-off.

- **Feast of San Juan Smoke Abatement**
  - **Timeframe:** May-June 2012
  - **Investment:** US$ 2,000
  - The San Juan campaign sought to increase awareness among neighborhood communities with regard to the importance of avoiding bonfires, brush and clearing fires annually on the night of 23 July, given that smoke quantities then generated give rise to poor visibility and elevates CO₂ and other gas concentrations depending on the material used to fuel the bonfires (in some cases tires). After nine years of intense work and constant campaigning, in 2012, below-allowable-limit concentrations were registered at four of La Paz’s five air quality monitoring stations for the first time.

- **Solar Kitchens**
  - **Timeframe:** July-October 2012
  - **Investment:** US$ 4800
  - This project seeks to develop low-cost clean energy to reduce toxic gas emissions and fossil-fuel energy dependence. Solar kitchen technology affords a number of benefits such as a reduction in excessive biomass use for fuel. The project will benefit 23 families in the Lluto, Hampaturi rural district community of greater La Paz and following an evaluation, the feasibility of replicating the program in remaining rural communities will be established.

### Major Climate-Change Adaptation Actions

- **Plan La Paz 2040**
  - **Timeframe:** December 2011-October 2012
  - **Investment:** US$ 400,000
  - Plan La Paz 2040 is an integrated municipal development plan whose objective is to establish climate-change related policies and environmental actions that drive implementation of integrated environmental-management instruments that include active citizen participation designed to achieve a habitable, equitable and productively sustainable city. With regard to climate-change adaptation ancillary issues, efforts have been made to establish specific programs and projects in four critical areas, specifically, water resources conservation, proper use of renewable energy, food security and natural spaces conservation.

- **“Technical-Operative Action Integrated Disaster-Risk Management” Diploma for Local Officials**
  - **Timeframe:** June-November 2012
  - **Investment:** US$ 100,000
  - The diploma was created out of a need to develop efficient rapid-response to threat, vulnerability and exposure risks in greater La Paz. The diploma offers resources to local officials for making decisions and rolling out immediate technical operative actions related to disaster prevention, preparation and response, such as in the case of intense rainfall. One of the course’s main subjects is climate-change adaptation, taught to raise awareness of adaptation mechanisms that La Paz should adopt.

- **La Paz/Lima/Quito Regional Carbon and Water Footprint Project**
  - **Timeframe:** September 2012-May 2013
  - **Investment:** US$ 15,000
  - The objective is to quantify energy and water consumption to encourage good habits among the public in general that put those resources to proper and rational use. To provide the program with an extended reach in the Latin American context, La Paz, Quito, and Lima will participate. Noteworthy actions include carbon and water footprint evaluations for all three cities; local- and regional-level climate change adaptation and mitigation actions identification, prioritization and implementation; and promoting coordination and participation among the three local governments, the business sector and society at large with regard to their joint adaptation and mitigation actions.
MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

- The Belo Horizonte Sustainable Seal
  Timeframe: July 2011-September 2012 (ongoing)
  Investment: US$ 40,316
  The seal is a municipal certification awarded to public and private residential, commercial and/or industrial establishments that take measures to reduce water and energy consumption, direct GHG emissions, and reduce/recycle solid wastes. Compliance is voluntary and following appropriate analyses and audits, gold, silver or bronze seals are possible. To date nine certifications and three official approvals have been awarded.

- Greenhouse Gas Emissions Reduction Plan (PREGEE)
  Timeframe: November 2012-April 2013 (ongoing)
  Investment: US$ 151,444
  The PREGEE’s drafting seeks to subsidize environmental urban planning designed to reduce and mitigate GHGes via urban area climate-change adaptation initiatives that call for actions in areas such as transportation, energy, sustainable construction, soil use/zoning, health and education to favor sustainable development and low-carbon economy promotion. In September 2012 the municipal GHG emissions inventory update was completed.

- Sustainable Civil Construction and High-Volume Wastes Management System (SGRCC) and Integrated Municipal Civil Construction and High-Volume Wastes Administration Plan (PMRCC)
  Timeframe: published August 2012; enters into effect in August 2013
  Investment: US$ 56,921
  Municipal code 10,522, enacted 25 August 2012, instituted the SGRCC and PMRCC. The former is package of actions, services, infrastructure and operative installations that aim at proper management of civil construction and high-volume wastes. PMRCC objectives include stakeholder discipline and proper environmental disposal of such wastes. To contribute to full adoption, municipal code 10,522 was enacted on 10 September 2012 to deal with urban cleanliness, services and solid waste management.

MAJOR CLIMATE-CHANGE ADAPTATION MEASURES

- BH + Verde Tree-Planting Program
  Timeframe: October 2011-October 2014
  Investment: US$ 7,474.83
  BH + Verde is a tree-planting program for high-visibility public spaces and other visual priority public areas that seeks to promote environmental and landscape quality upgrades for the city. The project is to be carried out from 2011 to 2014 via rainy-season planting that takes place from October to March yearly for a total of 54,000 units to be planted, divided into three 18,000-sapling crops, equally distributed in the city’s nine administrative regions.

- Public-Space Tree Inventory
  Timeframe: July 2011-October 2014
  Investment: US$ 1,673,305
  An inventory of trees in public spaces as well as those located in private lots (located at up to five meters’ frontal distance) was undertaken via a data harvest the physical characteristics and phytosanitary status of each tree specimen and its surroundings in order to perfect and manage such vegetation. The inventory will generate a complete information system for each of the trees, allowing for ongoing and permanent updates that in turn allow for an advance in urban forestry management.

- Flood-Zone Mapping and Hydrological Monitoring
  Timeframe: March 2007-October 2011
  Investment: US$ 1,250,000
  Hydrological and hydraulic molding studies have been carried out as part of the Belo Horizonte master drainage plan in all local-area basins to identify flood-prone areas and associated risks as well as complete flood mapping. In October 2011, 42 hydro-meteorological monitoring stations entered into operation alongside a system that allows real-time access to collected data. In the rainy season, the municipal government monitors stations 24 hours a day, seven days a week.

Participating organizations: 40 Núcleos de Alerta de Lluvia (NAC), volunteer groups that inhabit flood-prone zones and assume responsibility for spreading rain and local waterway level alerts to neighbors. Local government coordinates community flood alert nuclei.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

The “Green Brigade”
Timeframe: October 2011-September 2012
Investment: US$ 105,000
The project calls for active citizen-participation in tree planting, undertaken during the rainy season, in city public spaces and parks. At the same time, awareness is increased among local residents who are encouraged to reflect on this urban project’s importance.

Participating Organizations: Rede Globo

Air-Quality Monitoring
Timeframe: October 2011-September 2012
Investment: US$ 8000
In conjunction with state government agencies, an automated air quality monitoring station was established. The municipal government provides permanent security, maintenance and operating conditions. The goal of the station is to strengthen an optimized monitoring network along the Belo Horizonte-Betim axis, cities that lie to the east and west of Contagem, respectively.

Participating Organizations: The State Ministry of the Environment and Sustainable Development and the State Environmental Foundation

Contagem

<table>
<thead>
<tr>
<th>Mayor or local authority name</th>
<th>Marilia Aparecida Campos</th>
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<tbody>
<tr>
<td>Population</td>
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<td>Territorial extension</td>
<td>195 km²</td>
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<td>Total climate-related actions budget</td>
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Curitiba

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</table>

MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

Socio-Economic and Environmental Vulnerability Study
Timeframe: December 2011
Investment: US$ 340,396
The study includes meteorological input and hydrology-model calibration to assess climate change impact and the city’s vulnerability. Hydrology data will be calculated and converted into cartography information, generating maps indicating flooding locations and quotas. Areas with higher likelihood of erosion will be defined by taking into account geo-morphology factors and their direct relation to surface runoff dynamics. The relationship between stream direction and climate will also be used to generate an environmental statement.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- Socio-Economic and Environmental Vulnerability Study
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- Hybrid Buses
  Timeframe: June 2012
  Investment: US$ 12.80 million
  At Rio + 20 in June 2012 the mayor presented Hibridus, a hybrid bus with an electric and biodiesel driveline, soon to be part of the city’s public transportation fleet. Sixty hybrid vehicles with an 85-passenger per-bus capacity will join the Integrated Transportation Network starting in September 2012. The new technology affords up to 35% better fuel economy and reduces 90% of polluting gas emissions in comparison to conventional buses with Euro 3 technology. Additionally, the new buses are silent some 30% to 40% of operating time.

- Natural Municipal Heritage (RPPNM) Private Reserves
  Timeframe: May 2012
  Investment: N/A
  RPPNMs main objective is protecting fauna and flora in reserve properties featuring significant native vegetation. The original owner retains title to the property, but the mechanism brings advantages such as property tax relief equal to forested area value; the right to transfer 100% of the property’s development rights to other city areas; and a right to negotiate Private Reserve status with Natural Municipal Heritage authorities.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- Barigui, Tingui and São Lourenço Park Lake Dredging
  Timeframe: November 2011
  Investment: US$ 3.69 million
  In addition to flood prevention, the objective is to improve conditions in parks with historical, civic and tourism value. The Barigui project calls for dredging its namesake river to extend the existing canal and install mechanical locks to control water volume. São Lourenço’s current manual locks will be mechanized for more rapid water-level adjustment, particularly in case of heavy rains. Tingui Park work focuses on bank recovery and containing erosion brought on by the park’s capybara population.

- Barigui River Flood Prevention and Intervention
  Timeframe: May 2012
  Investment: US$ 8.86 million
  In May 2012 Curitiba began major flood prevention and control interventions. Initial Barigui River investments will improve river flow between the Fazendinha district and the Barigui Delta adjoining Fazenda Rio Grande. Along a 22-kilometer course, flow conditions will be improved, banks will be cleaned and the bed will be dredged, easing rainwater flow and avoiding flood points.

- Vila Rigoni and Bernardo Meyer Park
  Timeframe: May 2012
  Investment: US$ 9.70 million
  New recreational and environmental preservation areas will be established in a 210-thousand m² parcel on the banks of the Barigui River, an at-risk area formerly home to local families subsequently placed in affordable housing developments. New parks will feature recreation equipment, paving, public lighting, drainage works, hiking trails, sandboxes and landscaping; both parks are part of the Viva Barigui Linear Park that will link existing parks, woods and recreational areas to conservation units as a means of fostering biodiversity and a Barigui River infrastructure corridor.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Transfer Station**
  Transfer Station
  Timeframe: starting July 2012
  Investment: US$ 2,500,000
  A new garbage receiving and transfer station was constructed for Diadema, a 2,290.16 m²-area that replaces the previous 400 m²-area, and features a biological filtering system that eliminates odors and dark organic materials decomposition fluids (lixiviates), which are transferred to a water and runoff treatment plant for recapture and reuse. The station benefits the environment as well as the surrounding neighborhood and community.

- **Municipal Mass Transit System Timing Unification**
  Timeframe: starting June 2012
  Investment: US$ 2,500,000
  This program enhances user appeal among Diadema public transit riders. An electronic card allows riders board buses at any point throughout the city and avoid trips to the Central Terminal; transfers are allowed within a fifty-minute window and at no additional cost. Accessibility, low fares and quality have greatly improved public transportation ridership.

- **Diadema’s First Bike Paths**
  Timeframe: starting June 2012
  The city government has begun implementation of bike paths that allow cyclists to circulate along city streets on Sundays and holidays, offering citizens another option for sports, healthy community life and environmental protection. Installation of such bicycle-only lanes are envisioned citywide.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Mananciais Growth Acceleration Program**
  Timeframe: starting September 2012
  Investment: US$ 24,500,000 (from the federal government) and US$ 6,300,000 (from the local government)
  30% of Diadema’s territory is made up of environmental reserves, but these are irregularly occupied by some 60 thousand individuals in communities within the Represa Billings district. With support from the federal government’s Growth Acceleration Program, a plan was implemented for the partial ecological recuperation of these areas, to improve housing through infrastructure and environmental health measures, and to create municipal parks that benefit more than four thousand families in eleven local village communities.

- **Solar Water Heating and Conservation at Four Schools and the Polyclinic**
  Investment: US$ 7,000,000
  The city government provided four more early-education schools and a new polyclinic featuring solar water heating and technology that helps control water consumption, affording an up-to-20% savings.

- **New Greenspaces with Open-Air Gymnasiums and Tree Planting**
  Timeframe: starting May 2012
  Investment: US$ 220,000
  The city government created four new plazas as greenspaces for the people of Diadema, featuring open-air workout equipment. New green areas were built or revitalized from May to September 2012 in city neighborhoods; 2300 new trees were planted citywide.

- **Water-Loss Reduction, Water-Appreciation and Environmental Education/Awareness Program**
  The local Diadema water company and its environmental team conducted workshops with civil-society and student organizations to train “waste-fighting agents.” The program includes a “water house” in which children really get to know how this essential liquid is distributed as well as how to conserve it. Environmental education activities are expected to involve participation from nearly 7000 individuals.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

 ■ Urban Forestry Master Plan
 Timeframe: 2011
 In 2011 the Environment Secretariat exceeded annual tree planting targets for the City, with 20,000 native tree seedlings planted. City reforestation is regulated by the PDAU, a set of methods and metrics adopted for urban tree preservation, management and expansion according to technical and community-based demands. It establishes, for example, that sidewalks should encompass a minimum of 40% vegetated area.

 ■ Bus Rapid Transit
 Timeframe: March 2012-August 2013
 BRT is a high-capacity bus system that provides fast, comfortable, efficient and quality service. Using dedicated lanes, BRT simulates rail-based transportation system performance as well as other attractive rail features, yet costs less. BRT systems have demonstrated a potential to drastically reduce CO₂ emissions. Partial construction of the PROTÁSIO ALVES and BRT BENTO GONÇALVES lines has already begun.

 ■ Bicycle Paths Implementation
 To support bicycle use as a transportation alternative, the Integrated Master Plan for bicycle lanes identified 495 suitable km in different areas of the city. Besides providing greater user security, the plan seeks to support enhanced quality of life by improving environmental and urban issues. Cycle paths totaling 17,050 meters are already under construction; and should be completed by World Cup 2014.

 ■ City Greenhouse Gas Inventory and Emissions Scenario
 Timeframe: July 2012-December 2013
 Investment: US$ 600,000
 A GHG inventory is a planning process stage that demonstrates baseline emission conditions and sources. Numerous GHG inventories are analyzed and estimated in accordance with a methodology that accounts for most emissions that arise from socio-economic activities. A GHG Emissions Scenario seeks to identify a future emissions baseline scenario and identify/quantify mitigation actions (alternative scenarios) that consider various strategies.

 Partic pating Organizations: Gerência de Mudanças Climáticas/SMAC – Secretaria Municipal DE Meio Ambiente; COPPE/UFRJ – Instituto Alberto Luiz Coimbra de Pós-Graduação e Pesquisa de Engenharia; ThyssenKrupp CSA – Companhia Siderúrgica do Atlântico; IPP – Instituto Municipal de Urbanismo Pereira Passos

 ■ City GHG Monitoring System
 Timeframe: July 2011
 Investment: US$ 1,200,000
 The Rio de Janeiro city government has partnered with the World Bank, COPPE-UFRJ and the World Resources Institute (WRI) to develop a GHG monitoring strategy that seeks to: (i) establish the Rio Climate Data Bank, a city GHG data archive; and (ii) implement a methodology that periodically compiles and processes citywide GHG emitter data, allowing Rio to update its GHG inventory annually.
Participating Organizations: Gerência de Mudanças Climáticas/SMAC – Secretaria Municipal DE Meio Ambiente; World Bank; COPPE/UFRJ – Instituto Alberto Luiz Coimbra de Pós-Graduação e Pesquisa de Engenharia; IPP – Instituto Municipal de Urbanismo Pereira Passos

**Bike Rio**
Timeframe: 2013 – 2016
Investment: US$ 8,123,000
The Bike Rio program seeks to conserve and expand the city’s bicycle paths as well as connect them to other transport systems. Guard and loan stations will be installed and an additional 150 kms of bike paths will double the network. A new 2013-2016 strategic plan calls for yet another 150 km of bike paths with a goal of 450 km total by the 2016 Olympiad.

Participating Organizations: SMAC – Secretaria Municipal DE Meio Ambiente; CET-RI; IPP – Instituto Municipal de Urbanismo Pereira Passos

**Major Climate-Change Adaptation Actions**

**City Population Climate-Change-Related Health Vulnerabilities**
Timeframe: September 2012-May 2014
Investment: US$ 651,000
This research allows climate risks to be incorporated into municipal planning, providing the city with necessary tools to identify and reduce social/environmental/health vulnerabilities. A principal objective is to bridge the gap between research and public health services through multi-institutional networking and innovative spatial-information technology tools.

Participating Organizations: Gerência de Mudanças Climáticas/SMAC – Secretaria Municipal DE Meio Ambiente; Ministério da Saúde; FIOCRUZ – Fundação Oswaldo Cruz

**Brazilian State Capital Environmental Management Success Stories**
Timeframe: May 2012
Investment: N/A
A forum attended by 22 of Brazil's 27 state capital environmental ministers. Over the course of two days, they debated propositions and solutions for their respective cities' major environmental problems. Several success stories were presented, touching on reforestation, waste management, urban mobility, and other issues, leading to the Rio Sustainability Declaration, later presented at the Rio+20 Mayors Summit and the Rio+C40 meeting, a principal debate forum for cities at the Rio+20 United Nations Conference on Sustainable Development held in June 2012.

Participating Organizations: Gerência de Mudanças Climáticas/SMAC – Secretaria Municipal DE Meio Ambiente; Konrad Adenauer Stiftung

**Rio de Janeiro Metro Area Vulnerability Map**
Timeframe: 2010 – 2011
Investment: N/A
Vulnerability map put together by INPE in partnership with the Rio de Janeiro city government and UK financing. A key step forward in terms of decision-making, the study was conducted with the help from both Brazilian and international experts, based on climate-change-related evidence.

Participating Organizations: INPE – Instituto Nacional de Pesquisas Espaciais; UFRJ – Universidade Federal do Rio de Janeiro; UERJ – Universidade do Estado do Rio de Janeiro; FIOCRUZ – Fundação Oswaldo Cruz; IPP – Instituto Municipal de Urbanismo Pereira Passos; Embaixada Britânica/Brasília; UNICAMP – Universidade Estadual de Campinas
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Methane-to-CO₂ Conversion at the Sanitary Landfill**
  Timeframe: 2000-2012
  Investment: N/D
  This program collects and burns off methane generated at the sanitary landfill, a step originally undertaken to avoid slides and explosions caused by gas-accumulations within the fill. The city landfill was in operation from 1995 until the second half of 2011; methane generated there was captured and burned off following the fill's third year of operations, as part of landfill management best-practices efforts.

- **São Carlos Anti-Burning Campaign**
  Timeframe: 2000-2012
  Investment: N/D
  Fire use as a means for clearing urban vacant lots in most of interior Brazil's cities is an historically established practice that promotes serious and direct harm to human health as it significantly contributes to increased GHG emissions. The described campaign seeks to combat this practice via environmental education activities, taxation and legal recourse. The campaign is especially active in the dry season, April to September.

  **Participating Organizations:** The fire department, the State Ministry of Education Teaching Office, the Universidad Federal de São Carlos, Embrapa Pecuaria Sureste.

- **City Orchard Organic Wastes Composting**
  Timeframe: 2003-2012
  Investment: N/D
  Starting in 2003, the São Carlos municipal government prevented nearly 1.5 metric tons of food waste from entering the sanitary landfill. These wastes were instead processed via a composting technique to be used as fertilizer in the city's municipal orchard, which adopted agro-ecological and organic production guidelines starting in 2001. Much of the compost manufacture is carried out using aerobic fermentation processes, which avoids generating high-impact GHG such as methane.

MAJOR CLIMATE CHANGE-ADAPTATION ACTIONS

- **Urban Macro-Drainage Master Plan**
  Timeframe: 2010-2012
  Investment: N/D
  São Carlos's Urban Macro-Drainage Master Plan is an important adaptation component for the community given a probable worsening in global climatic conditions that will affect the entire planet differently depending on local environmental characteristics, but also in accordance with which local adaptation preventative measures are adopted. São Carlos is situated in a region of emerging headwaters; increases to precipitation and the frequency of extreme weather events represent one of its principal disaster risks.

- **Municipal Risk-Reduction Plan Preparations Kickoff**
  Timeframe: 2011-2012
  Investment: US$ 5000
  The Municipal Risk-Reduction Plan, which features a Urban Macro-Drainage Master Plan as one of its principal components, seeks—among other measures—to establish goals and timeframes to implement an risk reduction alert system in light of imminent natural or manmade disasters. Without question it is a fundamental part of societal changes in São Carlos that respond to increasing and permanent threats that global climate change generates in the local environment.

- **Plantando el Futuro Planting Program**
  Timeframe: 2001-2012
  Investment: N/D
  This program seeks to foment local plant and riparian forest recuperation as well as offer incentives encouraging urban forestation, which could reduce average local temperatures up to four degrees centigrade—a quite notable figure in light of the fact that by 2030 the planet’s average temperature may rise as much as 2 degree centigrade. The local government created a program in which every citizen can receive a free sapling in his or her home. A tax incentive was also created for buildings that plant trees streetside and reserve a percentage of interior vegetation-covered permeable area.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Anthropogenic Emissions Inventory and Greenhouse Gas Removal**
  
  **Timeframe:** December 2011 kickoff  
  **Investment:** US$ 400,000  
  
  This program sponsors drafting city emissions and GHG removal scenarios to inform government decision-making and propose climate-change-related public policy regarding energy, transportation, health, development, land use and solid urban waste management, based on an examination of the 2003-09 period.

- **Municipal Climate Change and Eco-Economy Committee**
  
  **Timeframe:** Permanent  
  **Investment:** Running Costs  
  
  The committee implements recommendations from different municipal authorities as well as on the part of NGOs that enjoy committee membership.

- **Vehicle Inspection**
  
  **Timeframe:** Begun 2009, ongoing  
  **Investment:** Installation of 33 inspection centers, variable costs  
  
  The City implemented an automatic emissions control system for its registered municipal fleet designed to reduce emissions and therefore help improve air quality and overall public health.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Renewable Fuel Buses**
  
  **Timeframe:** Permanent  
  **Investment:** Variable  
  
  The City will use ethanol and hybrid-powered buses as the electric fleet is expanded.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Ladner Leisure Centre Energy and GHG Emission Reduction Retrofit**
  Timeframe: January 2012 (retrofits complete)
  Investment: US$ 750,000
  Ladner Leisure Centre consists of an ice arena, aquatic installations and recreational facilities. The retrofit included high efficiency boilers, heat recovery from the ice rink ice plant, heat recovery from the pool chamber exhaust air, pool plate heat exchangers, variable speed drives for the main pool air-handling units and a solar hot water system for pool water heating. This project is guaranteed to reduce facility GHG emissions by 34%, a total reduction of 360 tCO2eq/year.

- **Delta Solar Hot Water Project**
  Date of execution: May 2012 (Project kickoff; in progress)
  Investment: US$ 350,000
  The Delta Solar Hot Water project involves significantly increasing the size and scope of the solar system originally contemplated for the Ladner Leisure Centre and the addition of solar hot water systems to Delta’s two outdoor pools. These systems will result in further emissions reductions equaling 33 metric tons of GHG annually. The project is currently in the design and procurement stage.

- **Vancouver Landfill Technical Liaison Committee (City of Vancouver/Corporation of Delta)**
  Timeframe: January 2012
  Investment: US$ 4,000,000
  In response to community concerns relating to landfill gas escaping from the City of Vancouver Landfill located in Delta, BC, a Technical Liaison Committee was formed between senior Vancouver and Delta staff to monitor progress towards implementing measures to mitigate community impacts and reduce GHGs. It is estimated that GHG emissions will be reduced by at least 100,000 metric tons in 2012 (from 2011 levels) as a result of new landfill gas collection infrastructure and landfill closure projects.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Oliver Pump Station and Boundary Bay Dyke Improvements**
  Timeframe: November 2011
  Investment: US$ 6,455,000
  A major upgrade to an existing drainage pump station as well as dyke improvement works that will improve flood protection and resiliency for Delta with respect to changing weather patterns and rising sea levels. The pump station and dyke around the pump station were constructed at a higher elevation than the existing station to allow for rising sea levels. Funding for the project was provided by the Government of Canada, Province of BC and Delta.

- **Delta Irrigation Enhancement Project (DIEP)**
  Timeframe: In progress
  Investment: US$ 18 million
  Funded by the Province of British Columbia, the DIEP will greatly increase the capacity of the Delta agricultural irrigation system that conveys freshwater from the Fraser River to agricultural properties in Delta. The new system will draw water from further upstream to avoid saltwater intake. With rising sea levels, Fraser River saltwater distribution will change; an abundant source of reliably fresh water will help farmers adapt to climate change.

- **Climate Change Adaptation Planning Initiatives**
  Timeframe: January 2010-March 2013
  Investment: In-kind
  A leader in adaptation planning, Delta participated in the development of a guidebook on this subject for Canadian municipalities, published by ICLEI Canada. Delta is now working through the guidebook. A new agricultural adaptation project is underway; Delta is one of three participating BC communities. Finally, an innovative climate change visualization project that examines possible sea-level-rise adaptation measures has just been completed in collaboration with the University of BC.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Street Light Conversion to LED (Corporate Operations)**
  Timeframe: 2011-2020 inclusive
  Investment: Costs and savings are generated each year. Over a twenty-year life cycle assessment period, the project is expected to save City Operations $34 million. Through ongoing research and pilot testing the City has been able to confirm a low energy lighting design acceptable to its roadside lighting operations. The City plans now to replace the 100,000 roadway units in its system, 12,000 by the end of 2012. By 2020, an annual emissions reduction of 25,000 tCO2eq/year is expected from this initiative.

- **Landfill Gas (LFG) Capture System**
  Timeframe: 2011
  This system has been in operation since 1992. Originally, the LFG was cleaned up and injected into a pipeline to supplement natural gas used to generate power. In 2005, this gas was instead routed directly on-site to three reciprocating CAT engine turbines to generate power for the grid. The following data reflects metric tons of CO2eq “captured”:
  - 2007: 141,369.8
  - 2008: 141,775.6
  - 2009: 146,045
  - 2010: 150,394
  - 2011: 134,071.2
  Participating Organizations: Capital Power

- **Composter Facility**
  Timeframe: 2011
  Landfill waste in Edmonton has been diverted to a composting facility since 2001. The CO2 reduction is based upon what would have been emitted if the waste that was composted were instead sent to a landfill. The calculation meets the reporting protocols in our jurisdiction, accounting for the energy inputs into composting and the emissions from the composting process itself, further discounting this value by 10% to account for methane oxidation through the landfill cover.

- **Sustainable Transportation**
  Timeframe: Ongoing
  Investment: Ongoing Capital /Operational
  The aim is to encourage a shift from private automobile to walking, cycling and transit use by infrastructure improvements and social marketing, as directed in the Transportation Master Plan in 2011:

  - 4.5 km of sidewalk and Shared Use Pathways “missing links” constructed
  - 20 km of on-street cycling facilities implemented
  - 15 bus stops connected
  - 250 curb ramps repaired
  - Sponsored community events to promote sustainable transportation and developed trail maps for our communities and river valley.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Lendrum Stormwater Management Dual-Use Dry Pond**
  Timeframe: 2006-2016
  Investment: Ongoing operational expense. Estimate US$146 million over ten years
  In 2004 an extreme rainfall event created massive flooding problems throughout Edmonton. In response, the City Council approved a $146 million flood prevention program. One component, the Lendrum dry pond, is situated on a school property. The field was reconstructed at an elevation below the adjacent roadways to receive and contain flood waters during infrequent, large rainfall events, providing flood control, yet still allows the school field to fulfill its current function as a recreational area.
  Participating Organizations: Insurance Bureau of Canada
**Really Grate Tree Project**  
**Timeframe:** 2011-2013  
**Investment:** Ongoing Operational expense  
The City has begun assessing the potential effects of climate change on its urban forest canopy. The plan is to change survival statistics by testing different tree-planting and -replacement programs to anticipate which trees will survive in the wetter, warmer climate anticipated for the Edmonton of the future.

**Root For Trees Initiative**  
**Timeframe:** 2012-2015  
**Investment:** Ongoing Operational expense  
The aim is to increase the number of trees planted in the city through volunteer participation and education. This initiative includes already-underway programs plus the addition of specific tree planting festivals.

### Metro Vancouver

<table>
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<th>Mayor or local authority name</th>
<th>Greg Moore</th>
</tr>
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<tbody>
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<td>2 313 328 (2011)</td>
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<tr>
<td>Territorial extension</td>
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</tr>
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<td>City’s overall budget allocation for climate-change-related actions</td>
<td>US $ 600 000/year</td>
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### MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

**Small-and Medium-Enterprise GHG Training Program**  
**Timeframe:** April 2011-June 2012  
**Investment:** US$ 150,000  
Metro Vancouver and several of its member municipalities supported a pilot program to train small and medium enterprises to manage their GHG emissions. Participating businesses were required to compile an inventory of their businesses’ direct and indirect emissions and identify strategies to reduce them. The participating businesses account for 92,000 metric tons of regional emissions. Based on data, the median GHG reduction businesses are achieving in the first year is 6.4% below the previous year.
Metro Vancouver

PHASE I – COQUITLAM LANDFILL GAS CAPTURE SYSTEM UPGRADE
Timeframe: October 2011–April 2012
Investment: US$ 3 million
Metro Vancouver is upgrading the landfill gas collection system at its closed landfill in the City of Coquitlam. The landfill has not been receiving waste since 1983, but is still generating significant amounts of landfill gas. As result in 1993, a gas collection system was installed. In 2011, Metro Vancouver repaired and expanded the system to improve collection efficiency and thereby significantly reduce fugitive methane. The upgraded system is expected to generate approximately 25,000 GJ/year of landfill gas and reduce an additional 4000 t/year of GHG.

INTERIM SEWER HEAT STRATEGY
Timeframe: December 2011–July 2012
Investment: Staff time
As the authority responsible for the region’s trunk sewer network and wastewater treatment system, Metro Vancouver has developed an Interim Sewer Heat Strategy to enable access to sewage heat for district energy systems. The intent is to provide clear direction to public and private entities interested in using sewer heat in place of natural gas for heating while a more detailed long-term sewer heat policy framework is being developed. The interim strategy allows Metro Vancouver staff to conduct further technical analysis and engage with stakeholders on issues such as governance, ownership rights, liability, etc.

ICLEI ADAPTATION INITIATIVE
Timeframe: January 2011–December 2012
Investment: US$ 23,500
Metro Vancouver and four of its member municipalities are participating in the ICLEI Adaptation Initiative. Through the five-milestone process, regional local governments are gathering more data on the impacts of climate change in the region, identifying risks and vulnerabilities, and identifying strategies to address those risks. Participating Organizations: ICLEI

PROJECTED CLIMATE CHANGE, EXTREMES, AND HISTORICAL ANALYSIS
Timeframe: November 2011–July 2012
Investment: US$ 10,000
Those local governments participating in the ICLEI Adaptation Initiative worked closely with the Pacific Climate Impacts Consortium (PCIC) to generate more useful downscaled climate impacts data for the Metro Vancouver region. The study produced forecasts for changes in precipitation, heating- and cooling-degree days, and temperature extremes. The data will be used by Metro Vancouver and the region to plan for climate change impacts.

ECOLOGICAL HEALTH ACTION PLAN
Timeframe: Adopted in October 2011
Investment: Staff time
In October 2011, the Metro Vancouver Board adopted the Ecological Health Action Plan which supports the protection and enhancement of the region’s ecological systems in four opportunity areas: 1) advancing the regional green infrastructure network 2) supporting Salmon in the Cities 3) supplementing ecosystem services and 4) reducing toxins. These four projects will help strengthen regional resilience to climate change impacts by protecting important ecosystem services such rainwater infiltration and retention, local food production, erosion control, and biodiversity protection.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Green Can Food Scraps and On-Street Recycling Program**
  Timeframe: May 2012
  Investment: US$ 25,000 (Green Can Program) and US$ 44,000 (On-Street Recycling Program)
  The City has installed fifteen new on-street recycling containers in prominent locations throughout the community. The program is the result of a City-wide waste audit, and will divert a significant volume of recyclable material from the garbage. In May 2012 the City began collecting food scraps at the curbside with the new Green Can program. The food scraps are sent to a facility for composting into a rich soil amendment, thus reducing methane emissions from landfilling.

- **Local Carbon Fund**
  Timeframe: September 2012
  Investment: US$ 50,000 annually
  The City has received directive from City Council to develop a local carbon funding structure to account for its corporate carbon emissions. Based on the City’s corporate emissions inventory, funding will be directed annually towards carbon reduction projects at a specified amount per tonne of emissions generated. This process will formalize the City’s continued climate action commitments and ensure a legacy of continued funding for carbon reduction projects in the community.

- **Higher Energy Efficiency Zoning Bylaw Amendment**
  Timeframe: 2011
  Investment: US$ 25,000
  The City has implemented an innovative zoning bylaw amendment to encourage energy efficiency in all new buildings. The City’s novel approach of incentivizing higher energy performance has resulted in almost all of new buildings being built to or exceeding the higher energy standards. Energy modeling estimates that the bylaw amendment will save 440 tons of GHG emissions and 1.3 GWh of electricity annually.
MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

■ Sea Level Rise Adaptation Study
Timeframe: September 2012
Investment: US$ 120,000
The City has completed floodplain mapping to assess sea level rise at present, in 2100 and in 2200. The study is informing the establishment of new flood construction levels, and computer modeling will be used to inform a sea level rise adaptation strategy. The study will also contribute to the development of a local climate adaptation action plan as part of ICLEI’s Climate Adaptation Initiative, a program that assists local governments with action plan development and implementation.

■ Climate Action Plan Tree Planting Program
Timeframe: April 2012
Investment: US$ 20,000 (2012 – 2013)
The City has developed a Climate Action Plan Tree Planting Program to plant trees on streets with no trees at present, specifically planting approximately 30 trees per year (2012-2013), 80 trees per year (2014-2015) and 130 trees per year (2015-2020). Program implementation and species selection is guided by the City’s Street Tree Master Plan. Over time, the increase in the urban forest canopy will improve carbon sequestration, moderate the heat island effect, and filter air pollutants.

■ Food Security and Urban Agriculture Strategy
Timeframe: June 2012
Investment: US$ 5,000 annually
The City has developed a Food Security and Urban Agriculture Strategy, which provides a framework for acquiring additional food production land and encouraging citizens and community groups to engage in urban agriculture on public and private land. This program will increase food security while reducing GHG emissions associated with food production, processing and transportation, as residents source locally grown food.

OTHER RELEVANT INFORMATION
The City of North Vancouver is located at the base of the beautiful North Shore Mountains, connected by seabus to downtown Vancouver. The City’s vision is to be a vibrant, diverse, and highly livable community that strives to balance the social, economic, and environmental needs of our community. Sustainability and climate protection are integrated into all City operations and projects.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **City of Surrey Cycling Plan**
  Timeframe: July 2012
  Investment: US$ 2 million (annual budget)
  In July 2012, a new comprehensive City of Surrey Cycling Plan was approved; it focuses on four key principles: expanding and improving the on- and off-street cycling network; increasing the availability, quality and variety of end-of-trip facilities; keeping the network safe, visible, and in good condition; and promoting safe cycling as a healthy, fun, affordable and sustainable way to travel. The City's overall investment in cycling infrastructure is now close to 14% of the total transportation budget.

- **City of Surrey Community Energy and Emissions Plan**
  Timeframe: Ongoing
  Investment: US$ 300,000
  The City of Surrey is developing a Community Energy and Emissions Plan (CEEP) that will outline how the city intends to meet its GHG emission reduction targets. The CEEP will identify strategies and policies related to land use, transportation, buildings, energy infrastructure, and solid waste. The City has completed an energy and emissions baseline and 25-year projections to better understand future energy demand and supply. A draft Plan is under development along with stakeholder engagement around specific strategies.

- **City Center District Energy System and Utility**
  Timeframe: Ongoing
  Investment: US$ 5.5 million
  Surrey is implementing district energy (DE) systems to provide thermal energy to buildings in the city center. The inaugural system will rely on a vertical, closed-loop geo-exchange field to provide heating and cooling to the new City Hall, library and large mixed-use development on the site. Over time, Surrey will build additional district energy systems in step with downtown growth and re-development. A “Surrey City Energy” utility has been established, and a bylaw enacted which requires all city center developments of a certain size to be compatible with DE connection.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **City of Surrey Climate Adaptation Strategy**
  Timeframe: Ongoing; February 2011-December 2012
  Investment: US$ 25,000
  The City of Surrey is developing a Climate Adaptation Strategy to anticipate and respond to the impacts of climate change over the coming century. The strategy is being developed with support from ICLEI: Local Governments for Sustainability and follows their five-milestone process: initiate; research; plan; implement; and monitor. The strategy will be completed by 2013 and aims to enhance flood management capacity and human health, as well as increase the resilience of infrastructure, ecosystems and agriculture in Surrey.

- **Climate Change Floodplain Review**
  Timeframe: October 2011-September 2012
  Investment: US$ 300,000
  A study is underway to better understand how the City of Surrey’s coastal floodplains may be affected by projected sea level rise and estimated ground subsidence rates. The majority of the city drains either through the Nicomekl or Serpentine Rivers, both tidally influenced. A series of long-term simulations will quantify the combined impact of sea level rise, storm surges and rainfall on low-lying areas. Study outcomes will be used to develop a Climate Adaptation Strategy for these areas.
Global Cities Covenant on Climate

CHILE

Lautaro

Mayor or local authority name: Renato Hauri Gómez
Population: 35,236
Territorial extension: 901 km²
Total climate-related actions budget: US $ 52,300

Major Greenhouse-Gas Mitigation Actions

- **Waste Minimization Pilot Plan**
  Timeframe: starting January 2012
  Investment: US$ 45,000
  Two city “clean points” have been set up and provided with 48 special paper and plastic recycling bins. These clean points form part of street installations featuring container identification and signage as well as information for their proper use. Their location is determined by their proximity to major housing complexes, street and on-foot accessibility, and a proper placement area. In turn, the 48 specially colored bins and their collection system gave rise to 24 clean points: twelve located in in the city’s urban high schools and twelve at different sites where neighborhood groups meet. The local government’s role is to assure the proper array and maintenance of the placement area. Neighborhood associations and school student bodies are charged with the mission of publicizing, educating and creating awareness within the community, in addition to establishing contact with the purchasing entity to receive part of the activity’s economic benefit. Finally, the buying entity is charged with guaranteeing completion of the waste minimization cycle.

- **Battery Recycling Campaign**
  Timeframe: March-July 2012
  Investment: US$ 2,000
  The municipal government decided to participate in a three-way partnership between the Ministry of the Environment, Frontel (a private electrical distribution company) and the Lautaro local government to carry out a five-month campaign that asked the community via television and radio to set aside their batteries until a July submission date when Frontel took on final disposal of nearly 800 kg at a safe landfill. The batteries were received at a ceremony in the community’s main plaza.

- **Glass Recycling in Lautaro**
  Timeframe: July 2012-July 2017
  Investment: US$ 17,500
  This project arose from a cooperation agreement signed between the Corporación de Defensa de la Flora y la Fauna (CODEFF), the municipal government of Lautaro and Cristalerías Toro. The agreement led to twelve community glass recycling campaigns deployed at strategic points that allowed for the largest possible collection of glass quantities. Cristalerías Toro reclams the glass to turn it into new bottles; part of recycling proceeds go to benefit CODEFF. Being able to recycle three essential energy- and natural-resources-consumption components (plastic, paper and glass) reduces atmospheric carbon emissions.

- **Nuevo Aire Campaign**
  Timeframe: June-October 2012
  Investment: US$ 7,300
  This campaign’s mission is to bring together organizations and individuals who get increasingly involved in south Chile’s atmospheric cleanup via education and the application of measures that favor responsible energy selection and alternative heating systems. Part of the campaign included publicity and awareness activities aimed at students in the community’s educational installations to create awareness from an early age with regard to the use of firewood as a main heating element.

Participating Organizations
CODEFF, Cristalerías Toro, SEREMI Medio Ambiente Región de la Araucanía, Diario Austral de Temuco, Frontel
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Green and Public Space Upgrades**
  Timeframe: October 2011-September 2012
  Investment: US$ 123,284
  Forty-three community plazas were improved through plantings, playgrounds and sixty new trees, which led to coverage of 34,200 m² of new green areas.

- **Proactive Paving**
  Timeframe: October 2011-September 2012
  Investment: US$ 283,379
  Thirty-three streets were paved to cover a total of 27,965 m².

- **Project-Based Paving**
  Timeframe: October 2011-September 2012
  Investment: US$ 750,827
  Undertaken improvements facilitated paving nearly 6000 m² of streets and 3300 m² of sidewalks.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Community Recycling Implementation**
  Timeframe: October 2011-September 2012
  Investment: US$ 31,712
  This initiative seeks to promote active community participation in recycling disposable materials (paper, plastic, batteries, glass and tetrapak) via container deposit as well as in charity institution bins. The program is developed by means of streetside recycling areas and containers are identified by distinctive colors according to the materials they are to receive.
  Participating Organizations: Codeff, Cruz Roja, consultancies, CMO schools, city offices and the Agrupación de Recicladores Ecológicos de Quilpué.

- **Green Area Protection and Proposed Quilpué/Regional Park**
  Timeframe: October 2011-September 2012
  Investment: US$ 2114
  The proposal calls for the conservation of 450 hectares as an inter-community park to avoid deforestation and later development after zoning changes. Open spaces, for use by the community, are to be facilitated as spaces for gatherings, play, sports, traditional celebrations and recreation. This sector is part of the Marga Marga basin and experts have classified it as a biodiversity corridor that should be protected.

- **Workshops Focused on Creating Environmental Sustainability Monitors**
  Timeframe: October 2011-September 2012
  Investment: US$ 5285
  Workshops focus on appropriate technologies and permaculture by means of education on building solar ovens, fruit dryers and solar kitchens, organic orchards, composting and vermiculture, designed to enhance domestic space utilization and organic waste reuse as part of a refuse-reduction process that complements recycling efforts.
MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

- Study: Green Transportation Use in Santiago’s Historic City Center
  Timeframe: October-March 2012
  Investment: Financed by the British Embassy at Santiago within the context of the NAMAS (“nationally appropriate mitigations measures”) project
  This study proposes a preliminary implementation plan for a green transportation zone in Santiago’s historic city center, seeking to reduce GHG emissions as well as local pollutants. Highly replicable, the potential exists to redefine the urban transportation model with a new focus on integrated, sustainable transportation. The study was carried out by the Chilean consultancy Sistemas Sustentables and involved active participation from the Santiago local government, the Ministry of the Environment and the Ministry of Transportation.

- Santiago Carbon Footprint and Reduction Measures Calculation
  Timeframe: January-December 2011
  Investment: US$ 15,000 (with academic support from the Universidad Andrés Bello)
  This study’s principal objective was to quantify GHG emissions originating in city government operations and services. Knowledge of the institutional carbon footprint allows for an identification of possible actions to be undertaken to reduce or mitigate emissions. Santiago generates 18,163.8 tCO₂eq and these emissions are fundamentally linked to electrical energy consumption (public lighting systems) and diesel fuel consumption largely used in municipal garbage trucks.

- Greenspace Construction, Upgrade and Recovery Plan
  Timeframe: October 2011-October 2012
  Investment: US$ 150,000,000
  As a means of contributing to climate change effects mitigation and benefitting city inhabitant health and quality-of-life, the municipal and regional governments have developed efforts to improve green cover and infrastructure at current greenspaces alongside the construction of new mega-parks:
  - Parque La Aguada (60 ha), which aims to avoid flood risk in adjacent districts
  - Parque Fluvial Renato Poblete river park (40 ha)
  - A 42-K project that will connect greenspaces, pedestrian walks and bike paths to city communities that line the Mapocho River
  - 100% recovery of Santiago’s 25 community plazas
  - Remodeling of the Forestal and Quinta Normal parks
  - Renovation and remodeling of Forestal and Quinta Normal parks
  - Parque O’Higgins equipment and upgrades
  - More in-depth forestation plans for numerous community streets and green areas
  - Urban orchard construction

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- Clima Adaptación Santiago (CAS) Program
  Timeframe: December 2009-November 2012
  The city of Santiago is subject to climate change, making it necessary to introduce specific adaptation measures that respond to high resource demand as well as concentration of economic power and the city’s functional systems, particularly in key energy, water and soil use (zoning) sectors. The project seeks to determine Santiago’s main climate changes alongside their consequences, and risks, and as they relate to city inhabitants’ vulnerability. To date a number of adaptation measures have been identified; migrating these to policies that allow for their implementation is currently under analysis.
  Participating Organizations: Universidad de Chile, Universidad Católica, CEPAL, Asociación Helmholtz

- Climate-Change Adaptation for the Forestry, Agriculture and Ranching Sectors
  Timeframe: 2011-2012
  This plan was elaborated by a technical team from the Ministries of the Environment and Agriculture to respond to adverse climate-change effects that affect the sector as well as to contribute to GHG mitigation. Recently a citizen-participation process was undertaken that operates as a forum that invites individuals to get involved and register their opinions with regard to the improvement of public affairs. The plan proposes 27 measures to be implemented nationwide, including in the city of Santiago. Each measure includes an objective, strategic guidelines, responsible parties, coverage and objective milestones.
Chile
Santiago Metropolitan Region

Mayor or local authority name: Cecilia Pérez Jara
Population: 6,945,593
Territorial extension: 15,403 km²

MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

- Analysis to Determine the Estimated Total and By-Sector Emissions Reductions that the Nation Can Achieve within a Given Time Horizon (2015, 2020, 2025 and 2030)
  Timeframe: 2011-2012
  Investment: US$ 100,911,025
  The project involves strengthening the País de Eficiencia Eléctrica program in accordance with results from potential energy savings and efficiencies, in order to reinforce energy efficiency actions in sectors like construction, retail, residential, industrial and transportation, as well as evaluate future mitigation potential. The potential of renewable energy generation is also studied.

- 15-to-20-Year-Horizon Mitigation Scenarios Elaboration
  Timeframe: 2011-2012
  Investment: US$ 141,649
  The project involves creating mitigation scenarios with a fifteen-to-twenty-year horizon that implies scenarios for 2025 or 2030 within sectors whose contribution to national GHG emissions is most significant. As these scenarios are developed, the energy sector's new baseline scenario will be taken into consideration, to reflect new domestic and international conditions with regard to supply and demand.

- Creation of a System to Annually Update National and Regional Carbon Emissions and Catchments Inventory
  Timeframe: 2011-2012
  Investment: US$ 29,930
  The project involves creating a system to annually update the carbons emissions and catchment inventory in order to monitor its evolution and evaluate emissions growth restrictions possibilities for a number of sectors by means of potential mitigation measures. Additionally, regular inventories will make it possible to maintain installed capacity when it comes to such inventories and continue compliance with Chile's international climate change commitments.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- Establishment of Water Resources Vulnerability Levels in Relation to Basin-Level Climate Scenarios and Definition of Resource-Use Adaptation Options
  Timeframe: 2011-2012
  Investment: US$ 105,108,449
  Drinking water provision activities indicate that hydrological changes will occur in the case of the metro region at the city’s main water source, the Maipo River. As such, water demand projections for the overall population will produce a provision deficit.

- Strengthening of Public-Health Systems in Response to Climate-Change Threats
  Timeframe: 2011-2012
  Investment: US$ 95,137
  Climate change also implies new challenges for infectious disease control. Many major causes of death are highly sensitive to meteorological conditions such as temperature and rainfall, as is the case with cholera and diarrhea-related diseases. Six million greater Santiago residents are exposed to high levels of air pollution that translate into respiratory diseases and premature deaths.

- National Adaptation Plan/Sector Adaptation Plans Elaboration, 2010-2030
  Timeframe: 2010-2012
  Investment: US$ 42,283
  This action involves the drafting of a national Adaptation Plan and corresponding by-sector adaptation plans for the 2010-2030 period. Plans execution is to be monitored as sector impact scenarios are revised and updated over time.
Kaohsiung

Mayor or local authority name: Chu Chen
Population: 2,770,000
Territorial extension: 2,947 km²

MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

Carbon Reduction, Energy Savings and Low-Carbon Community Demonstration Project
Timeframe: July 2011-July 2012 – 26/07/2012
Investment: US$ 217,000
Due to heavy industrial development, Kaohsiung has the highest per-capita CO₂ emissions in Taiwan, leading to a series of municipal actions to effectively reduce GHG emissions through carbon reduction and energy savings as well as a demonstration of the “low-carbon community” model. It additionally seeks to update the Kaohsiung GHG emissions database and revisit GHG emission reduction strategies and objectives. Energy savings, CO₂ reduction and low-carbon lifestyle promotions are also principal project objectives.

2010 GHG Emission Reduction and Energy Savings Project
Timeframe: October 2010-October 2011
Investment: US$ 207,300
This project’s primary tasks are (1) understanding and controlling Kaohsiung’s GHG mitigation potential and renewing each sector’s GHG emissions database; (2) facilitating GHG mitigation regularization and assessment, regularly evaluating GHG emissions reduction outcomes, and revising the Kaohsiung GHG mitigation action plan; and (3) promoting “low-carbon lifestyles” alongside implementation of city low-carbon policies at the community level.

Promoting GHG Mitigation Actions Cooperation Between Cities
Timeframe: June 2011-August 2012
Investment: US$ 320,000
The project’s principal objective is to introduce innovative GHG mitigation mechanisms such as carbon trading between cities as well as to apply more efficient GHG mitigation technologies to Kaohsiung’s industrial sector. Practical actions include introducing ISO 50001 systems to industries and offering support for adopting such systems, inviting GHG mitigation experts to share their experiences at an international conference, and visits to Kitakyushu and Tokyo for GHG mitigation policy exchange and strategy.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

2010 Kaohsiung Climate Change Adaptation Project
Timeframe: October 2010-December 2011
Investment: US$ 290,433
A program to evaluate national and international climate change adaptation laws and policies as a reference for the Kaohsiung city government as it proposes the outlines of its Climate Change Adaptation Policy as well as its short-, mid- and long-term plans for collecting data, scenario simulations, and evaluating environmental impacts. It is additionally expected that certain objectives will be achieved via establishment and application of a Kaohsiung adaptation fund to encompass an industrial GHG mitigation plan, relevant research, citizen education and reduced regional/city vulnerabilities.

Impact Analysis: Kaohsiung Climate Change Adaptation Fee for City Businesses
Timeframe: October 2011-February 2012
Investment: US$ 28,170
This study analyzes impacts on business arising from the future imposition of Kaohsiung’s climate change adaptation fee, and calls for building theoretical models of businesses that will benefit from the fee as well as pre-evaluating possible related fee-collecting influences. The fee is aimed at businesses that emit more than 10,000 metric tons GHG per year (a total of 108 businesses). Fee revenues are projected to reach US$ 25 million.

Kaohsiung Biodiversity Database
Timeframe: February 2012-February 2013
Investment in US$ 236,666
In addition to promoting biodiversity conservation, the city gathers biodiversity-related data and research to begin its own investigation into little-studied “hotspot” issues, as a way of better understanding biomass allocation. The city also looks at outcomes from national and international biodiversity projects and protocols to propose feasible plans and actions tailored to the Kaohsiung urban context.
MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

■ **2012 Community Energy-Saving Lighting Equipment Grant Project**
  Timeframe: June 2012- November 2012
  Investment: US$ 66,600
  This project is designed to improve energy efficiency through subsidies to 100 neighborhoods. It directs a US$ 157,000 subsidy (including grant amount) into 100 volunteer communities this year, and is expected to save 1 MWh—an estimated US$ 112,000 yearly.

■ **2012 Million-Dollar “Mad for Household Energy Savings” Sweepstakes**
  Timeframe: May 2012- November 2012
  Investment: US$ 66,600
  Promoting energy savings and carbon reduction as a national campaign, the Taipei city government launched its Million-Dollar “Mad for Household Energy Savings” Sweepstakes to reward households that demonstrate energy best-practices. Those showing electricity consumption reductions of 5% in subsequent years in the May-to-October period are eligible to enter the drawing. Besides 100 smaller prizes, the luckiest household wins a sweepstakes worth up to one million NTD (US$ 34,000).

■ **2012 District/Neighborhoods Energy Savings and Carbon Reduction Promotion Campaign**
  Timeframe: May 2012- December 2012
  Investment: US$ 50,000
  In order to support energy savings and carbon reduction awareness and habits, the project calls for 150 campaign kiosks in neighborhoods in twelve districts, designed to promote six activities: (1) energy and resources conservation; (2) low-carbon transportation promotion; (3) publicizing projects related to community grants as well as energy conservation assessment counseling; (4) inviting the public to sign the Energy Savings and Carbon Reduction Declaration; (5) encouraging people to eat locally grown and seasonal food, while eating fewer processed and packaged foods and reducing waste; and (6), creating awareness of global warming and climate change impacts.

■ **Green Building Pilot Program**
  Timeframe: 2012
  Investment: N/A
  Since July 2003, the Taipei Construction and Management Office has stipulated that any public building construction budgeted over US$ 1.67 million must enclose a Green Building Candidate Certification issued and overseen by the Ministry of the Interior when soliciting building permits. After receiving completion approval, the Green Building Labeling Committee will certify the green point-rating according to 10 principal attributes that lead to final approval.

■ **Renewable Energy Initiative Project**
  Timeframe: 2012
  Investment: N/D
  The city government created its Renewable Energy Action Plan in 2008 to promote renewable energy policies and meet its Urban Environmental Accords renewable energy commitment. Besides support for education, energy conservation, carbon reduction and renewable energy applications, the city government appropriates funds for public institutions and schools, and provides subsidies to private industry and businesses to install solar and photovoltaic power systems and contract professional institutions to carry out research on renewable energy development mechanisms.

■ **YouBike Bicycle Rental System**
  Timeframe: 2012
  Investment: N/D
  “YouBike” is a bicycle rental service designed specifically for city commuters that encourages the general public to use bicycles over taxis, cars or motorcycles for intra-city movement, while helping ensure enhanced environmental quality through reduced CO₂ engine exhaust emissions. The YouBike program offers:
  • An automated management system that provides 24-hour, multi-site rental services.
  • 5350 bicycles for rent; 162 rental stations; and two YouBike program centers to process membership applications, repairs and logistics.
  • An extension to MRT and conventional bus services.
MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

■ CO2 Monitoring
Timeframe: March 2012 to date
Investment: US$ 33,777.51
The project involves installation of a new CO2 sensor in Bogotá to monitor and control CO2 levels in reported ppm via the District Secretariat for the Environment Air-Quality Monitoring Network. The investment includes purchase of the CO2 sensor and operative costs incurred during the monitoring period.

■ Greenhouse Gas Emissions Scenarios
Timeframe: January 2011-March 2012
Investment: US$ 38,439
Consists of GHG emissions scenario projections for the 1990-2050 period, according to the 2008 inventory baseline and the IPCC 2006 methodology.

■ Climatic Trends
Timeframe: January 2011-March 2012
Investment: US$ 16,862
Involves analyzing the Urban Heat Island phenomenon in Bogotá’s twenty local communities as well as temperature projections from 1990 to 2050.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

■ “Bogotá Humana 2012-2016” District Development Plan. Environmental Planning with a Regional Outlook for Climate-Change Adaptation and Mitigation
The “Bogotá Humana 2012-2016” District Development Plan has proposed “a territory that faces climate change and is ordered around water” as its second strategic axis. Its premise is not to adversely exploit the environment and to orient actions and investments toward a guarantee of territorial regulation and management that overcomes environmental and human risks. To this end, territorial regulation, environmental management and risk management policies have been articulated in order to face climate change and support a region that adapts to and generates sustainable development.

■ Capital Region Development: Environmental Component
Timeframe: December 2011-June 2012
Investment: US$ 47,675.66
This action calls for supporting development of a second phase in the Capital Region Integrated Climate Change plan elaboration process. The plan’s objective is to collectively define strategic action guidelines and respective mitigation and adaptation project portfolios in light of climate change and variability to drive social and economic development options that are robust enough to withstand changing climate conditions.
Environmental Planning with a Regional Outlook for Climate-Change Adaptation and Mitigation.

Timeframe: July 2012 to date
Investment: US$ 140,983

The program contemplates plateau area projects and regional planning in light of climate change featuring goals such as:

- Regional evaluation of water as a resource to inform water-cycle decision making
- The formation of a district-wide plan and support for the formulation of a regional plan as well as the definition and execution of climate-change mitigation and adaptation projects
- Development of a regional environmental conditions information and monitoring system for decision making with regard to water management and land regulation
- Eco-urbanism and sustainable construction criteria adoption

“Bogotá Humana 2012-2016” District Development Plan

In order to roll out the development plan’s second phase—“a territory that faces climate change and is ordered around water”—programs have been developed to articulate climate-change-related actions:

- Major Ecological Structure and Water Spaces Recuperation, Rehabilitation and Restoration program
- Human Mobility GHG Mitigation Measure
- Integrated Risk Management program
- The “Basura Cero” program that supports a culture of at-source waste reduction and garbage separation as well as a recycling model for Bogotá
- The “Bogotá Humana Ambientalmente Saludable” program, whose objective is to contribute to city and regional preparedness in light of climate change, from the perspective of transformations to sanitary and socio-environmental conditions

Participating Organizations:

ICLEI, PRICC, the Clinton Foundation, the Cundinamarca and Distrito Capital departments of the interior, CAR, CORPOGUAVIO, CORPORINOQUIA, Colombian technical institutions, IDEAM, the Instituto Alexander von Humboldt, Unidad de Parques Nacionales (UAESPNN), the Ministry of Sustainable Development and National Planning, the UN Development Program and the Government of Spain.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Urban Forestation**
  Timeframe: Since 2011
  Investment: US$ 20,000
  The program consists of planning a six-year execution plan for urban forestation in San José's central canton featuring forest species and shrubs that work with the realities of San José’s climatic and topographical realities. Designed to offer enhanced quality of life to city residents alongside an improved urban aesthetic through CO₂ absorption.

- **The Agenda Verde Environmental Covenant**
  Timeframe: Since 2007
  Investment: US$ 20,000 yearly
  A covenant struck between the municipal government and Costa Rica's National University. Part of seven years of ongoing air-quality and water-body-quality measurement in San José's central canton. Based on water-quality measurement actions in surface bodies (rivers and ravines) that originate or traverse the area. Climate change issues were incorporated into the agenda in 2012.

- **Environmental Inspection**
  Timeframe: Ongoing, regular work
  Investment: US$ 2750
  Responses provided to environmental complaints surrounding illegal dumping, industrial emissions controls and solid waste management issues within different economic and residential communities.

MAJOR CLIMATE CHANGE-ADAPTATION ACTIONS

- **Creation and Implementation of Municipal Environmental Solid Waste Management Plan**
  Timeframe: 2011-2012
  Investment: US$ 36,000
  The plan was developed as part of an agreement with the CyMA-GIZ (German Ministry of Health and Cooperation) and undertakes actions to develop complete management systems in order to reduce waste generation, foster separation, monetization and proper handling. The plan encompasses a number of strategic guidelines for collection, reuse, final disposal, regulations, technological changes, monitoring, evaluation and environmental education.

- **Institutional Environmental Management Plan (Acronym in Spanish: PGAI)**
  Timeframe: starting 2012 and for as long as the Commission sees fit
  This plan's goal is to meet 2021 carbon-neutral goals the nation has established for itself. Its development seeks to reduce the institution’s carbon footprint; its execution involves a number of environmental management actions, energy savings and above all environmental education. As such, use-, consumption- and behavior-pattern changes can be effected to minimize negative environmental impacts.

- **Recycling Program**
  Timeframe: Beginning 2006, until the budget is exhausted
  Investment: US$ 341,000
  As part of environmental actions from the San José Municipal Government’s Río María Aguilar Hydrographic Basin Program a recyclable materials collection center was created with quite positive outcomes. Through the inclusion of a number of initiatives, participation from more than 600 users was encouraged, including Costa Rica’s most recognized recycling industry businesses. The first recycling center’s creation was proposed in 2007, a joint action on the part of the San José Municipal Government and the Instituto Nacional de Aprendizaje (acronym in Spanish: INA). The Japanese government’s JICA agency was invited to bring its specialists in the field to collaborate on the center's design.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Collection Center Creation**
  Timeframe: 2001 to date
  A collection center was created to receive solid, recyclable, reusable and co-processable wastes.

- **San Rafael Central District Organic Waste Management Project**
  The center’s goal is to establish an experimental organic waste management pilot project for the San Rafael de Heredia Central District, to contribute to GHG emissions reduction.

- **Municipal and Canton Transportation Regularization and Efficiency Project**
  The project’s goal is to propose alternatives to reduce emissions in San Rafael de Heredia municipal and canton transportation.

- **Reforestation and Restoration Project**
  The project’s goal is to contribute to GHG emissions management and capture in San Rafael de Heredia by means of reforestation and restoration in the canton’s high-risk and degraded areas.

- **Municipal Solid Waste Management Plan (PMGRS) - CYMA-GTZ**
  Timeframe: 2008

- **Greenhouse Gas Emissions Inventory**
  Timeframe: 2008
  Total 2008 Canton CO₂eq emissions: 47,993.43 tCO₂eq/year

MAJOR CLIMATE CHANGE ADAPTATION ACTIONS

- **Community Cleanup**
  Timeframe: 2001 to date
  The cleanup project is designed to improve quality-of-life for the people of San Rafael via formal and informal environmental education projects that sensitize and train citizens to retain and separate recyclable, reusable, and co-processable solid wastes for the collection center and to help keep the canton clean.

- **Environmental Education Program**
  The program’s objective is to develop a training process on climate change and existing alternatives for canton-wide CO₂ emissions reductions, aimed at community members, instructors, students, local officials, businesspeople and farmers.

PARTICIPATING ORGANIZATIONS
The Universidad Nacional, the Heredia Public Services Company, CYMA-GTZ, Ciudades Limpias and GTZ
**Koprivnica**

**Mayor or local authority name**
Vesna Zeljeznjak

**Population**
31 000

**Territorial extension**
91 km²

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**MAJOR GREENHOUSE GAS-MITIGATION ACTIONS**

- **Second Low-Energy House Construction**
  Timeline: October 2011-June 2012
  Investment: US$ 1.2 mil
  The city has planned construction of a “green neighborhood” featuring seven residential blocks of flats and a number of single-family houses. The flats have been included in the national subsidized house-construction program for young and low-income families. These are the first passive houses in this part of Croatia. The first house was completed a year ago, the second constructed this year. All flats have been sold at very favorable prices, energy efficiency is excellent and project GHG emissions have been reduced by 63%.

- **Energy-Efficient Palace of Justice**
  Timeline: March 2012-end of year
  Investment: US$ 14,000
  Based on the city’s passivity policy, all public buildings the city constructs must be energy efficient. The city has undertaken an ambitious construction project, its Palace of Justice, to house all municipal and regional courts. The structure is currently under construction and when finished will be certified as a low-energy public building. At least 70% lower energy consumption and 80% lower GHG emissions must be achieved in comparison with conventional constructions.

- **Energy Efficiency Measures in Public Buildings**
  Timeline: April 2012 to date
  Investment: US$ 200,000
  Following energy audits completed by UNDP Croatia, the city has designated 10 public buildings (kindergartens, primary schools) for the national energy efficiency program and ten additional public buildings for the second phase of the same program. The public procurement process is currently underway. Project partner: Kampus d.o.o.

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**MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS**

- **Rainwater Recuperation Project**
  Timeline: September 2012; Design period underway
  Investment: To be determined
  Previously all rainwater was transferred to the wastewater treatment plant with a resultant loss of freshwater and undue burden to the system, which used energy for treating fresh rainwater in the same way as wastewater. Now, an alternate system is being built to discharge rainwater into the stream that passes through the city, restoring vibrancy to the stream, making it more attractive and keeping its biodiversity alive.

- **Project Orient Gate (South-East Europe Transnational Program)**
  Timeline: August 2012-August 2014
  Investment: US $80,000 for the City of Koprivnica
  Knowledge acquired from fourteen different partners in fourteen EU countries with experience collecting and analyzing climate change data, such as professional national weather and climate institutions. The aim is to gain and implement practical knowledge in several climate change adaptation pilot projects.

- **Campus Orchard Revival**
  Timeline: October 2011 to date
  Investment: US$ 30,000
  An old orchard on the university campus has undergone extensive replanting in which old and indigenous fruit trees are being reintroduced alongside an educational project that lets kindergarten children tend the orchard. The aim is to collect and reintroduce resilient heirloom fruit varieties requiring neither excessive amounts of water nor specially treated and fertilized soil.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Municipal EVs and Hydrogen Cars**
  Timeframe: January 2012
  Investment: No extra funding. The city is reducing the size of the car fleet to finance the project. Since January 2011, all city-bought passenger cars have been either electric or hydrogen vehicles. Forty-three new electric and 8 hydrogen cars have been put into service as of August 2012. By 2015, 85% of the City's 411 passenger cars will run on electricity or hydrogen. The total reduction in CO2 emission will be approximately 1,000 tCO2/year, which is equal to 0.09% of the 2025 goal. EVs and hydrogen cars will replace gasoline and diesel powered units as needed.

- **The First of XX Cycle Superhighways Established**
  Timeframe: January 2012
  Investment: US$ 2.3 million
  Part of a cooperative effort involving more than 20 other municipalities, Copenhagen is developing Cycle Superhighways, a system of 28 extra-wide, dedicated-lane bike routes that connect the suburbs to the city. Cycle Superhighways offer easy access, in addition to a safe, fast and comfortable way of commuting by bike. Albertslund, the first route, stretches 13.4 km and passes through five different municipalities. When finished, the system will extend along more than 300 kilometers of bicycle paths.

- **Wind Turbines**
  Timeframe: September 2012
  Investment: US$ 37.5 million
  In September 2012, the Copenhagen City Council issued guarantees on low interest loans to city-owned utility company KE. KE will invest in and erect 8 wind turbines before 2014, resulting in a 21,000 metric ton yearly carbon emissions reduction. All in all, the City of Copenhagen will erect some 100 wind turbines within and surrounding the city, both on and off shore.
MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- Sankt Kjelds City District
  Timeframe: 2012 – 2016
  Investment: US$ 34,000,000
  The St. Kjeld’s City district is Copenhagen's first climate district, a pilot project for climate adaptation in densely populated urban areas. Here climate adaptation solutions will be incorporated into overall urban development, in close partnership with citizens and businesses. The Sankt Kjelds District is a major climate-change adaptation project which will ensure implementation of Copenhagen’s Climate Adaptation Plan. Goal: 30% of precipitation to be used creatively by means of green and blue surface solutions.

- The Copenhagen Severe Storms Plan
  Timeframe: September 2011-August 2012
  Investment: US$ 660,000,000 to secure Copenhagen against 100-year storm events.
  The new Copenhagen Severe Storm Plan has been designed to prepare the city to receive vast quantities of water, mandating significant anti-storm security standards and program guidelines that will assure the city’s safety. The plan is subject to political approval until 2012 and will be incorporated into a pending wastewater plan. The severe storm plan secures Copenhagen against 100-year weather events. With new capacities established, water will be directed to non-vulnerable areas such as squares, parks, sports facilities, etc., then discharged into sewers that channel it to the harbor or ocean using above- or below-ground conduits.

- Severe Storm Anti-Flooding Initiatives (The Vilhelm-dal Drainage System)
  Timeframe: January-September 2012
  Investment: US$ 4,400,000
  During the past year Copenhagen realized six anti-flooding works initiatives to protect the city during severe weather events including the Vilhelm-dal Drainage System. The initiatives fit into the overall Severe Storm plan but are not a part of it because they were initiated before the general plan was completed. The initiatives are waterworks that convey huge quantities of water to non-vulnerable areas, principally Copenhagen harbor. Storm modeling indicates where the rainwater will flow and identifies critical zones. The projects represent a proactive measure on behalf of an urgent adaptation issue.

OTHER RELEVANT INFORMATION

Copenhagen will become the first carbon-neutral capital by 2025. Extensive structure retrofitting, energy supply reorganization and change to commuting habits figure among numerous initiatives that Copenhagen will implement to become carbon neutral by 2025.
**MAJOR GREENHOUSE GAS-MITIGATION ACTIONS**

- **Cuenca Landfill Biogas Harvestt**  
  Timeframe: August 2012-August 2022  
  Investment: US$ 2,377,000  
  The Pichacay landfill, administered by the municipal company known as EMAC EP, 21 kms outside Cuenca, receives 350 metric tons of solid wastes daily. The biogas that is currently burned off there will be exploited to generate electricity. The project—currently in its final design stages—will begin operations in 2013 and in its first phase will prevent the emission of some 75,000 metric tons of CO₂ equivalent into the atmosphere annually.

- **Energy Efficiency in Cuenca’s Artisanal Brick Industry**  
  Timeframe: March 2010-May 2013  
  Investment: US$ 500,000  
  There are some 500 artisanal brickworks in Cuenca, the fifth largest GHG generating industry, producing 66,700 tCO₂/year (2009 statistics), and the second largest generator of direct pollutants after transportation. Working in tandem with SWISSCONTACT and via simple actions like using fans or bricks’ proper placement in kilns, the GHG emission from every firing has been reduced by 30%.

- **Streetcar and Integrated Transportation System Project**  
  Timeframe: January 2010-January 2014  
  Investment: US$ 200,000,000  
  80% of the city’s 475-vehicle bus fleet enters the city’s historic downtown at an average speed of 7-10 km/hr, where a number of bus lines share the same routes and generate large amounts of noise, visual and air pollution. The streetcar, working as the spine of an integrated transportation system, will avoid emitting 11,000 tCO₂/year, will extend 21.4 km and will move 106,000 passengers daily at an average speed of 22 km/h.

**MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS**

- **Potable Water-Source Conservation via Strategic Land Acquisitions**  
  Timeframe: October 2011-September 2012  
  Investment: US$ 1,337,400  
  In the past year, the city telecommunications, potable water and sewers company, ETAPA EP, has acquired 4458 hectares of land that are added to 10,471 hectares already reserved for conservation. The lands are located at the city’s water sources and at largely plateau, high-Andean ecosystems that are highly vulnerable to eventual climate-change effects as well as any human activity.

- **International “Climate-Change Mitigation and Carbon Market Mechanisms” Seminar**  
  Timeframe: May 2012  
  Investment: US$ 60,000  
  The Environmental Management Commission—together with SWISSCONTACT—realized a seminar for more than 120 participants representing the general population, the productive sector, national and local governments, professional associations, and university students. Carbon market mechanisms were explained at the seminar alongside economic and environmental opportunities afforded by the implementation of climate-change mitigation measures.

- **Water Resources Regulation Possibilities and Alternative Design Analysis to Benefit Multiple Uses in Major Cuenca River Sub-Basins**  
  Timeframe: April 2010-September 2012  
  Investment: US$ 154,000  
  Due to growing water demand for general use, water scarcity events in recent decades and possible climate-change effects, a study was realized with regard to the possibility of integrated surface water regulation at the Tomebamba River hydrographic sub-basin, a Cuenca River tributary. The installation of small reservoirs will significantly reduce water-scarcity risks in the city of Cuenca.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

  Timeframe: October 2011-January 2012
  Investment: US$ 48,000
  The Pichincha province GHG emissions inventory was realized using the same methodology as national inventories that made up the Second National Report submitted to the UNFCCC; the provincial inventory for 2000/2006 was conducted based on IPCC methodologies, as described in its 1996 revised IPCC GHG emissions inventory guide, to estimate human-activity-based GHG emissions and removal in the categories of energy, agriculture, soil use (zoning), soil use changes (zoning changes), silviculture, industrial processes and wastes.

■ Pichincha Verde Program
  Pichincha Verde Program
  Timeframe: October 2011-September 2012
  Investment: US$ 115,825
  Pichincha Verde is a program that focuses on fragile ecosystem recuperation and the proper stewardship of hydrographic micro-basins. Forestation and reforestation processes are carried out jointly among local and government agencies as well as civil society organizations who contribute labor to planting activities and commit to maintaining and managing newly planted areas. Forestation activities take place during the rainy season and they are previously reinforced with training and awareness sessions for stakeholders in affected areas.

■ Pichincha Province Central Government Structure International Carbon-Neutral Certification
  Timeframe: June 2012-January 2013
  Investment: US$ 35,000
  Seeking to support national and global efforts to reduce the causes of climate change, the Pichincha provincial government hopes to demonstrate with this project that meaningful action begins at home. The project was carried out with the support of a hired consultancy and began with the government’s central facility, workplace for over 1000 individuals, and will be extended in the future to other institutional facilities such as those for maintenance, camps and regional centers.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

■ Pichincha Province Climate Change Strategy
  Timeframe: January 2011-December 2012
  Investment: US$ 114,000
  The Decentralized Autonomous Government of Pichincha Province (GAD PP for its abbreviation in Spanish) and the Universidad Católica del Ecuador entered into a climate change cooperation agreement that includes initiatives such as a first Pichincha province climate change strategy draft and a REDD+ program proposal.

■ Pichincha Province Meteorological and Hydrological Stations Network Design and Implementation
  Timeframe: May 2012-May 2015
  Investment: US$ 100,000 by 2012
  Based on institutional authority and shared objectives the GAD PP and Ecuador’s National Institute of Meteorology and Hydrology entered into a cooperative agreement based on a notion of “shared resources” for short-, medium- and long-term ends. The agreement includes the following principal points: the design of a basic meteorological/hydrological network; station operation and maintenance; information processing; climatic and hydrological series; and awareness activities.

■ Pichincha Province Risk Management Information System
  Timeframe: February 2011-July 2012
  Investment amount: US$ 191,000
  This program seeks to strengthen compilation, consolidation, integration, updating and transmission information processes related to disaster risk management in Pichincha province via the implementation of a an information-based technological tool jointly managed by canton and provincial governments to support decision-making on related matters. In the short-term, any national or international user will have free access to the system via internet.

  Participating Organizations: The Ministry of the Environment, the National Meteorological and Hydrological Institute and the Universidad Católica del Ecuador
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- The Quito Climate Pact/Climate-Change Local Management System
  Timeframe: June 2011 to date
  Investment: US$ 250,000 annual
  The metro Quito local government, as a Global Cities Covenant “Mexico City Pact” signatory, structured ten climate-change actions that synthesize the content of its Climate Action Plan. It also took up an initiative to replicate and expand responsibility to all Ecuador local governments through its June 2011 launch of the “Quito Climate Pact” initiative.

- Government Buildings Alternative Energy Interventions
  Timeframe: October 2011-February 2012
  Investment: US$ 100,000 annually
  The program involves installing solar-panel powered water heating systems at the Centro Deportivo Metropolitano Iñaquito recreation center for pool and shower systems, directly benefitting 500 users daily, particularly children from city education centers and seniors from the 60 y Piquito program. The project is carried out annually and studies are currently underway at 25 municipal facilities for three new system installations by 2013.

- Bici-Q, Quito’s Shared Bicycle Program
  Timeframe: October 2011 to date
  Investment: US$ 1,400,000
  Quito’s shared bicycle system, Bici-Q, is a low-cost bicycle rental service for citizen use designed to satisfy short-hop, everyday mobility needs. It is structured around 425 bicycles and 21 stations set up in the city’s historic center (phase 1) near high volume areas, attractions, and sites of commercial, banking, tourist or student interest.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- Metro Quito Climate-Change Vulnerability and Adaptation Study
  Timeframe: October 2011-to date
  Investment: US$ 550,000
  This program establishes technical metro-area climate-change vulnerability indices and indicators alongside required actions and measures designed to reduce vulnerability and promote adaptation in priority sectors. To do so, a geographical socio-gram was elaborated to portray stakeholder relations as regard climatic variables; a citizen climate-impact perceptions survey was developed; and strategic sectors’ climate-change vulnerabilities were analyzed. A climate-change adaptation program, to be updated periodically, was also designed.

- Consolidation: Culture of Environment and Environmental Best Practices
  Timeframe: October 2011 to date
  Investment: US$ 300,000 annually
  Via an environmental best practices program, efforts are made to increase citizen awareness and implement practices for efficient resources-use among three identified groups: the educational community, neighborhoods and the organic local-government structure. To date, nine citizen environmental awareness training centers involving neighborhood leaders, and an eco-office project at 39 local government and 200 educational institutions, have been established.

- Integrated Climate-Risk Management and Early Warning Plan
  Timeframe: October 2011 to date
  Investment: US$ 600,000 annually
  The plan’s objective is to prevent, reduce and mitigate impacts occasioned by extreme weather events in Quito via the timely provision of information for decision-making. An inter-institutional response operation for summer and winter has been established to respond to floods, mass movements and forest fires.

PARTICIPATING ORGANIZATIONS:
The Stockholm Environmental Institute (SEI), the Red de Universidades en Gestión de Riesgo y Cambio Climático-Ecuador (RedUni), Corideas Cía. Ltda., Alianza Clima y Desarrollo-CDKN, Centro de Investigación Internacional del Fenómeno del Niño (CiIFEN), the Ecuador World Bank, MGM-Innova, the Inter-American Development Bank

OTHER RELEVANT INFORMATION

The Quito 2012-2016 Climatic Action Plan was presented in February and contemplates implementation of twenty-eight projects in strategic sectors such as energy, mobility, water, risks and biodiversity. Projects are planned according to the following issue axes: a) information creation and management; b) strategic sector adaptation and mitigation actions; and c) citizen participation and co-responsibility.
MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- Awareness Days with Central Office Employees on the “Resource Savings and Efficient Use at San Salvador Municipal Offices” Policy
  Timeframe: August 2012
  Investment: US$ 197

The object of the process is to build environmental awareness among all employees at different levels (administrative, general services, operative and technical). A link between finite city resources (material, economic, human and service resources) and individual attitudes (as well as in many cases, collective attitudes) is established in relation to resource-use perspectives and habits in numerous areas, activities and actions that all employees participate in both during the work day and/or when outside the office.

MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- Santa Ana Sanitary Landfill Phase 1
  Timeframe: November 2011
  Investment: US$ 1,558,000
  Phase 1 of the sanitary landfill occupies 50,021.11 m², with a maximum depth of 6 m and a minimum of one. The entire area features a 30cm clay layer and is covered with a high-density 1.5 mm polyethylene membrane. It also features a lixiviates network, 660 m of 15”-diameter perforated and number-three gravel covered pipes, and a 2250 m², 4 m-deep lixiviate pool with 7812 m³ storage capacity.

- Santa Ana Sanitary Landfill Phase 2
  Timeframe: December 2012-October 2013
  Investment: US$ 1,830,000.00
  Phase 2 features a 52,446.93 m² area with minimum 1 m and maximum 6 m depth and a complete 30 cm clay covering beneath a 1.5 mm high-density polyethylene membrane. It also features a lixiviates network, 660 m of 15”-diameter perforated and number-three gravel covered pipes, and a 2250 m², 4 m-deep lixiviate pool with 7812 m³ storage capacity.

- Bus Route Upgrades and Controls
  Timeframe: October 2011-June 2012
  Investment: US$ 455,270.00

A preliminary study was undertaken in collaboration with the Vice-Minister of Transportation with regard to bus routes and various stations, travel times, rider numbers, etc. A company was hired to analyze bus exhaust pipes. New route implementation is not yet complete, but superfluous traffic has been reduced.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- Santa Ana Greenspace Rescue
  Timeframe: January-May 2012 – 05/2012
  Investment amount: US$ 350,000
  Most city greenspaces are assembled as compensation for other urban development projects. In general, these areas are handed over without improvements and local government must invest from scratch.

- Protected Zone Reforestation
  Timeframe: May-October 2012
  Investment: US$ 150,000
  The mountains that surround Santa Ana have been declared protected zones but are largely deforested. Land lease for grain cultivation has been prohibited.
MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

- **Urban Heating Network Expansion**
  **Timeframe:** October 2011-September 2012
  **Investment:** US$ 1,420,000
  The urban heating network, owned by the city of Brest since 1985, is run on 85% renewable energy. Extending 24 km it provides approximately 117,000 MWh, avoiding the emission of nearly 15,000 tCO2/year. Four expansions are planned toward neighborhoods and equal approximately 55,000 MWh of supplementary heat along a 20.5 km line to be realized. Starting in 2012, work was begun on a 1200-meter extension and the network connection to a senior care facility, two schools, residences and the network connection to the Capucins neighborhood (560 residences and tertiary activities).

- **Tinerie (Internet Portal)**
  **Timeframe:** from March 2012
  **Investment:** US$ 116,130
  On 5 March 2012, Brest Métropole Océane launched Tinerie-Brest, the first public internet portal that supports thermal renovations for individuals. Tinerie-Brest is a one-of-a-kind, independent and free tool that supports individuals’ household thermal renovations projects. It is a joint effort with the local energy agency that constitutes a unique interlocutor that presents projects in all their phases and details. It includes participation on the part of an expert network that is highly aware and trained with regard to energy-management issues.

- **Ground-Level Thermography**
  **Timeframe:** March-October 2012
  **Investment:** US$ 15,485
  In winter, thermal façades help inhabitants raise awareness about their energy savings by creating infrared images of their houses (heat loss, stagnation defects). When the images are delivered, inhabitants benefit from tips on feasible priority thermal upgrade projects as well as a report that shows their residences’ main problem areas on thermograms. Six twenty-residence “thermal façade” campaigns have been undertaken and the program will continue next winter.

- **First Streetcar Line Built**
  **Timeframe:** October 2011-June 2012
  **Investment:** N/D
  The area’s first streetcar line, extending 14.3 km, was completed in June 2012 and began running in Brest on 23 June 2012.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Urbanization and Rainwater: Climate-Change Adaptation Considerations for Water Resources Management**
  For the last two decades, Brest Métropole Océane has overseen a water-resources protection and preservation policy via its “Blue Plan” bay agreement and its forestry/water-management plan for the Elorn River, which completes the agreement. A local urbanism plan, currently underway, (that is integrated into the Brest Métropole Océane regional climate plan) supplements this policy that seeks to respect the overall water cycle and adapt the region to climate change (flood risk, for example).
# MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Multifamily Housing Facility Energy Renovations**
  
  **Timeframe:** 2011-2013
  
  **Investment:** US$ 3 million (city subsidy budget)
  
  The city of Grenoble is on the cutting edge of residential thermic rehabilitations through its operation of OPATB Grands Boulevards. The metro area has rolled out MUR MUR, an even more important operation, which offers support to property owners based on energy efficiency levels and whose final goal is building renovation. Seventy-one Grenoble condominiums representing 3188 households, have joined the plan since its launch; 43—covering 2005 households—remain active.

- **Urban Heating Network Energy Package**
  
  A 160-km heating network connects the region and investments were made to convert its central boiler stations from coal to biomass fuels, which led from 200g content in 2008 to 137g content per kwh in 2011.

- **Expanded Streetcar Network**
  
  **Investment:** US$ 61 million + 381 million
  
  In order to extend public transportation services throughout the metro area, Line B is currently being expanded and Line E is being created. Line B expansion represents 1.6 km of new track that connects 15,000 jobs and 3500 residents; Line E extends 11.5 km and is expected to serve 45,000 passengers yearly.

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# MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **The Re-Greening of the City**
  
  **Timeframe:** Underway
  
  Currently community agents maintain 254 hectares of greenspace whose trees are a rich repository of over 342 different species and varieties whose diversity has been energized in the last seven years by means of 72 additional species. The city continued its efforts toward sustainable public space management and effectively reached its “zero phytosanitary products” target.

- **Drinking Water Resources Conservation**
  
  Grenoble’s water supply comes from aquifer-extracted water captured in systems located in a neighboring local jurisdiction. The Isles du Drac Natural Regional Reserve was created to protect those capture systems.

- **EcoCité Grenobloise**
  
  The city government is working toward a post-carbon city with priority development at the peninsula and esplanades prior to application in other parts of the metro area. The Eco Cité sustainable regulating system is based on multi-function urban systems that integrate sustainable mobility systems and cooperative energy management in order to anticipate resident needs.
**MAJOR GREENHOUSE GAS-MITIGATION ACTIONS**

- **School Cafeteria Fermentable Waste Composting**
  
  **Timeframe:** starting September 2011  
  **Investment:** US$ 1950  
  
  The Mellac local government maintains a school cafeteria that feeds 200 children at lunchtime. The weight of fermentable wastes is estimated at five metric tons annually. Six 800-liter composters reduce organic waste incineration at Concarneau, 30 km from Mellac. The first composters have been cleared and [fertilizer] has been used in area family parks.

- **Reduced Natural Gas Consumption**
  
  **Timeframe:** since October 2011  
  **Investment:** US$ 29,000  
  
  Five municipal buildings are natural-gas heated. The municipal government decided to reduce consumption via the application of a more economical regulating and circulating appliance as well as by double-glazing a previously unequipped room. The reduction reached 12% between 1 September 2011 and 2012, i.e., 55,000 fewer kwh and a ten-metric-ton reduction to greenhouse atmospheric emissions.

- **Certified Organic Agriculture Products in the School Cafeteria**
  
  **Timeframe:** September 2011-September 2012  
  **Investment:** US$ 1900  
  
  Agriculture is one of the largest sources of CO2 emissions. Mellac contributes to their reduction by using organically farmed products whose carbon footprint is 30% less than that of conventional agriculture. The city reached a weight figure of 26% organic products during the abovementioned period, i.e., nearly five metric tons.

**Urban Heating Networks Development**

**Timeframe:** 2011-2012  
**Investment:** Public service delegation  
Two existing networks are to be expanded. The “Centre-Loire” system will grow from 22 to 85 km, trebling its production capacity (from 132,000 to 390,000 MWh). These needs will be met by heating from waste monetization and wood-fired boiler construction. CO2 emissions reductions...
are calculated to reach 50,700 tCO₂eq/year. The Bellevue heating network, whose production will rise to 45,000 kwh/yearly based on biomass, will allow for a 10,000 tCO₂eq/year reduction.

**Condominium Housing Energy Rehabilitation**

**Timeframe:** 2011-2012  
**Investment:** Internal resources (local government agencies)  
Six climate consultants survey condominiums to kickoff and carry out energy renovation projects, working in conjunction with condominium management. Missions involve helping advisors convince condominium residents to take up energy upgrades; offering methodological tools for special-projects, office selections and advice to condominium owners in search of financing options.

**Climate Workshop**

**Timeframe:** concludes October 2011  
**Investment:** US$ 260,000  
150 Nantes-area households were mobilized to understand what drives and reduces behavior changes related to habitat, displacements, wastes, consumption and nutrition. At the end of the workshop, a response to citizen opinion was produced and initial actions were rolled out, particularly in support of an environmental information project concerning products as well as news ways to stimulate pilot development districts.

**MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS**

**VegDUD Research Project**

**Timeframe:** 2011-2012  
**Investment:** technical and logistical support from local authorities  
Nantes Métropole supports the VegDUD (vegetation’s role in urban sustainable development) project led by the city’s Institute for Scientific and Technical Research. The research project is organized along a number of lines: urban vegetation typology, impact modeling (climatic, hydrological, acoustic, thermal), the application of a Geographic Information System and the evaluation of its climatic, perceptions or societal effects.

**Pulverability Analysis Tool Testing**

**Timeframe:** December 2011  
**Investment:** a joint effort with the National Environmental and Energy Management Agency (ADEME)  
The Nantes Métropole tested a regional vulnerability diagnostic tool to better characterize past climate exposure, especially by means of a typology that builds on knowledge from the region’s past natural disasters. An evaluation of future exposure was made based on national climate scenarios for 2030, 2050 and 2100 horizons.

**Prospective +2 °C Nantes**

**Timeframe:** December 2011-June 2012  
**Investment:** University of Nantes Association  
A joint effort with the University of Nantes and the Nantes National Superior School of Architecture, a forward-looking study was undertaken to characterize climate change's impact in Nantes's urban core. The study sought to question urban practices within the framework of a 2-degree local climate temperature increase. Public space upgrade proposals were made in light of a hotter climate scenario.
MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

■ New Biomass Boiler Featuring Co-Generation in the North of the City
Timeframe: 2012-2014
Investment: US$ 64,000,000
A 37MW wood burning boiler with a 12MW alternator for electricity generation has been installed; 81% of energy will be provided via renewables, avoiding emission of approximately 47,000tCO2/year. With the installation of and identical boiler in November 2012, GHG reductions will reach 12% between now and 2015.
Participating Organizations: COFELY, DALKIA

■ La Source District Urban Renewal Completed
Timeframe: since 2004
Investment: US$ 255,000,000, of which US$ 63,500,000 go to “residential energy upgrades.”
The project involves renovating 1444 already standing structures and the demolition/reconstruction of 538 residences. Overall benefit is estimated at 3000 metric tons of carbon equivalent yearly.
Participating Organizations: state participation via the National Urban Renewal Agency, the Orleans local government, SEMDO, the metro area government, departmental and regional governments and official financial institutions.

■ Second Streetcar Line Inaugurated
Timeframe: June 2012
Investment: US$ 508,000,000
An expected 22,000 passengers will travel on this 11.2 km line. The modal migration avoids 4,500,000 km in car trips annually, i.e., avoids an average 7000 metric tons of carbon equivalent.
Participating Organizations: the European Investment Bank, state, regional and departmental governments.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

■ European “Flood Resilient City” Program Participation
Timeframe: January-December 2012
Investment: US$ 110,000
The goal is to create awareness among the general public, member entities and decision-makers in order to help them effectively face Loire River rises and limit their impacts.
Participating Organizations: the European Investment Bank, state, regional and departmental governments.

■ Orleans Metro-Area Water Conservation
Timeframe: 2001-2024
Investment: US$ 25,400,000
The goal is an 18%-per-resident reduction in water consumption from 2001 to 2011, and even one-third reductions for municipal services between 2006 and 2011.
Participating Organizations: Orléanaise des Eaux, the Chamber of Agriculture, Loiret Nature Environnement, the Loire River Site Protection Association.

■ “Let’s Beautify Our Streets” /Greenspace Proliferation
Timeframe: starting 2011
Investment: N/D
Local government encourages property owners to plant in public spaces adjacent to their homes to favor vegetation development, in ways that do not depend on government action. In 2011, the Orleans local government supported twelve such actions.
Participating Organizations: the Office for Public Space.
MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

- **Energy-Efficiency Cooperation Covenant for Paris Schools (Acronym in French: CPPE)**
  
  **Timeframe:** 2011-2013  
  **Investment:** US$ 13.3 million  
  CPPEs are global contracts that entrust contracting operators with devising technical solutions plus use and maintenance of all or part of installed equipment. They include contractual commitments with regard to energy efficiency improvements as well as the implementation of a benefits-and-penalties system as a function of these commitments’ proven distance. Paris’s CPPE has set a goal of reducing energy consumption by 30% in 100 schools.

- **SEM Energy “POSIT’IF Île-de-France New Energy” Program**
  
  **Timeframe:** Currently in development (November 2012)  
  **Investment:** between US$ 5.4 and 8.3 million  
  Along with the region, Paris is a member of the SEM Energy “POSIT’IF Île-de-France New Energy” (from the French: “Promote, Organize, Sustain and Invent the Île de France’s Energy Transition”) program whose role is to favor energy efficiency and renewable energy development. It helps kick off energy efficiency projects by simplifying oversight and proposing necessary and flexible consultation services for project completion.

- **Energy Efficiency Agreement (acronym in French: MPE) Regarding Public Lighting Installations and Lighted Traffic Signals**
  
  **Timeframe:** 2011-2016  
  **Investment:** US$ 64.4 million  
  MPEs are energy efficiency contracts that help legally guarantee compliance with energy efficiency objectives (30% less consumption, i.e., 46GWh). Notable actions include replacement of high-energy-consumption lamps for those featuring greater illuminating efficacy, replacement of obsolete illumination with current LED lighting technologies, and source-power variation applications.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Re-Vegetation: New Public Gardens**
  
  **Timeframe:** 2011-2012  
  **Investment:** US$ 6.4 million  
  More than 1.7 surface hectares of additional greenspaces were opened to Paris residents in 2011.

- **Paris Vulnerability and Resilience Study**
  
  **Timeframe:** 2011-2012  
  **Investment:** US$ 110,000  
  Study regarding climate-change impacts and resource scarcity in Paris.

- **Public Space Non-Potable Watering Experimentation Plan**
  
  **Timeframe:** two nights in August 2012  
  **Investment:** internal test  
  The Paris city government chose to experiment by watering public spaces with non-potable water in case of drought, in order to limit its public health impacts. The idea is to reduce temperatures—and by extension, heat effects—to help surrounding organisms rest at night and physically recover. The experiment was carried out for two consecutive nights during summer 2012; results are currently under analysis.
MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

■ Local Energy and Climate Agency Creation
  Timeframe: January 2011-September 2012
  Investment: US$ 151,536 yearly
  Due to an initiative from the Plaine Commune, a local energy and climate agency was created as an incentivizing and regional stakeholders assessment tool that informs and advises participating project individuals and businesses; offers advice and shares experiences with selected audiences, supports activities that respond to specific territorial and resident needs, and functions as a stakeholder-resource center. **PARTICIPATING ORGANIZATIONS**: Región de Ile-de-France, Seine-Saint-Denis General Council, ADEME, the city of Saint-Ouen, EDF, GDF Suez, Habi tät d’Aubervilliers public office, Plaine Commune Développement, Plaine Commune Habitat, Véolia environnement, Bouygues Immobilier.

■ Energy-Savings Projects Financing Organization Created
  Timeframe: September 2011-September 2012
  Investment: US$ 56,849
  Plaine Commune joined a Región de Île-de-France initiative to create the POSIT’IF Energy Organization, a financing tool for energy savings projects involved in public building, social and private housing greenspace renovations and renewable energy project development (solar, wind, geothermic, biomass, etc.). **PARTICIPATING ORGANIZATIONS**: Ile-de-France region, the cities of Paris and Créteil, the Val-de-Marne and Seine-et-Marne general councils, Sigeif, Sipperec, Siesm 77, Est Ensemble cluster communities, Cergy Pontoise, Plateau de Saclay, Val de Bièvre, Saint-Quentin en Yvelines, Sud de Seine, and regional financial institutions.

■ Public Lighting Upgrade
  Timeframe: Ongoing 5-year project
  Investment: US$ 1,200,000 yearly for five years
  Lighting equipment was replaced with equipment that consumes less energy (40% elimination of high-energy-consumption fluorescent bulbs and LED traffic lights), resulting in a 2% annual energy-use reduction.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

**An Energy-Efficient Dötlingen**

Timeframe: Ongoing; kickoff 2005/2006

With its “Energy-Efficient Dötlingen” initiative, the community makes a commitment to planning and carrying out actions to reduce CO₂ emissions that essentially encompass the following areas: energy savings at municipal government agencies; residential energy savings; renewable energy acquisition development, co-generation plants and transit. Through the project, the community seeks to contribute to environmental protection as well as improve the city’s quality-of-life, reputation and tourist appeal, reduce costs and support local industry. The initiative’s activities are led by a project team made up of members of the city council, local Dötlingen workers, the local gas company (EWE) and other qualified citizens.

**Binzengrün 9 High-Rise Passive Energy Retrofit**

Timeframe: October 2011-October 2012

Investment: US $14.7m

This energy retrofit is one of three such climate-protection projects undertaken by Freiburger Stadtbau GmbH in Weingarten. The old balconies of the 1960s-era building have been enclosed to reduce thermal bridges. An overall thermal cover surrounds the building. Furthermore, triple glazing and controlled-heat recovery ventilation systems will support superior energy efficiency and simultaneously provide ideal comfort to occupants. Total energy consumption has been cut by approximately 78%. The building is heated by a nearby gas-fired co-generation power station.

**“Eichelbuck” Landfill Site Solar Installation**

Timeframe: October 2011-December 2011

Investment: US$ 6.3m

Freiburg’s largest solar plant, occupying 17,900m², is located on the former Eichelbuck waste disposal site. The solar facility was initiated by the City of Freiburg and is run by ASF Solar GmbH und Co. KG, founded in early 2011. The company is an affiliate of Abfallwirtschaft und Stadtreinigung Freiburg (ASF), a waste management company, and Badenova, a local energy distributor. The solar plant has a total output capacity of 2.57 MWp (megawatt peak) and meets the energy demands of 1000 Freiburg households/year, enabling approximately 2000 metric tons/year of carbon emissions savings.
Weingarten CHP Plant Modernization
Timeframe: July 2012-November 2012
Investment: US$ 9m
Badenova has modernized the Weingarten combined heat and power plant by adding six new co-generation units, three heat pumps and three boilers. It heats 20,000 households and provides 16,000 with electricity. The new co-generation units were installed in July 2012, and final modernization measures will be completed in November 2012. The saved CO₂ emissions are be calculated by mid 2013.

Since 2008, Badenova has published annual environment and sustainability reports.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

Department of the Environment City-Wide Adaptation Measures Coordination.
Timeframe: 2011
Investment: N/A
A Climate Change Adaptation taskforce was founded in 2011 to coordinate adaptation measures implemented across different areas of city administration as well as city-owned companies. The taskforce was charged with identifying key stakeholders and ascertaining how they interact. The aim was to explore synergies, develop action plans, or in some cases, immediately initiate adaptation measure implementation.

Department of Civil Engineering, Regional Planning and Urban Development Urban Land-Use Planning Adaptation Measures.
Timeframe: 2011
Investment: N/A
Freiburg municipal council land development directives now stipulate with regard to land-use planning that green roofs should be planted on rooftops with an incline of up to 25°.

Facility Management Office Adaptation Measures for Municipal Building Management.
Timeframe: 2011
Investment: N/A
During recent sports facility renovations, for example, earth collectors have been retrofitted so that fresh air required in summer can be cooled and used for ventilation at 8°C below outside temperatures, a significant improvement to building insulation that helps prevent or minimize overheating. Additionally, the earth collector can pre-heat outdoor air in winter and help save even more energy.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Reforestation Program**
  Timeframe: May-September 2012
  Investment: US$ 28,125
  The program calls for reforestation in the capital city’s greenspaces and involves citizen participation along streets, avenues and boulevards as well as in neighborhoods.

- **Composting Organic Wastes Produced at the Central Wholesale Market (CENMA)**
  Timeframe: 5 years
  Investment: US$ 418,421.30
  The CENMA wholesale market generates organic materials used for composting. Market stall tenants have been educated and trained to carry out organic and inorganic refuse separation, leading to more practical and cleaner collection. The program operates a truck provided by the Guatemala City local government.

  Participating Organizations: Misión Técnica Taiwán

- **The Guatemala City Restricted-Lane Bus System**
  Timeframe: April 2009 (kickoff); July 2012-2019 (UN registry)
  Investment: US$ 2,000,000.00
  The system calls for a preliminary trunk component known as Transmetro, a mass transit system based on rapid, dedicated-lane bus lines featuring designated platform stops. The second component features feeder lines, known as Transurbano, that host lower-capacity buses that circulate throughout the city but do not directly compete with the trunk line; rather, they seek to provide fusion for optimal integrated system operation. With the project’s complete implementation, an up-to-500,000-metric-ton emissions reduction is contemplated based on baseline studies assuming that in the absence of a dedicated-lane system, users would circulate in traditional, much less efficient buses, if not in taxis, motorcycles or private automobiles.
  The Guatemala City restricted-lane bus system has been registered with the United Nations Framework Convention on Climate Change under the aegis of its Clean Development Mechanism for carbon credit generation. The registry was realized according to methodology AM0031, Version 3.1.0, “Baseline Methodology for Rapid Transit Bus Projects.” The project was overseen by Local Green Development with support from world-renowned Grütter Consulting Group.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Woodchip Manufacture**
  The Guatemala City local office for the environment oversees a tree culling and planting department charged with felling and pruning trees to avoid damage and accidents. Its activities produce waste branches and trunks that can be converted into reusable materials. An idea emerged to manufacture wood chips from existing tree prunings and trunks and use these in gardens and parks throughout the city for weed control as well as soil enhancement that benefits plants. This improvement supports the environment and prevents additional wastes from entering the city’s zone three dump.

- **Recycling Project**
  The Guatemala City local office for the environment coordinates city waste management to protect the environment and reduce natural-resources-use impacts. Ongoing citizen education efforts are necessary to increase awareness and involve citizens in environmental protection as a means to achieving a cleaner, more ecological city. The project publicizes waste management options and the opportunities that can emerge from those activities.
### Major Greenhouse Gas-Mitigation Actions

- **Model Solar City Project Approved by Government of India**
  The Government of India has selected Nagpur as a Model Solar City, allocating US$ 1,600,000 for GHG Mitigation actions there. The City plans to establish a compressed biogas plant to process methane-rich gas captured from the Nagpur Municipal Corporation (NMC)'s existing Sewage Treatment Plant 100 MLD-capacity digestion chamber.

- **Local “DO YOU KYOTO?” Credit System**
  Timeframe: Since 2011
  In 2011, Kyoto initiated the “DO YOU KYOTO? Credit” system. This is a “local production for local consumption” model CO2 credit that promotes GHG reduction initiatives among citizen groups, shopping-mall associations, and medium- and small sized city enterprises. As of September 2012, 22 groups have sought to reduce their CO2 emissions through reduction activities and approximately 35 metric tons of credits have been sold by the city to different events organizers to offset their CO2 emissions. The city will reduce 1000 tCO2/year as it identifies and publishes representative cases to increase public awareness, enhance system brand equity and further develop the Kyoto model.

- **Solar Photovoltaic System Promotion and Popularization**
  Timeframe: Since 2003
  Investment: Approximately US$ 4 million (Fiscal 2011 budget)
  Following the Fukushima disaster, renewable energy promotion has been increasingly vital. In 2003, Kyoto introduced a subsidy program for citizens to cover a portion of the cost of installing solar photovoltaic systems. By the end of 2011, subsidies totaled 1571 and were valued at US$ 3.5 million. In 2012, the city paid US$ 256 per kw and cases reached more than 800 by the end of the first half-year. This project brought about 6000 tCO2 reduction in 2011.

- **Power-Saving Campaigns**
  Timeframe: December 2011-March 2012 and March-September 2012
  Investment: N/A
  To make up for anticipated electricity shortages due to prolonged nuclear plant inoperability, businesses and households throughout Japan (except Okinawa) were asked to reduce electricity consumption in winter and in summer. Kyoto will initiate power-saving programs such as cutting power consumption at peak hours, and ask for cooperation from citizens and enterprises to avoid large-scale blackouts. Each season’s power use fell below government-mandated targets. In July/August power use was cut by 18.3% in city offices and by 11.7% overall, based on 2010 numbers. Based on this experience, the city will encourage citizens and businesses to continue climate change mitigation via energy conservation.

### Major Climate-Change Adaptation Actions

- **Model Solar City Project Approved by Government of India**
  Timeframe: 2011 – 2012
  Investment: US$ 2,100,000
  The Government of India and its MNRE department have allocated US$ 2,100,000 for Solar Water Heating System projects to be applied to apartments, hospitals and restaurants. Pilot projects call for a solar PV Plant at NMC municipal office buildings and hospitals. Microprocessor based Controller and Panel installation as well as overall performance improvement through a feedback facility in the existing panel are also called for.

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Nagoya

Mayor or local authority name
Takashi Kawamura

Population
2 266 693

Territorial extension
327 km²

MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

■ Subsidies for Home Solar Generator and Thermal Power System Installation
Investment: N/A
Nagoya subsidizes installation of home-use solar power generators and thermal power systems to expand natural energy use. In FY 2011, the City provided subsidies for 2092 solar power generators (a 9230 kW power output), and in FY 2012 will provide 2200 such subsidies (8800 kW power output).

■ Energy Conservation Measures for Business Activities
Investment: N/A
There has been total output reduction of 430,000 tCO₂ from FY 2007 to FY 2009 as part of the “Global Warming Countermeasures Plan” system that encourages big businesses to voluntarily combat global warming (plans were submitted from FY 2004 to FY 2006). For small- and medium-sized businesses, the City offers advice for energy savings via energy consultants and pamphlets ordered by business type. Consultants conducted 1850 visits starting in FY 2009 and realized 627 visits in FY 2011.

■ Eco-Drive Expert Recognition System
Timeframe: From FY 2008
Investment: N/A
The City has implemented an “Eco-Drive Experts Recognition System” that recognizes “Eco-Drive Experts,” businesspeople who actively call for the implementation of environmentally-friendly driving practices. 2478 people have been recognized as Experts starting in FY 2008 and 473 people were named in FY 2011.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

■ Improved Rainwater Absorption
Timeframe: Starting FY 2009
Investment: N/A
Urbanization has meant that much of Nagoya is covered by asphalt and concrete. During heavy rains, water flows directly into sewers and renders the city flood prone. By blocking flood-causing runoff via absorption and rainwater catchment, rainwater will not accumulate in sewers, an effective flooding counter-measure. Nagoya also drafted an “Osmosis Suitability Map” that sectioned the city by color with regard to rainwater absorption possibilities; the city is installing rainwater absorption facilities on an ongoing basis.

■ Local Greening System
Timeframe: October 2008
Investment: N/A
The first such system in the country, it calls for an area-based greening requirement on larger land plots where building construction or extension is taking place. There were 4475 such applications from October 31, 2008 to March 31, 2012. The applied site-area totaled 892.6 hectares and the applied greening area totaled 139.5 hectares, leading to an average 15.6% greening rate.
## Tokyo

<table>
<thead>
<tr>
<th>Mayor or local authority name</th>
<th>Shintaro Ishihara</th>
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<tr>
<td>Population</td>
<td>13,161,751</td>
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<td>Territorial extension</td>
<td>2,189 km²</td>
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<tr>
<td>Overall budget allocation for climate-change-related actions</td>
<td>US$ 334,000,000</td>
</tr>
</tbody>
</table>

### Major Greenhouse Gas-Mitigation Actions

- **Tokyo Cap and Trade**
  - Timeframe: 04/2010
  - Investment: N/A
  - Larger emissions producers are required to reduce CO₂ emissions by 6% to 8% over a 5-year period. 64% of covered facilities have exceeded compliance standards.

- **Carbon Reduction Reporting Program for Small- and Medium-Sized Facilities**
  - Timeframe: 04/2010
  - Investment: N/A
  - Over 34,000 small-and-medium sized facilities are reporting their CO₂ emissions as well as their reduction plans.

- **Green Building Program for New Construction**
  - Timeframe: June 2002
  - Investment: N/A
  - All new large buildings are required to rate and disclose their environmental performance. Over 1800 new buildings have published their rated results.

### Major Climate-Change Adaptation Actions

- **Comprehensive Climate Change Impact-Evaluation Studies**
  - Timeframe: April 2009
  - Investment: N/A
  - Tokyo Metropolitan Government (TMK) —in collaboration with the Japanese national government and national Environmental Studies statutes—has been carrying out comprehensive impact evaluation studies on climate change in Tokyo over a four-year period, 2009-2012. Adaptation measures will be adopted based on study findings.
MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

- **Linea Verde Integrated Social Renovation**
  - Timeframe: October 2011-September 2012
  - Investment: US$ 20,076,923
  - Linea Verde is an ecological and urban development, but above all, social program whose goal is to kick off enhanced quality of life for more than 300,000 inhabitants on the city's east side as a means of creating shared public spaces in a 12 km, 60 ha linear park as well as implementing actions to develop citizen competencies and social capital. The project includes a forestation and reforestation program, a public-space recuperation program, a shared cultural activities program and an urban/social acupuncture program.
  - **PARTICIPATING ORGANIZATIONS:** Mexico’s Ministry of the Environment and Natural Resources, the Ministry of Social Development, the Ministry of Communications and Transportation, the National Forest Commission, the National Water Commission, the Physical Culture and Sports Commission, the State Government of Aguascalientes, Petróleos Mexicanos, and more than 30 NGOs.

- **Clean Development Mechanism: Clean Energy Generation Based on Biogas Capture Created at the San Nicolás Sanitary Landfill**
  - Timeframe: October 2011-September 2012
  - Investment: US$ 7,000,000
  - The program objective is to capture and exploit biogas generated at the San Nicolás sanitary landfill for conversion into electricity for sale, public lighting and powering the automotive industry. The action translates into a GHG emissions reduction of approximately 162,593 tCO₂/year in addition to the 2.5 Mwh of generated power. Other benefits include economic resource acquisition via carbon credit commercialization, energy production for the local area and biogas risk control at the sanitary landfill.
  - **PARTICIPATING ORGANIZATIONS:** SAEVA, Ecomethane Biogas Technology, the Aguascalientes local government, NISSAN Mexican.

- **Bicycle Use Promotion: Integrated Bike Path System Master Plan**
  - Timeframe: October 2011-September 2012
  - Investment: US$ 75,000
  - In Aguascalientes some 3600 of every 100,000 people use the bicycle as a means of transportation; the government is seeking to improve the city’s public transportation, increase the present route network’s efficiency, and offer a real, sustainable mobility alternative to city residents. For this reason, bike path construction has been reinitiated via the integration of a citywide network extending 72.8 km. A first phase will add 30 new km and connect to three major cycling transit points.
  - **PARTICIPATING ORGANIZATIONS:** Four civil-society organizations, bicycle enthusiast citizen groups, Bicicletas Abel and Bicicletas Arellano.
MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Hydrological Micro-Basin Rehabilitation and Rescue Program**
  Timeframe: October 2011-September 2012
  Investment: US$ 826,923
  The municipal area features 49 hydrological micro-basins that occupy a 7206 ha surface extending 332 km that have been affected by urban sprawl and channel pollution. To resolve the problem, cleanup, grading and borderland reforestation as well as adjacent vegetation pruning and weeding activities have been implemented. These works were carried out as part of a Temporary Employment program whose principal characteristic is its reliance on citizen participation, and have led to the restoration, rejuvenation and conservation of 21.8 km of micro-basins along with the consequent creation of more than 1500 direct temporary jobs.
  **Participating Organizations**: Mexico’s Ministry of the Environment and Natural Resources, the Ministry of Social Development, the National Water Commission and the State Government of Aguascalientes.

- “**Linea Morada**” Urban Wastewater Treatment and Reuse
  Timeframe: October 2011-September 2012
  Investment: US$ 12,692,307
  The Aguascalientes local government treats 99.5% of its urban wastewater but subsequently uses less than 10%. The project contemplates infrastructure construction that would supply treated water to certain population sectors, at required quality levels according to intended use, for which a treated water distribution network that uses the city’s principal thoroughfares will be constructed. The network plan envisions an extension of 65 km as well as the renovation and rehabilitation of eight treatment plants citywide. Another four wastewater treatment plants are to be rehabilitated as well, to produce approximately 80 lps of treated water.
  **Participating Organizations**: Mexico’s National Water Commission, the State Government of Aguascalientes, and the Aguascalientes Water and Sewers Citizen Commission, de Agua Potable y Alcantarillado para Aguascalientes.

- **Eco-Technologies: Green Roofs and Citizen Training in Underserved Neighborhoods for Family Micro-Orchard Creation**
  Timeframe: October 2011-September 2012
  Investment: US$ 230,000
  The first green roof on a public building was installed atop the current Municipal Ministry of the Environment and Sustainable Development and features a surface area of 700m². This eco-technology model is to be replicated at other local government buildings to provide a solution to pollution problems and improve temperatures, since such roofs cool in the summer and warm in the winter. Among other benefits, they reduce the large-city urban heat island effect, reduce flooding because they retain significant rainwater, and leverage unused space.
  **Participating Organizations**: The municipal environmental education and climate change center, the Ministry of Social Development and Efecto Verde de México.
MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

- **Guardián Ecológico Program Reinforcement**
  Investment: US$ 101,000
  The city has included environmental stewardship as a basic, over-arching principal in all its actions; so much so that the Guardián Ecológico program has been one of the current local administration’s greatest successes and sources of pride. In the current period, the program received equipment and vehicles in line with its needs and activities.

- **Sector Sustainable Urban Mobility Plan; Integrated Public Transportation System**
  Investment: US$ 15,545,000
  Federal, state and local governments made deep investments in this plan to bring about efficient personal mobility as a support to economic and social development. The first trunk line extends 20.44 km and will provide rapid connections between the city’s northern and southern districts to more than 4000 riders per hour. The integrated public transport system will feature dedicated bus lanes, thirteen trunk lines, nineteen feeder lines, twenty conventional lines, 43 strategically located transfer points and two transfer terminals.

- **Eco-Technology Implementation Incentive Program**
  Investment: US$ 20,000
  The goal of the program is to offer tools to citizens and businesses to drive sustainable technology implementation along the following lines: a) LED lamp installation in public lighting systems in new real estate developments; b) solar powered water heating; c) wastewater reuse.

- **Chihuahua Local Government Construction Refuse Management**
  Investment: US$ 38,000
  Timeframe: October 2011-September 2012
  Regarding waste materials and in response to one of the city’s most tangible and extreme pollution and urban image problems, a major oversight/enforcement operation was undertaken citywide to rein in clandestine construction refuse and garbage dumping. As part of this effort, four control sites for the proper and legal rubble disposal were opened and received more than 300,000 m³ of construction refuse, reducing sanctions by 50% in the corresponding timeframe. Investments in contracting D6 and D8 machinery for proper construction oversight were also made and have led to increased citizen participation with regard to authorized site use.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Urban Tree Population Forestation**
  In concert with different social sectors, the Chihuahua local government is acting to reverse climate change. During the period covered, reforestation efforts have been carried out in the city of Chihuahua using endemic tree species that can resist atypical temperatures seen in recent years. To date, more than 5,756,000 m² of large trees have been planted.
Mexico City

Mayor or local authority name  | Marcelo Ebrard Casaubon
Population                      | 8,800,000
Territorial Extension           | 1,484 km²
Overall budget allocation for climate-change-related actions | US$ 1,000,000,000 (2012)  
                                           | US$ 5,000,000,000 (2007-2012)

MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

■ Transportation Corridors: Metrobús
  Timeframe: September 2011-November 2012
  Investment: US$ 30.76 million
  Obsolete low- and medium-capacity bus units are replaced by high-capacity, state-of-the-art models that operate on restricted lanes with pre-established stops. The city's Línea 4, 28 km in extension, began operation in 2012. The system encompasses 95 km, 120 stations, 368 buses and transports more than 750,000 passengers daily, avoiding 88,730 metric tons of carbon-equivalent emissions per year.

■ Taxi Replacement
  Timeframe: September 2011-November 2012
  Investment: US$ 1.15 million
  The city promotes voluntary replacement of taxis more than ten years old, in favor of 4-door units whose minimum fuel economy is 12.5 km/lt. 2489 units have been replaced. Since program launch, 81,300 units have been replaced and carbon-equivalent emissions of 395,821 metric tons have been avoided annually. The city's first fleet of electric taxis was also introduced; three electric-car charge stations—one of which is solar powered—have been installed.

■ Compost Plant Expansion
  Timeframe: October 2011-September 2012
  Investment: US$ 6.92 million
  2500 metric tons of organic fraction, reclaimed from garbage separation programs, is processed daily to produce organic peat to be reincorporated into greenspaces and eroded zones as well as for vegetation cover at the Bordo Poniente sanitary landfill, avoiding annual carbon-equivalent emissions of 574,971 metric tons.

■ Metro Línea 12
  Timeframe: 2010-2012
  Investment: US$ 3,300,000,000
  The metro system's Línea 12, extending 25 km, was constructed and serves 400,000 passengers daily. Its operations reduce carbon-equivalent emissions by 21,700 metric tons annually.

■ ECOBICI Shared Public Bicycle Program Expansion
  Timeframe: January-November 2012
  Investment: US$ 10,000,000
  The ECOBICI system expanded three-fold in 2012, to become one of the world's most efficient featuring 4000 shared public bicycles and 275 docking stations serving 79 thousand users who make up to 30 thousand trips daily. The system reduces carbon-equivalent emissions by 287 metric tons annually.
MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

■ Reforestation and Maintenance in Conservation Soils
Timeframe: October 2011-September 2012  
Investment: US$ 830,307.69  
1,084,000 reforestation plants have been sown in conservation soils. Additionally, planting-area maintenance activities were undertaken throughout the 1998-2011 period to reduce vulnerability to extreme precipitation as well as preserve soil-conservation ecosystems and assure environmental-services permanence. These activities also captured 190,767 metric tons of atmospheric carbon equivalent during the period.  
PARTICIPATING ORGANIZATIONS: 34 Mexico City communities and local cooperative communities (ejidos), Mexico’s National Forestry Commission (CONAFOR), Naturalia, Reforestamos México, Scout de México, Asociación de Colonos de Tlalpuente, Manos de la Tierra

■ Deep Drainage Rehabilitation
Timeframe: October 2011-September 2012  
Investment: US$ 8,121,153  
To reduce city vulnerability to extreme hydrometeorological events, rehabilitation work was performed during the period on 2.8 km of degraded central egress tunnels and interceptors that make up the city’s deep drainage system, which removes water from the basin surrounding Mexico City. Advanced techniques for underground hydraulic installations in seismically-active areas are used to this end.  
PARTICIPATING ORGANIZATIONS: Mexico’s National Water Commission, the Autonomous University of Mexico’s Institute of Engineering

■ Soil and Water Conservation Activities in Agricultural and Ranching Lands
Timeframe: October 2011-September 2012  
Investment: US$ 3,622,487  
To reduce vulnerability to extreme precipitation in seven city boroughs where agricultural and ranching activities take place—as well as assure primary production—twelve projects involving more than 132 soil and water conservation activities were realized for a more-than-291-hectare impact. Conservation activities undertaken included arboreal grove vegetative practices, prickly-pear cactus, agave and perennial species natural fencing, gabion filtration dams and hidden vats, among others.  
PARTICIPATING ORGANIZATIONS: Local communities and cooperative ejido communities, the Autonomous University of Chapingo

■ Río Magdalena River Rescue
Timeframe: 2010-2012  
Investment: US$ 40 000 000  
Mexico City’s last living river has been rescued with the construction of 20,847 m of collectors that avoid water pollution caused by household drainage. Surrounding ecosystems have been recuperated and 20 thousand m2 of public recreation and sports areas have been rehabilitated.  
PARTICIPATING ORGANIZATIONS: Mexico’s National Autonomous University and the Autonomous Metropolitan University.

OTHER RELEVANT CONSIDERATIONS
Mexico City concluded its Climatic Action Plan in 2012. In the previous four years, 26 greenhouse gas mitigation actions have been developed to reach the program goal of reducing 7.7 million metric tons of carbon-equivalent emissions.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

■ Symbio-Ecological Induced Biodegradation Project (BISE M-10)

The project consists of compost production for agricultural use and water recapture for Sacrificio Animal community greenspaces. The most important contributions are as follows:

- Up to 70% reduction in methane and CO2 production
- 50% reduction in water consumption
- Reduced fetid odor from waste decomposition
- 80% eradication in housefly populations
- Reduced risk of water table contamination
- Transformation of waste into organic fertilizer
- Designation and maintenance of greenspaces via water reuse
- Reduced disease risk for slaughterhouse personnel
- Installation and surrounding area cleanliness and hygiene
- Food purity

■ Municipal Integrated Solid Waste Treatment Center (Municipal Sanitary Landfill)

This center's implementation is currently in its second phase, recyclable waste separation and composting.

■ Official Closure of the Municipal Dump

Timeframe: October 2012

Municipal authorities formally closed its open-air garbage dump, operating in a natural reserve. The closure of the facility that had received community refuse for four decades was essential now that the city has a sanitary landfill located eight km from the city. Cuatro Ciénegas is one of the first communities in Coahuila State that has a landfill that meets all relevant specifications, a significant advance toward achieving “clean municipality” status. Citizens were informed that sanctions and fines will be assessed to halt dumping at the closed facility.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

■ Coahuila State Commission on Water and Sanitary Services Agreement

Given that the cost of waste water treatment plant construction is somewhat elevated and that operational costs imply a financial burden that municipalities sometimes cannot bear, the local government entered into an agreement with the Coahuila State Commission on Water and Sanitary Services in order to achieve compliance with federal water regulations governing wastewater treatment. The agreement obliges federal, state and local governments as well as the private sector to comply with the law and additionally benefits citizens via sustainable, enhanced water quality.

■ Cuatro Ciénegas Valley Sustainable Water Use Project

The project currently enjoys 90% completion of its technical and equipment upgrade phase, featuring central pivot, side roll and semi-portable irrigation systems at watering units whose source are springs from which water reaches fields via unimproved or concrete canals which in both cases led to transmission loss of up to 50% due to leaks and evaporation. Canal intubation is currently underway at the La Becerra, El Venado, Sta. Tecla and Tío Julio irrigation units and will prevent such losses. Most importantly, the water saved through these actions will be used for ecological purposes through a recuperation of Cuatro Ciénegas Valley wetlands, a natural habitat for the region’s endemic species.

■ Plaza, Thoroughfare and Park Reforestation

In cooperation with the Coahuila Ministry of the Environment and a number of civil society organisms such as the Comité Técnico de Aguas Subterráneas del Acuífero Cuatro Ciénegas A.C., reforestation works are currently being undertaken in plazas, along thoroughfares and in parks to plant 2000 individual trees, especially sycamores, gum trees and evergreen oaks.
**Naucalpan**

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<th>Otilia María Azucena Olivares Villagómez</th>
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**Global Cities Covenant on Climate**

**Mexico**

**Naucalpan**

**Major Greenhouse-Gas Mitigation Actions**

- **Hillside Recuperation Master Plan**
  Timeframe: November 2011
  Cleanup, recuperation, reforestation and equipment of 31 local hillside areas were realized, reining in irregular human settlement and the pollution foci these produce. Open spaces for social integration and public educational, cultural, recreational and sport equipment were created or installed, expanding the health/recreational offering available to residents of Naucalpan and surrounding communities.

- **Parks for Public Space Rescue, Rehabilitation and Upgrades**
  Timeframe: May 2012
  Through this program, to date 30 municipal parks have been rescued and today feature quality infrastructure, i.e., playground equipment, open-air gyms, cultural activity kiosks and sporting courts/fields. The program was completed thanks to state, local and private-enterprise resources. These actions additionally integrate greenspaces and recreational areas into the community structure and protect such spaces from harmful activities—such as littering and crime—that disrupt social order.

- **School Upgrades: Sustainable Classrooms**
  Timeframe: October 2011
  School quality has been improved via the implementation of sustainable computer labs and school infrastructure renovation. It puts the entire community at the forefront of information, mobile networks and sustainable energy use via solar cells.

**Major Climate-Change Adaptation Actions**

- **Reforestation Program**
  Timeframe: June 2012
  59,775 trees have been planted citywide, of which 15,533 (jacarandas, ficuses and willows) were destined for urban areas and 44,242 (encino oaks, Mexican weeping pine, Mexican grey cypress, spreading-leaf pine, sweet acacia, black acacia, ash, tejocote hawthorns, capulin cherry, piñón pine, beach oaks, acacias, peach trees and medlars) were destined for natural protected areas. These efforts were carried out over a 59.5-hectare area and it is estimated that when these individuals reach phenological maturity they will capture 2380 metric tons of atmospheric dust, reducing air particulate matter, will also capture 245 metric tons of contaminants, and will produce 177.6 metric tons of oxygen yearly.

- **The Reciclón**
  Timeframe: June 2012
  The success of this campaign’s implementation, which unifies citizen and government efforts that confront the challenges of preserving the environment, led to the collection and proper disposal of 17-metric-tons of used batteries and tech wastes.
MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

- **Chiltepeque Sanitary Landfill Use-Life Expansion**
  Timeframe: August 2011-September 2012
  Investment: US$ 332,339.065
  Approval has been granted for Sanitary Landfill Cell B construction, outfitting and operation including excavation, grading and internal roadway installation. Cell B can receive 1600 metric tons of urban solid wastes daily. The upgrade guarantees their proper containment in the coming four years and expand the landfill’s use-life.

- **Waste-To-Energy Project Feasibility Study**
  Timeframe: May-August 2012
  Investment: US$ 374,312
  A technical and economic feasibility study was carried out for the Waste-to-Energy project; favorable findings indicate the viability of constructing and operating an energy generation plant in the Puebla local area. The incinerator would be capable of processing from 1350 to 1700 metric tons daily to generate between 30 and 40 Mw/Hr of electricity.

- **Restricted-Lane (BRT) Bus System**
  Timeframe: November 2011-September 2012
  In conjunction with the Puebla State Government, Line 1 Metrobus construction continues in Puebla, designed to promote public transportation via a system of restricted-lane buses that reduce travel times as well as the release of pollutants into the atmosphere. It is estimated that the BRT system’s implementation will prevent the emission of 44,496 metric tons of atmospheric pollutants annually.

Participating Organizations: Puebla State and Local Governments

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Environmental Awareness of Climate Change Conditions**
  Timeframe: October 2011-September 2012
  Investment: US$ 9357
  Sixty-three interventions have been made at numerous schools at differing education levels via courses, workshops, talks and conferences on agriculture, energy savings, reuse/recycling, climate change and reforestation; 4282 individuals have been served such events. Additionally, two environmental education campaigns were undertaken—“¡Haz algo por el planeta!” (“Do Something for the Planet!”) and “Respira Puebla” (“Puebla Breathes”)—that featured pennant placement in thoroughfares citywide.

- **Gran Via ReCorre Puebla Sunday Bicycle-Use Program Implementation**
  Timeframe: November 2011-September 2012
  The city of Puebla continues to implement the Gran Via Recorre Puebla program through its Municipal Sporting Institute as a way to promote green transit among Puebla residents. The program features three service and bike rental stations; due to popular demand, the program route has been expanded and encompasses approximately five km from Frailes Fountain to the Teatro Principal de la Ciudad. Participating Organizations: The Municipal Sports Institute and the Ministry of the Environment and Public Services.

- **Solid Waste Management**
  Timeframe: October 2011-September 2012
  All in all, 64 training sessions and workshops were conducted on solid waste management, to the benefit of 4702 citizens. Twenty-four recycling workshops were additionally realized, to the benefit of 1032 individuals.

- **Public Lighting System Infrastructure Modernization**
  Timeframe: October 2011 - September 2012
  Investment: US$ 5,722,748
  Twelve thousand magnetic induction lamps featuring an average lifespan of 20 years were acquired.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Día del Árbol and Fiesta del Bosque State Reforestation Efforts**
  
  **Timeframe:** July 2012  
  **Investment:** N/D  
  Reforestation efforts have been realized on a five-hectare parcel in the Agua de Pajarito commons area to plant 5000 seedlings in collaboration with governmental and private-sector agencies CONAFOR, SAPAM SEMARNAT, SEMAHN, Nabolom, A.C., the municipal conservation and environmental office, the Comité de Cuenc, Bioclores, A.C., local residents and Más Agro magazine. The program involved approximately 450 individuals.

- **Coca-Cola Femsa, S.A de C.V. Annual Reforestation Efforts**
  
  **Timeframe:** June-July [no year stated]  
  **Investment:** N/D  
  The principal objective is planting 2825 representative mountain mesophile tree species from the Chiapas highlands. The project is also considering a biodiversity inventory for distinct plant and animal taxonomy groups to serve as a baseline to evaluate the impact of introducing and maintaining the hill forest cover will have on additional organism diversity. The Cerrito de San Cristóbal parcel, approximately 18.8 hectares, belongs to the San Cristóbal de las Casas municipal government.

- **Cerrito de San Cristóbal de las Casas Ecological Restoration; Forest Enrichment and Conservation Actions**
  
  **Timeframe:** June-July [no year stated]  
  **Investment:** N/D  
  The principal objective is planting 2825 representative mountain mesophile tree species from the Chiapas highlands. The project is also considering a biodiversity inventory for distinct plant and animal taxonomy groups to serve as a baseline to evaluate the impact of introducing and maintaining the hill forest cover will have on additional organism diversity. The Cerrito de San Cristóbal parcel, approximately 18.8 hectares, belongs to the San Cristóbal de las Casas municipal government.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Green Certification at Five Schools**
  
  **Timeframe:** September 2001-June 2012  
  **Investment:** N/D  
  Mexico’s National Ministry of the Environment and Natural Resources (SEMARNAT) called on schools via the Municipal Conservation and Environmental Office to participate in the “Escuela Verde” green school certification process designed to motivate elementary schools to drive integrated environmental management actions with support from the educational community. This action helps diminish schools’ environmental impact and develop environmentally responsible citizenry.

- **World Biodiversity Day**
  
  **Timeframe:** May 2012  
  **Investment:** N/D  
  This program included participation on the part of children, teachers, parents and ecology workers. To encourage solid waste separation and collection in the City Center, a banner was placed featuring local children’s written words; signs were also erected in planted areas encouraging citizens to respect animals and avoid littering. Later, children traveled to a Cultural Center and learned to recognize tree seeds and the importance of having forests, the animals that inhabit it, and the reasons that they are useful to humans.

- **Climate Change and Forest Role Training for Trainers**
  
  **Timeframe:** June 2012  
  **Investment:** N/D  
  A workshop was conducted to train environmental boosters who work together to promote activities programs related to climate change in the State of Chiapas and thereby create a culture of environmental awareness in rural and indigenous communities, based on education and communication about climate change causes and effects as well as measures individuals can take in light of such change. The idea is that the acquired knowledge can be replicated in communities using the materials and tools trainers receive at the workshop.
Sierra Mojada

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MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

- **Solar Powered Street Lighting**
  Timeframe: 2010-2011
  Investment: US$ 23,000
  The plan calls for solar energy street lighting to be acquired and installed at strategic points throughout the metro area.

- **Residential Solar Energy Use**
  Timeframe: 2011-2012
  Investment: US$ 14,400
  The plan calls for distribution of solar energy accumulation devices to all solar energy plant owners throughout different local communities.

- **Equipment and Rural Infrastructure**
  Timeframe: 2011-2012
  Investment: US$ 70,000
  Water extraction windmills were provided and installed for ranching use, as were submergible solar energy pumps for ranching-use water extraction; livestock trailers were provided as well.
MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

- **Municipal Integrated Solid Urban Waste Management Program**
  Timeframe: 2010-2012
  Investment: US$ 116,415 yearly
  The Integrated Solid Urban Waste Management Plan (PMP-GRSU) features a basic diagnostic, guidelines, goals and actions to be implemented on the part of the Tecalitlán Solid Urban Waste Management Municipal System as well as for environmentally sustainable waste management on the part of different societal sectors, particularly local industrial, business and service establishments.
  Participating Organizations: Instituto Tecnológico de Ciudad Guzmán Modulo Tecalitlán, Sistema Intermunicipal de Manejo de Residuos Sur Sureste.

- **Electronic Waste Recycling**
  Timeframe: February 2012
  Investment: US$ 500
  The electronic wastes recycling marathon seeks to recuperate metals with monetary value and its noteworthy benefits include CO₂ emissions reductions via plastic, glass, ferrous and non-ferrous materials recycling as well as their diversion from the local garbage dump. There will also be a reduction to the environmental problem that emerges from electronic waste mishandling (uncontrolled burning, toxic lixiviates, soil/water pollution).
  Participating Organizations: the Jalisco State College of Scientific and Technological Studies, Ecovía A.C.

- **Forest Fire Prevention, Alert, Combat and Control Activities Program**
  Timeframe: 2010-2012
  Investment: US$ 12,500
  The plan's general objective is to establish an organization, protocols, institutional responsibilities and required resources to prevent, control and put out all manner of forest fires that occur in the 2010-2012 period.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Municipal Drought Program**
  Timeframe: 2010-2012
  Investment: US$ 3500 per year
  The program goal is reduced water consumption through water-use best practices and a service schedule for the entire local area sectioned by community residents and manufacturers as well as ejido indigenous communities, organizations and small landowners within the Tecalitlán municipal area. The plan is to be applied in times of water scarcity

- **Local Reforestation Program**
  Timeframe: 2010-2012
  Investment: US$ 1000
  The municipal reforestation plan is applied annually through citywide greenspace rescue featuring participation from area elementary schools.
  Participating Organizations: the Carolina Alegria, Wenceslao de la Mora, Maria Trinidad Guevara Alveares, Adolfo Lopez Mateos and Lazaro Cardenas elementary schools.

- **Clean Air Campaign**
  Timeframe: 2011-2012
  Investment: US$ 500
  An awareness and activities handbill campaign that seeks to prevent residential, agricultural and forest fires that are unhealthy, bother neighbors and pollute the environment. The goal is to encourage the public to compost and take advantage of organic kitchen, branch, leaf and grass wastes, transforming refuse into plant fertilizer and avoiding both air pollution and the planet’s environmental degradation.
MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

■ Xrao Recreation Center, San Marcos Tlacoyalco
Timeframe: April-July 2012
Investment: US$ 636,226
A cultural/recreational center has been constructed with greenspaces and public restrooms at the indigenous village of Ngigua de San Marcos Tlacoyalco. This infrastructure contributes to more rational water use because it features a rainwater catchment system, an approximately 600m² rainwater capture roof and a 15,000-liter storage cistern for greenspace maintenance. The construction of healthier, more sustainable urban centers designed to promote coexistence between humans and the natural environment, is also enhanced.

■ Nhrii Park, San Marcos Tlacoyalco
Timeframe: January-March 2012
Investment: US$ 240,025
A community park has been constructed featuring green areas, public restrooms a gazebo and plaza at the indigenous town of San Marcos Tlacoyalco. The infrastructure seeks to be a complete space that enhances community quality-of-life and pays symbolic tribute to nature. The goal is to offer fully improved spaces that dignify community life in relation to nature. Green areas become a driver for global warming mitigation and simultaneously fortify the physical and mental health of community members

■ Rehabilitation of the El Duraznillo Spring Feeder Line at Santa María la Alta
Timeframe: October-December 2011
Investment: US$ 165,566
2.6 km of feeder lines from the El Duraznillo spring to the indigenous village of Santa María la Alta were rehabilitated. The community’s drinking water line is gravity activated and serves some 7000 residents. The system saves approximately USD $2300 monthly in electricity and above all, mitigates annual CO2 emissions, making it a socially, economically and environmentally sustainable system. These actions constitute best practices that benefit communities in the short-, medium- and long-term.

MAJOR CLIMATE-CHANGE ADAPTION ACTIONS

■ Rural Housing Program: Resident-Built Sustainable Housing in Indigenous Communities
Timeframe: January-September 2012
Investment: US$ 770,508
Joint efforts have been made for the construction of 100 sustainable housing units in the indigenous communities of Ngigua de San Juan Sacabasco, San Martín Esperilla, San Francisco Esperilla, Piedra Incada de la Soledad and Palo Verde. The housing is made of adobe, uses rainwater as well as ecological, flushless toilets, which results in virtual-zero water consumption. This housing focus is socially, economically and environmentally sustainable, leading to carbon dioxide emissions mitigation and enhanced long-term quality-of-life.

■ Priority Zone Development Program: Ecological Stoves
Timeframe: July-September 2012
Investment: US$ 67,584
357 ecological stoves have been acquired, designed to reduce CO2 emissions arising from conventional fires that simultaneously aggravate forest and grassland deforestation. This sustainable development focus seeks to improve quality-of-life for the very neediest, such as those in indigenous communities. Not only does it contribute to reducing deforestation and improving air quality, it also creates time-savings for individuals who have additional time to do more for their families.

■ Rural Zone Drinking Water and Sanitary Services Systems Construction and Rehabilitation: San José Buenavista Wastewater Treatment Plant
Timeframe: October 2011-March 2012
Investment: US$ 330,964
A wastewater treatment plant was constructed in the indigenous community of Ngigua de San José Buenavista designed to mitigate ground and underground aquifer contamination as it builds a new focus on water reuse and savings given that treated wastewater can be used for agricultural irrigation. This not only protects the environment but also incentivizes the local economy to create irrigation areas in low rainfall zones. Average per-plant volume is 3.28 l/s.
**Villa de Zaachila**

**Mayor or local authority name**
Adán López Santiago

**Population**
28,000

**Territorial extension**
55 km²

**MAJOR GREENHOUSE GAS-MITIGATION ACTIONS**

- **Ecological Community Heaters**
  
  Timeframe: February-September 2012
  Investment: US$ 4000
  Heaters made from regional materials such as clay, sand and stones, designed to generate more heat while using less fuel to reduce emissions.

- **Garbage Separation and Organic Peat Manufacture**
  
  Timeframe: June-September 2012
  Investment: US$ 4000
  The project seeks to contribute to a healthier environment through solid waste classification that in turn leads to recycling and organic peat manufacture.

**MAJOR CLIMATE CHANGE-ADAPTATION ACTIONS**

- **El Árbol, Fuente de Vida Program**
  
  Timeframe: May-September 2012
  Investment: US$ 300
  2.5 hectares have been planted with 2500 native and imported tree species individuals.

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**Yurécuaro**

**Mayor or local authority name**
Rigoberto López Serrato

**Population**
29,995

**Territorial extension**
195.28 km²

**MAJOR GREENHOUSE GAS-MITIGATION ACTIONS**

- **Reforestation**
  
  Timeframe: February 2012-September 2012
  Management and acquisition of 7000 trees to be planted in agricultural lots, greenspaces, commercial areas, schools and communities as a means of reducing temperatures and avoiding erosion.

- **Proper Agricultural Plastics Handling**
  
  Timeframe: April-September 2012
  A business located at Zacapu, Michoacán, periodically collects agriculture-sector plastics to reduce incineration and resultant air pollution.

- **The 2012 Yurécuaro Recycle-Thon**
  
  Timeframe: July-September 2012
  Electronic discard collection for proper waste management, complete component recycling and to prevent their mixing with household waste.

**MAJOR CLIMATE CHANGE-ADAPTATION ACTIONS**

- **Local Slaughterhouse Water Treatment Plant Reactivation**
  
  Timeframe: June-July 2012
  Sewage vats were repaired and reinforced, reactivating the use of treated water for municipal park and greenspace irrigation.

- **Municipal Wastewater Treatment Plant Construction**
  
  Timeframe: April-September 2012
  Investment: US$ 5,112,901
  Installation of the storage pool to conclude wastewater treatment plant construction; to date the plant is 85% complete.

- **Open Dump Maintenance**
  
  Timeframe: May-June 2012
  Investment: US$ 4900
  Fire control at the outskirts of the municipal open-air dump, separation of agricultural plastics and garbage burial to avoid polluting gas emissions.
NEw ZEALAND
Palmerston North
Mayor or local authority name: Jono Naylor
Population: 85 000
Territorial extension: 326 km²

MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

■ Recycling and Composting
Timeframe: January 2011-September 2012
Investment: US$ 5,300,000
The Council has little control over the waste sector apart from its own operations. The Council provides an opportunity for recycling and separating waste types in public places; influences what types of packaging products come in at venues and facilities, and provides education about waste reduction. Actions include an audit of corporate waste arrangements for Council facilities that was undertaken in 2011, curbside recycling pickup (since 2010) and a composting trial (currently underway) to assess city-wide composting scheme capacities.

■ Energy Efficiency and Management
Timeline: October 2011-September 2012
Investment: US$ 112,000
In 2011 energy audits completed for top 5 energy-use facilities (CAB, Library, Arena, WWTP, Albert St. Depot), a solar hot water system was implemented at Freyberg Pool; Vivian St. was provisioned with LED streetlights. During 2012 solar photovoltaic panels were installed on the new depot at the Victoria Esplanade and LED streetlights with dimming systems were installed on Cascade Crescent and Kensington Mews. PNCC encourages active transport and provides alternatives to cars (such as electric bikes) for short work trips. Four electric bikes were purchased for employee use.

■ Sustainability Awareness Raising
Timeframe: January 2011-September 2012
Investment: US$ 129,600
ECO WARS: PNCC supports 10 tertiary flats in order to compete in a sustainable living program over a three-month timeframe, featuring corresponding workshops.
SUSTAINABLE BUSINESS EDUCATION: PNCC supports the Natural Step program and provides scholarships for 10 local businesses to attend a locally administered sustainable business program.
ENVIRONMENTAL EDUCATION: Education is fundamental to PNCC strategy and programs are available for Primary and Intermediate Schools, Secondary Schools, and include Adult and Tertiary Education. Statistics show more than 2500 school-children visit the site Clean Bin Project annually.
GREEN CORRIDORS: PNCC supports native planting, with 90,000+ trees and over 25 hectares planted, supported by 20-50 participants per community.
LET’S CARPOOL: Regional online carpooling solution.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

**Buildings and Energy**
The Council has commenced a program to reduce household energy and resource use. The primary aim is to implement energy efficiency retrofits and projects in 1500 homes per year—saving an average of 1 tCO₂eq/year per participating household. This program is also expanding to include other elements of household sustainability and resilience such as earthquake preparedness, water capture and storage, and waste efficiency.

**Land Transport**
The Council has initiated and coordinated an electric vehicles pilot program, resulting in New Zealand's first production electric cars (eight Mitsubishi iMiEVs) operating with four Wellington business partners. It has also helped open the city’s first electric vehicle charging station. Monitoring and analysis of vehicle use is underway. There are now one million NZ dollars invested yearly in safer cycling and the first suburban, shared pathway will open in October. Walking targets are reached by more than 42% of children walking to school, alongside excellent numbers with regard to CBD workers who choose to walk to work. Public transport usage is the highest in Australasia. The Mayor sets an example by often cycling and walking around the city and rejecting her mayoral vehicle. All overseas Council travel includes the purchase of carbon offsets.

**Forestry**
The Council currently holds over 4700 carbon credits from city forests, valued at approximately US$ 76,775, and is anticipating up to US$ 408,375 in credits by January 2013 by committing other forest areas to carbon-sink schemes. In December 2011, the Council completed its first carbon trade of voluntary emission reduction units (VERs) that were linked to its PFSI forests. The trade resulted in net revenue of $120k.

**Waste**
The Council is testing sewage sludge disposal and energy generation using microwave pyrolysis. A Waste Minimization and Conservation Plan has been developed, covering aspects such as education, funding and bylaws. Allowances for purchasing carbon credits have been considered in long-term financial plans. The City already captures 90% of the methane from its Southern Landfill in order to generate electricity.

**Council Operations**
There is an ongoing energy management program for Council facilities involving facility audits and priority actions implementation that emerges from those audits. The Council is currently testing GIS systems in selected fleet vehicles. Information from this trial will be used to assess vehicle capabilities and optimum fleet size.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

The Council's 2010 Climate Change Action Plan addresses the increasingly important need to prepare for adapting to climate change effects. The key aim is to assess how vulnerable the city may be to effects such as sea level rise, and what the possible response options are. The Council has contributed to coastal area scientific modeling by combining bathymetry and coastal topographic data to run wave run-up models to calculate storm surge and sea level rise.

Asset management plans have been updated to reflect the latest advice regarding climate change impacts.

The Council is developing a project to evaluate sea level rise and response options for the city—in conjunction with significant community engagement—to be designed and planned over the next 6 months.

The City has participated in local and national events on hazards and responses, and taken part in adaptation work in the Pacific, advising Pacific countries as an invited expert.

A work program is under development in conjunction with other agencies to make a solid case to the central government for national-level adaptation action.

The Council is looking at buildings which may have potential for roof greening as well as a range of available mechanisms to encourage tree planting and alternative “green engineering” solutions across Wellington.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Tree Planting**
  - Timeframe: July 2012
  - Investment: US$ 15,337
  - July 14 was named "Tree-Planting Day" and the local government planted over two hundred trees in addition to 4000 trees planted the previous year. Factoring in the sustainability element, the local government set up a green club to nurture them and oversee their growth. The aim of the project is to help mitigate against some climate change impacts by absorbing excess atmospheric CO₂ mostly derived from vehicular and energy generation emissions. A handbook published by the local government’s Climate Change Unit was distributed.

- **Solar Energy/Energy-Saving Lightbulbs**
  - Timeframe: January 2012
  - Investment: US$ 61,349
  - The local government ensured that all offices use energy-saving bulbs and retrofit office blocks to green standards that increase energy savings, reduce water consumption and facilitate cross-ventilations that reduce energy consumption for cooling the facility. The local government will extend these efforts to other communities in its jurisdiction, mandating that every house switch to energy-saving bulbs. At present, the local government’s principal health center is solar powered and plans are underway to insure that all street lighting migrates to solar power.

- **Clean-Cook Stoves**
  - Timeframe: 27/12/2012
  - Investment: US$ 30,674
  - This project was launched to reduce dependence on firewood for domestic use and as an energy source. The project is an offshoot of the tree planting campaign that discourages felling trees for firewood. Clean-cook stoves run on ethanol, derived from aerobic fermentation of agricultural by-products such as cassava and waste, among others. The local government is working on large-quantity clean cook stove distribution and is setting up a bio-diesel refinery, to assure adequate ethanol supplies for powering stoves. Clean-cook stoves will reduce deforestation and reduce fossil fuel use.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Train the Trainers**
  - Timeframe: March 2012
  - Investment: US$ 7361
  - Training sessions were realized to enhance local climate-change mitigation and adaptation measures as well as to educate the young with regard to climate-change challenges. Train the Trainers brought together major community stakeholders to address issues of deforestation, tree planting, carbon dioxide emissions reductions and clean development mechanisms. Trainees included chairmen and secretaries from 65 community development associations, NGOs and 22 primary school principals. We also launched a tree-planting program in support of a sustainable environment during the training sessions, and over 500 trees were planted in local government areas including primary schools.

- **Mosquito Net and Malaria Medicines Free Distribution**
  - Timeframe: March 2012
  - Investment: N/A
  - The advent of global warming has led to unprecedented flooding which in turn has lead to drainage and catchment area stagnation. Water immobility creates breeding grounds for malaria-transmission vectors, i.e., mosquitoes. The local government moved proactively by providing free mosquito nets and medicines that limit spread of the disease. Many inhabitants have benefited from the project and continue to do so, as reflected in a marked decrease in reported malaria cases.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

■ **Oil free Oslo!**
  Timeframe: 2010-2012
  Investment: US$ 18,300,000
  In 2006, the City Council decided to phase out fossil fuel use for heating municipal buildings by 2012. An extra US$ 35 million was allocated to the project from the city budget, and three relevant municipal projects appointed project managers responsible for replacing oil-fired boilers in their buildings. In December 2011, 50 schools and 100 other municipal buildings had switched from oil to renewable energy heating systems. Some city buildings still rely on oil heating, but the government will soon be entirely oil-free. The City Council has also set a target of phasing out oil-fired heating in private buildings and households in Oslo by 2020.

■ **Food Waste Becomes Biogas and Bio-fertilizer**
  Timeframe: 2011-2012
  Investment: US$ 100,000,000
  Oslo residents separate their food waste at the source and it is collected separately in green plastic bags. A biological treatment plant is now being constructed in Nes municipality, northeast of Oslo, scheduled to open January 1st 2013. Biogas from one kilo of food waste equals about 0.13 l of gasoline, which means that a bus can operate some 500 meters on 2 kilos of food waste. The biogas plant will produce some 4.5 million Nm³ upgraded biogas and 90,000 m³ bio fertilizer (liquid) per year, enough to run approximately 200 buses on biogas and provide 100 medium-sized farms with bio fertilizer yearly.

■ **FC Bus Pilot**
  Timeframe: 2012-2015
  Investment: US$ 23,000,000
  Ruter, the company that coordinates Oslo’s public transport, has ordered five emission-free hydrogen buses and climate-neutral fuels such as biogas, bioethanol and biodiesel are already in use. Oslo sees the development of zero-emission buses as an important next step. Ruter, Akershus county, Oslo and the Zero Emissions Resource Organization (ZERO) have established HyNor Oslo Buss. The buses are electric vehicles with hydrogen fuel cell power sources; the hydrogen is used to generate electricity, and the only gas emitted is water vapor. Regenerative braking technology captures and reuses braking energy, keeping hydrogen consumption low. The hydrogen will be produced at a fuelling station via water electrolysis that uses electricity from renewable sources. The five buses have been put into service on a route stretching from near the fuelling station to Oslo starting in summer 2012.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

■ **The Oslo Midgard Snake**
  Timeframe: 2011 – 2014
  Investment: US$ 167,000,000
  The Water and Wastewater Department’s project known as “The Midgard Snake” functions as an interruptive drainage system that prevents polluted water reaching the Oslo Fjord. A part of this drainage system includes a two-kilometer tunnel that reaches the city sewage plant. The tunnel will have a capacity of 50,000 cubic meters that will function as both transport route and reservoir, where water can be stored when the purifying plant lacks capacity. The project will improve fjord water quality and address climate change consequences.
MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

- Quebrada Cusipata Forestation Program
  Timeframe: June 2012-June 2013
  Investment: US$ 40,000
  This project seeks to manage and minimize disaster risks occasioned by water, earth and rock slides at Quebrada Cusipata. There is a four-hectare area for planting 4400 trees and to date approximately 600 have been sown. Additionally, an Inter-Institutional Cooperation Covenant has been signed between the Chaclacayo local government and SERPAR to create a tree-adoption program that called for 1000 tree assignments.
  Participating Organizations: the Chaclacayo local government, the Peruvian Comptroller's Office, SERPAR

- Metro Chaclacayo At-Source Solid Waste Separation Pilot Program
  Timeframe: July-December 2012
  Investment: US$ 20,000
  Efforts were made with a previously selected community in relation to selective solid domestic waste management. The objective is to minimize final disposal as well as publicize and define milestones and criteria for at-source garbage separation; all necessary materials will be provided to this end. Program outcomes call for a start-up date in October 2012.
  Participating Organizations: the Chaclacayo local government, REDAALC's Grupo de Apoyo Perú.

- Rímac River Left Bank Zone Cleanup
  Timeframe: 15 days
  Investment: US$ 25,000
  This project seeks to preserve and improve the overall quality of Lima’s most important water source, the Rímac River, establishing a number of mechanisms that avoid the riverbank becoming a dumpsite for solid wastes, rubble and weeds. Additionally, dredging and restricted access continuously control against polluting tributary discharge points.
  Participating Organizations: Chaclacayo local government, the Metro Lima Agrarian Sub-Region, the Lurigancho-Chosica local government, and private area businesses.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- Metro Chaclacayo Best Environmental Practices Awareness Program
  Timeframe: 6 months
  Investment: US$ 22,000
  The program goal is to create awareness of best environmental practices among the general population, which led to door-to-door visits and talks offering information on environmental problems caused by improper solid waste management alongside their health- and climate-change-related impacts. An understanding of public perception of solid waste management was gained and corrective measures were established.
  Participating Organizations: Chaclacayo local government, REDAALC's Grupo de Apoyo Perú.

- Creation of a Ecological/Recreational Seawall along the Rímac River’s Left Bank
  Timeframe: September 2012-September 2016
  Investment: US$ 13 million
  The program involves environmental upgrades and riverbank stone and retaining-wall reinforcements; asphalt pathways, tile paths, bike paths; lighting, benches, rubbish bins; recreational, sport and special-use areas as well as lawn and tree cultivation in an approximately 7500 m² area, to be realized by the metro Lima local government. Co-financing for a 20% private investment was attained; the project assures safety, recreational opportunities and enhanced health for the populace at large.
  Participating Organizations: metro Lima local government, the Chaclacayo local government, SERPAR, private enterprise, neighborhood associations, and the National Water Authority via the Chillón-Rímac-Lurín local water authority.

- FY 2102 Eco-Efficiency Measures
  Timeframe: January-April 2012
  Investment: US$ 4500
  Protocols have been implemented to achieve eco-efficiency measures within the local government that favor proper economic and material resources management. The action implies these resources’ sustainable conservation and use via employee awareness training, above all focused on institutional reductions in paper, energy, water and fuel consumption, leading to natural resources conservation and a subsequent reduction of negative environmental impacts.
  Participating Organizations: Chaclacayo local government.
**MAJOR GREENHOUSE-GAS MITIGATION ACTIONS**

- **At-School Eco-Efficient Environmental Education for Children and Young People**
  
  **Timeframe:** 18 months  
  **Investment:** US$ 100,000  
  
  The program seeks to train and create awareness among children and young people and calls for the implementation of a school environmental committee at area educational institutions; six workshop programs were organized to inculcate good environmental habits. The goal is to strengthen the application of an environmental focus at educational institutions within a sustainable development education framework aimed at water, air, and solid wastes stewardship as well as land-related improvements. The implementation of a community reforestation project via school contests is also foreseen.  
  **PARTICIPATING ORGANIZATIONS:** the Ministry of the Environment, the Ministry of Agriculture, UGEL N° 10 de Huaral, educational institutions and private businesses.

- **Agrorural - Chancay Local Government Framework Nursery Agreement**
  
  **Timeframe:** 5 years  
  **Investment:** US$ 115,400  
  
  The local government signed a five-year inter-institutional accord with Agrorural to cultivate trees for forestation and reforestation in district desert areas. This community association program helps reforest the Chancay River basin from its source to the Pacific Ocean. A national tara tree for exportation program has additionally been inaugurated. This forest cover plays an important role capturing carbon that is later converted into oxygen. Finally, the use of inorganic gels and vegetable beds to facilitate water retention around tree individuals is currently being analyzed.

- **Santa Rosa Wetlands Environmental Recuperation**
  
  **Timeframe:** 18 months  
  **Investment:** US$ 200,000  
  
  The Santa Rosa wetland is a research, environmental education and climate conditions monitoring area featuring 42 hectares of reflective pools, 38 plant varieties and 45 animal species. Grazing there is restricted and programmed with animals that do not damage vegetation roots. Noteworthy potential includes nutrient retention and its incorporation into natural cycles, which reduce and control possible area eutrophication processes. The wetlands additionally provide protection against possible climate-related catastrophes in adjacent cultivated lands and help stabilize micro-climates; their absence would produce a rise in local temperature and for these reasons, the local government is making efforts for their conservation and protection.  
  **PARTICIPATING ORGANIZATIONS:** The Ministry of Housing, Región Lima

**MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS**

- **The PMRS Program: At-Source Solid Inorganic Garbage Separation**
  
  **Timeframe:** 1 year  
  
  Following involvement from solid waste management specialists, this program was developed through a characterization study to determine waste type, quantity and hazards and understand each district inhabitant's per-capita production rate. The study led to a solid wastes management plan that in turn gave rise to an at-source garbage separation program. Such oversight prevents indiscriminate garbage incineration or open-air disposal, which would produce GHG that contribute to climate change.

- **Agua para Todos Program**
  
  **Timeframe:** 2 years  
  **Investment:** US$ 4,615,384  
  
  This program involves insuring that communities have access to potable water provision and also calls for the installation of sewer systems to evacuate both gray and black wastewater. The municipal business known as Emapa Chancay has drafted profiles for a water treatment plant that will be a solid climate-change-fighting measure.  
  **PARTICIPATING ORGANIZATIONS:** The Ministry of Housing, EMAPA S.A.

- **Integrated Municipal Solid Waste Management Upgrade and Expansion**
  
  **Timeframe:** 12 months  
  **Investment:** US$ 2,132,134  
  
  The project involves a solid wastes treatment plant and final disposal facility for material generated by the Chancay residents. Its infrastructure represents and important step forward with regard to environmental protection since GHG will no longer be produced and methane will be harvested for use as an energy source. The project conserves natural resources and at least in part reduces fossil fuel consumption in the fight against GHG-produced climate change.  
  **PARTICIPATING ORGANIZATIONS:** Ministry of the Environment
MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

**Scraping Program**
Timeframe: April 2012-December 2014
Investment: US$ 6.1 million
The program goal is to gradually reduce excess vehicle units by promoting the replacement of low- with high-capacity units as well as help reduce pollutant emissions levels from older vehicles. To date, 750 public transportation vehicles more than twenty years old have been scrapped. The proposed goal is four thousand vehicles by March 2013.
**Participating Organizations:** The certifying and scrapping entities, Corporación Financiera de Desarrollo S.A- COFIDE, Operadores del “Metropolitano”, Lima vias Express, Lima Bus Internacional, Perú masivo and Transvial.

**CICLOLIMA: Special Non-Motorized Transportation Project**
Timeframe: January 2011-December 2014
Investment: US$ 16,870,370 (approximate)
This project seeks to expand the number of users that choose bicycles as an alternative means of transportation. Project components are as follows:
1. Infrastructure: 150 km bike path construction, 95 km bike path maintenance (more than 83% of the total), docking stations.
2. Promotion: Bicicole (high school educational campaigns), U.Bici (shared bicycle system at universities), Ciclo-día (Sunday thoroughfare closures), Aquí tu bici.
3. Communication: social network use.

**Transportation Reforms**
Timeframe: July 2012-December 2014
Investment: US$ 34,570,948 (approximate; 2013/2014)
Transportation reform seeks safe, rapid and orderly transportation that helps reduces emissions levels. The reform encompasses the following: a fleet freeze (regulation 1538) to rein in additional mini-bus additions to the public-transport fleet; a template bus that is high-capacity and pollutes less; transportation corridors that form part of an integrated transport system; regulation of major thoroughfares; adjustments to consortia; taxi registry; and urban transport regulation.
**Participating Organizations:** district-area municipalities, Lima and Callao consortia and businesses, Lima and Callao transportation unions, the Autoridad Autónoma del Tren Eléctrico (AATE), the Instituto Metropolitano Protransporte de Lima – PROTRANSPORTE, and the Peruvian Federal Police.

The program won the 2012 “Public Management Best Practices” award in the Public Impacts category.

**Participating Organizations:** Organización Panamericana de Salud OPS, area local governments, the Ministries of Education and the Environment, the Autoridad Autónoma del Tren Eléctrico (AATE), Cooperación Alemana (GIZ), embassies, Fundación Transitemos, the Lima Parks Service SERPAR, Touring, universities, educational institutions and private businesses.
**MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS**

**Lima Verde Program**

Timeframe: Parque para Todos (January 2011-December 2014), Adopta un Árbol (June 2012-December 2014), Lomas de Lima (September 2012-December 2014)

Investment: US$ 147,010,844

This program seeks to expand the city’s green spaces via

1. “Parques para Todos.” Goal: six new regional parks plus 14-park upgrade
2. “Adopta un Árbol.” Forestation with citizen participation; goal: 300,000 trees
3. “Lomas de Lima” seeks to conserve and fully utilize hills through the creation of a regional hills conservation system, the establishment of two hillside parks, promotion of three eco-tourism routes in the Villa María del Triunfo, San Juan de Lurigancho and Pachacamac hills, and promotion of the “Lima Verde” annual contest.

**Participating Organizations:** area local governments, grassroots social organizations (neighborhood, community, cultural and sporting organizations, soup kitchens, mothers’ clubs, youth clubs and environmental organizations; academic institutions and research centers, educational institutions, youth groups, universities, private enterprise, tourist operators and associations, volunteer networks, NGOs and the public at large.

**Mi Huerta Program**

Timeframe: June 2012-December 2014

Investment: US$ 2,060,295

This program takes up the practice of urban agriculture in abandoned urban and suburban spaces to generate wholesome foodstuffs for at-home consumption and commercialization. It emerges as a strategy that helps promote and develop alternatives that aid in improving family nutrition and more diverse citywide dietary paradigms. 2014 goals: sixteen associated districts, 2014 urban orchards.

**Participating Organizations:** district local governments, the Ministry of Education, local school districts, NGOs, foundations, academic institutions, research centers, urban farming organization, producers and grassroots organizations.

**Barrio Mio Program**

Timeframe: December 2011-December 2014

Investment: US$ 490 million

This program is an urban improvement and social development project-identifier in Lima’s working class neighborhoods that emerges from a focus on integrated and participatory land development. Its main goals are to improve resident quality-of-life and to build a culture of citizenship, helping to benefit approximately three million residents in the capital’s neediest neighborhoods, in coordination with local governments and the general population.

**Participating Organizations:** Local governments, neighborhood and social organizations, NGOs, volunteer networks, etc.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

■ Massive Mangrove Urban Greening
   Timeframe: May 2011-September 2012
   Investment: US$ 3,940
   Dagupan has a total land area of 4008 hectares. Of these, 40 percent is made up of bodies of water such as rivers and fishponds, and the remaining land area is maximized for commercial use as a result of the city's rapid economic development. In light of these factors, the city's urban greening project is concentrated along the riverine area to enhance marine biosphere biodiversity. At least 20 species of mangroves populate forested areas. The program also addresses the need to implement an urban greening initiative even within limited land areas. Large-scale mangrove planting is Dagupan's major GHG mitigation initiative. The project was implemented along riverbanks, fishpond areas and coastal road networks and is considered significant to local carbon sequestration and climate change adaptation, due to its minimal required input that yields large GHG reductions. The project's successful implementation increased mangrove areas from 28.86 to some 39.86 hectares and also improved not only city air quality but also quality of life for local residents whose livelihood depends on river harvests. To date, a total of 107,000 mangrove seedlings have been planted and more than 175,000 fully grown mangroves are maintained throughout Dagupan's riverine areas.
   Participating Organizations: City Fisheries and Aquatic Resources Management Council, Barangay (Community) Fisheries and Aquatic Resources Management Council, Pangasinan Federation of Non-Government Organizations, Latter Day Saints, Sonshine Radio, Bureau of Jail Management and Penology, University of Pangasinan, University of Luzon, Philippine National Police Maritime Group, and Barangay (Community Council).

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

■ River Rehabilitation and Cleanup
   Timeframe: September 2010-September 2012
   Investment: US$ 35,700
   Recognizing the role the river plays in city biodiversity expansion and climate change adaptation, the city government launched a massive river cleanup and rehabilitation backed by scientific research that served as framework for cleanup efforts. Under the program, all the structures that impede the free flow of water and cause eutrophication have been removed, allowing for faster river draining to Lingayen Gulf. It also facilitates easy flushing which makes water quality more conducive to fish production. Vast city river areas were planted with thousands of mangroves that allow the biosphere to flourish.
   Participating Organizations: City Fisheries and Aquatic Resources Management Council, Barangay (Community) Fisheries and Aquatic Resources Management Council, Pangasinan Federation of Non-Government Organizations, Latter Day Saints, Sonshine Radio, Bureau of Jail Management and Penology, University of Pangasinan, University of Luzon, Philippine National Police Maritime Group, and Barangay (Community Council).

■ River Dredging
   Timeframe: June 2010 to date
   Investment: US$ 108,000
   With the assistance of the provincial and national governments, the city government initiated large-scale river dredging operations to cover the majority of the city's river system. Flushing river water—especially during heavy rains—was enhanced after the initiative's initial completion. Moreover, a placid flow will support natural cleansing, making the river more accommodating to aquatic species, particularly freshwater fish. Additionally, dredging the river minimizes floods because rivers serve as catch basins that absorb excess water during heavy rains and high tides. The fill gathered was deposited in low-lying communities to elevate ground levels. To date, a total of 16,865 cubic meters of fill has been obtained by dredging operations; an average of 4 ft has been added to the depth of the rivers.
**Ligao**

<table>
<thead>
<tr>
<th>Mayor or local authority name</th>
<th>Linda P. González</th>
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<tr>
<td>Population</td>
<td>119,094</td>
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<tr>
<td>Territorial extension</td>
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<td>Overall budget allocation for climate-change-related actions</td>
<td>US $ 576,293</td>
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**MAJOR GREENHOUSE GAS-MITIGATION ACTIONS**

- **Bamboo Planting**  
  **Timeframe:** May 2012 to date  
  **Investment:** US$ 5,952.38  
  A public-private partnership between the Ligao city government, the Management Association of the Philippines, the Philippine Chamber of Agriculture and Foods, Inc., EARTH Institute Asia, Inc., and Bicol University largely seeks to establish a plan for Ligao to use bamboo to green the environment and provide a sustainable livelihood/business opportunities to city communities.

- **Materials Recovery Facilities (MRF)**  
  **Timeline:** December 2011 to date  
  **Investment:** US$ 160,714.28  
  In compliance with federal Act 9008 (the Ecological Solid Waste Management Act) as well as city participation under the aegis of ordinance 2011-002, the city erected a Materials Recovery Facility that will enhance the city's waste management system. The facility is complete and features the following facilities: sorting conveyor, transfer conveyor, surge tank, vertical baler, hammer mill, bio-waste shredder, plastic shredder, mobile containers, electrical control and maintenance tools.

- **Ligao Slaughterhouse and Biogas Digester**  
  **Timeframe:** December 2011 to present  
  **Investment:** US$ 71,428.57  
  Aside from improved city services at the slaughterhouse, GHG emissions and other forms of pollution will be minimized. Wastes collected serve as an alternative energy source.

**MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS**

- **Raw Materials Processing, Treatment and Preservation Skills-Training**  
  **Timeframe:** May-September 2012  
  **Investment:** US$ 5,127.86  
  Ligao is endowed with abundant karagumoi (Pandanus simplex) plants that have never been exploited. The present project supports the city’s “No Plastic Policy”—which seeks to abate the negative effects of day-to-day plastic use—by recognizing Bayong’s vast potential in the form of native karagumoi bags, to be sold in both local and foreign markets.

- **Participatory Community-Managed Disaster Risk Reduction Training Plus Contingency and Action Planning for Ligao’s 55 Barangay Villages**  
  **Timeframe:** January 2012-September 2012  
  **Investment:** US$ 5,952  
  Community-Managed Disaster Risk Reduction (CMDRR) is an approach that strengthens and capacitates the community through participative and proactive involvement in a complete training program. Participants included the Barangay council, the youth sector, NGOs, religious organizations, the Barangay Disaster Risk Reduction and Management Council, the education sector and other community stakeholders. Analyses (risk, hazard, vulnerability and capacity), Contingency and Action Plans have already been completed and are now being mainstreamed into the barangays’ DRRM system.

- **Community Potable Water, Sanitation and Hygiene (CPWASH) Project**  
  **Timeframe:** July 2012 to date (ongoing project)  
  **Investment:** US$ 71,428.57  
  The Community Potable Water, Sanitation and Hygiene (CPWASH) Project seeks to enhance household access to potable water and sanitation services by improving supply and sanitation conditions, particularly in Barangay, via the introduction of low-cost, culturally-acceptable and appropriate technologies that the community can manage and sustain. Biogas facilities installation is another CPWASH sub-project that seeks to convert community-generated wastes into renewable energy. This project is made possible in partnership with the Department of Agrarian Reform.
QUEZON

Mayor or local authority name: Herbert M. Bautista
Population: 2,915,774
Territorial extension: 161 km²

MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

- **City Garbage Separation Program Incorporated into City Haul Scope**
  Timeframe: July 2011 to date
  Since July 2011, city garbage haulers’ services have included dedicated collection of separate biodegradable and non-biodegradable garbage in conjunction with a proper solid waste management information campaign. 80.77% of Quezon households now separate their garbage.

- **Waste Reduction Initiatives**
  Timeframe: Year-round
  Several community-, institution- and school-based projects have been implemented to involve stakeholders in the city’s waste reduction efforts with an eye to attaining an at-least 50% waste diversion rate as mandated by law. Such efforts have resulted in a 43% waste diversion rate in 2011 and a 55% rate from January to June 2012.

- **Biogas Emissions Reduction Project**
  Timeframe: 2007-present
  The biogas plant has extracted a total of 22,636 m³/hr of biogas, with 20,814 m³/hr going to the flare line while 768 m³/hr went to the engine line for electricity production. Average monthly flow is 1,886 m³/hr; to date, there are some 87 installed wells. Savings from facility-generated power is approximately Php 544,241.

- **Advocacy and Social-Marketing Program**
  Timeline: 2011-June 2012
  The city conducted various advocacy and social-marketing projects aimed at promoting environmental stewardship actions, ranging from special events implementation/participation to training, seminars and print materials production.

- **Anti-Polluting Exhaust Emissions Ordinance**
  Timeframe: Year round
  The Anti-Emissions Unit conducts regular roadside inspections of suspected polluting vehicles.

- **Greenhouse Gas Inventory**
  Timeframe: government operations completed in 2011
  Based on initial reports, city government operations in 2010 have emitted approximately 62,480,890.21 kg or 62,480.89 tCO₂eq. Considered emission sources included electricity consumption, fuel consumption and waste generation.

- **Green Building Program**
  Timeframe: ongoing
  Quezon enacted a Green Building Ordinance mandating green design and technologies for planning, construction, operation and maintenance activities, including city building project retrofits. As of June 2012, seventeen new Quezon green buildings have fully complied with green building certification requirements.

- **Green Procurement Program**
  Timeframe: Year Round
  In 2012, a resolution to create Quezon’s Green Public Procurement (GPP) Team was approved. The team is tasked with monitoring implementation of the city’s Green Public Procurement Program.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Flood Control Program**
  Timeframe: Year Round
  The city’s flood control and mitigation policy includes the following actions:
  - Drainage improvement program implementation
• Embankment inventory, repair, recovery and construction
• Engineering work coordination with resettlement strategies
• Continuous coordination with national government agencies and affected communities

■ Housing and Resettlement Program
Timeframe: 2011-June 2012
More than 3000 families were relocated from waterways and other at-risk areas, as a means not only to save families but also to clear waterways for dredging and other flood mitigation strategies. Nine housing projects were also inaugurated during the same period.

■ Making Cities Resilient Campaign
Timeframe: ongoing
The city was selected among twelve South Asian and Southern African cities to benefit from the ICLEI and the United Nations International Strategy for Disaster Reduction (UNISDR)'s Making Cities Resilient Campaign Local Government Self Assessment Tool. The project helps cities build resilience to disasters and anticipate climate change.

■ Other Disaster-Risk Reduction Initiatives
Timeframe: ongoing
Barangay Emergency Response Teams and community-based leaders received ongoing training to serve as first-responders for the city’s Disaster Risk Reduction and Management Council. The council also trained junior rescuers from public schools about response protocols to different emergency types.
Almada

**Mayor or local authority name**
Maria Emilia Neto de Sousa

**Population**
173,298

**Territorial extension**
71 km²

**Overall budget allocation for climate-change-related actions**
US $590,000

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**ECOENLIGHt ECO-EFFICIENT PUBLIC AND TRAFFIC LIGHTING**

- **EcoEnLight Eco-efficient Public and Traffic Lighting**
  
  **Timeframe:** October 2011 to date
  
  **Investment:** US$ 490,000
  
  An intelligent street lighting system—with dimming and remote control technologies—as well as LED traffic lighting, was installed. Results indicate a more than 40% reduction corresponding to street lighting and 80% related to traffic lighting. The EcoEnLight project, slated to be complete in 2013, will cover 1500 light points in the public lighting system as well as a total of 1350 LED technology traffic lights.

- **Municipal Recreational Centers 100% Solar Powered**
  
  **Timeframe:** September 2012
  
  **Investment:** US$ 58,000
  
  Since 2008, Almada has equipped municipal swimming pools and recreational centers with solar panels for water heating. The latest swimming pool, opened in September 2012, ensures that all four municipal pools use solar thermal energy for water heating and therefore reduce fossil fuel use through a total of 820 m² solar area. The remaining municipal recreational centers will be equipped with solar energy in 2013.

- **Efficient Lighting for Historic Monuments**
  
  **Timeframe:** September 2012
  
  **Investment:** US$ 10,200
  
  Efficient lighting for historic monuments is an ongoing project that seeks to replace decorative lighting using energy efficient solutions. The latest project renovated lighting on the Dom Fernando II e Glória Frigate, a museum ship anchored on the Almada riverfront. The old lighting was replaced with LED lighting, and resulted in an 80% energy consumption reduction.

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**MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS**

- **Planning for Climate Change**
  
  **Timeframe:** Ongoing
  
  **Investment:** US$ 97,000
  
  Regulatory frameworks, based on vulnerability studies, have been established in order to include climate change adaptation in new and existing urban project plans that are obliged to cross-reference vulnerability, risk and urban development maps to minimize future impacts. Several strategic development goals from the Municipal Master Plan, under revision, have direct relation to climate change adaptation. One of the most emblematic projects is the Polis Program’s renewal of coastal urban areas in Costa da Caparica.

- **Dune Restoration Along the Atlantic Seaboard**
  
  **Timeframe:** February-April 2012
  
  **Investment:** US$ 12,900
  
  With its 13 km beachfront, Almada has been developing several dune restoration projects, including sand capture system installation and autochthonous precursor plantings (European beachgrass, Ammophila Arenaria). In 2012, more than 1500 plants were introduced to a 2000m² area, allowing for dune fixation and restoration and minimizing erosion effects. Children from local public and surf schools carried out program efforts.

- **Almada Municipal Urban Farm Network**
  
  **Timeframe:** December 2012
  
  **Investment:** US$ 200,000 (estimated)
  
  This project included designing an urban farm network that contributes to Almada’s sustainability in vegetable production and resilience. Abandoned agricultural areas and existing urban areas were evaluated in terms of vegetable productivity; it led to the development of three urban municipal farms. These three farms cover a total area of 45.00 m² and will involve at least 150 urban farmers

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**Participating Organizations**
AGENEAL (Almada’s Local Energy Management Agency), Instituto Superior Técnico, Science Faculty of Lisbon University, Instituto da Conservação da Natureza e das Florestas, EDP and several local private social-solidarity institutions.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Installation of 514 Electric Vehicle Charging Stations**
  Timeframe: May 2012
  Investment: not municipal budget
  Mobi-e is the Portuguese consortium for electric mobility. As a partner, the Lisbon Municipality has acceded to the project and is now the largest such urban network. Lisbon Municipality has made a major effort to install charging stations and has made working investments in public space compatibility with existing infrastructures. 514 charging stations are now installed and the second phase of the project is underway.
  **Participating Organizations:** Lisboa-e-Nova Local Energy and Environmental Agency, Mobi-e (the National Electric Mobility Network)

- **Lisbon Cycle Network Belavista Park Bike and Pedestrian Bridge**
  Timeframe: June 2012
  Investment: US$ 1,559,640
  Lisbon Municipality has worked toward implementing its cycle network. Once all but extinct as a means of transport, the bicycle is now a visible player for daily commutes, and has led to 40 km of bike paths; however, city declivities require bridges to overcome certain obstacles. The Belavista cycle bridge crosses a large valley and contributes to the general goal of raising overall cycle journey numbers.
  **Participating Organizations:** Better World-Comunicação, Publicidade E Entretenimento, S.A

- **High Waste Production Reduction and Increased Recycling Rates**
  Timeframe: December 2011
  Investment: US$ 254,134 annually, resulting from a $2,105,683 investment in service costs and $1,852,142 of direct and indirect benefits.
  Lisbon is reducing its waste production due to an innovative approach to waste management—door-to-door recycling processes—which replace urban waste islands and identify specific days for each material. By 2012, 34% of the city was already in compliance with the door-to-door project and waste production was reduced more than 40% from 1999 levels. The city’s still growing recycling rate has reached nearly 22%.
MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

■ Reducing Public Space Water Demand
Timeframe: June 2012
Investment: US$ 896,655
Lisbon is reducing the environmental effect of public space irrigation. Central Park “Eduardo VII” and its new irrigation system will reduce yearly water consumption from 840,000 m³ to just 300,000 m³ at the same time maintenance intensity is reduced with resultant CO₂ emissions reductions. Biodiverse Mediterranean pasture development as an alternative to lawns, requiring no irrigation and featuring high capacity CO₂ capture, is another implemented measure. Recycled water has been used to wash streets as well.
Participating Organizations: Lisboa-e-Nova Local Energy and Environmental Agency

■ Urban Agriculture Program
Timeframe: September 2012
Investment: US$ 1,551,360
With two new agricultural parks implemented in 2011 and seven more under construction in 2012, Lisbon seeks to achieve a ten urban park network in 2013. Under the aegis of the “Lisbon Green Plan,” the agricultural plan serves more than 650 families and all areas will be integrated into expanded parks or greenways. Specific regulations have been approved to regulate land access and new farmers are learning biological skills focused on more modern and organized agricultural parks.

■ Municipal Fleet Efficiency
Timeframe: September 2012
Investment: US$ 2,469,050
The Lisbon Municipality is replacing vehicles dedicated to standard working trips, as part of a two-segment project. One segment reduced vehicle numbers by 51% over 2009 to a total of just 381 cars. Another segment acquired 54 electric vehicles via a five-year rental arrangement. Financial investment must be analyzed in light of electric car-related fuel cost savings. Reduced car numbers save money and result in significant CO₂ emission reductions.
Participating Organizations: Lisboa-e-Nova Local Energy and Environmental Agency
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Objective Greenhouse Gas Management System Implementation [supervised by the Ministry of the Environment]**
  
  Timeframe: January 2011 to date  
  Investment: N/A  
  The Ministry of the Environment has promoted objective system GHG management since 2011 to reduce GHG, promote green values, and cultivate social responsibility/improvement actions in the public arena. The city’s goal is to reduce GHG emissions by 20 percent at 59 public buildings, and all vehicles, by 2015.

- **City Greenhouse Gas Emission Trading System [supervised by Gyeonggi Province]**
  
  Timeframe: January 2010-December 2012  
  Investment: N/A  
  The system objective is to establish a GHG reduction goal (3 percent or higher compared to standard emissions) for the implementation year and purchase or sell emissions trading credits from other institutions or organizations should the reduction fail to meet or conversely exceed the goal. 357 tCO2 were eliminated in 2011. Anyang was selected as an Outstanding Emissions Trading City in 2010 and 2011.

- **Carbon Neutrality Program Participation [supervised by the Ministry of Knowledge Economy]**
  
  Timeframe: January 2010-December 2012  
  Investment: US$ 1801  
  Carbon Neutrality is a voluntary greenhouse-gas reduction movement that calculates day-to-day activity GHG generation to set up reduction goals and reach “zero” GHG emissions via independent activities and standard offset measures. 53 tCO2 were reduced in 2011 and 64 tCO2 in 2012.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Green Life-Practice Education and Promotion [supervised by Anyang]**
  
  Timeframe: January 2010-December 2012  
  Investment: US$ 36,019  
  Visits to environmental schools and citizen green life-practices training:
  
  2011: 318 sessions, 567 classes, and 19,877 participants  
  2012: 227 sessions, 481 classes, and 14,451 participants

- **Carbon Point System [supervised by the Ministry of the Environment]**
  
  Timeframe: January 2010 to date  
  Investment: US$: 271,167  
  The Carbon Point System encourages citizens to voluntarily reduce GHG emissions. If a home or business reduces electricity, water, and gas usage, the energy saved is calculated as the CO2 emission rate. Based on this rate, points and other incentives are awarded. (2011: US$ 114,071; 2012: US$ 71,736)

- **Green Leader Recruitment and Development [supervised by the Ministry of the Environment]**
  
  Timeframe: January 2010 to date  
  Investment: US$ 14,408  
  The program seeks to develop 21st century green life leaders who will lead the “Green Start Movement,” a nationwide movement for GHG reduction that promotes a low-carbon lifestyle. In 2011, 78 trainees were certified; 62 were certified in 2012.

  **Participating Organizations:** Pureun Anyang 21 Council, Green Start Anyang Network
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

■ Eco-Mileage Promotion
Timeframe: October 2011
Investment: US$ 17,000
Since 2009, the city has operated Eco-Mileage, a program in which families and organizations undertake efforts to voluntarily reduce electricity, water and gas consumption. The local government provides energy-saving resources and reforestation subsidies as incentives to participants that reduce energy consumption. 28,000 people (21% of the city’s population) have joined. Due to the eco-mileage program, 2012’s GHG reduction rate is expected to be about 4000t; Dobong-gu plans to reduce GHG by 10,000t by 2014.

■ Green Events Promotion
Timeframe: February 2012
No investment
Since February 2012, all local government events are green events that minimize GHG generation. Green events encourage e-mail and internet use, starting with the preparation process, to decrease printed materials distribution; venues that are easy to access via public transportation are selected; and low-floor spaces are used to decrease elevator use. Furthermore, Dobong-gu is putting together guidelines for administering additional emissions sources, maximizing energy-use reductions, encouraging use of highly-efficient, environmentally friendly products, using recyclable materials and avoiding disposable products use if possible.

■ Urban Agriculture Activation
Timeframe: January 2012
Investment: US$: 585,000
Dobong-gu activates urban agriculture by identifying undeveloped lands to expand direct carbon-offset areas and reduce the secondary GHG emission rate created indirectly in the transportation of agricultural products. In 2012 the City created vegetable gardens in public lands and four private parcels and has also created vegetable gardens on 23 public building rooftops. Heat island creation is also abated with the provision of 1500 box garden sets that allow any citizen to raise vegetables at home.
MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

■ Dobong Environment Class
Timeframe: January 2012
Investment: US$ 94,500
The Dobong Environment Class is an environmental education facility designed to encourage energy efficient lifestyles among students who will lead future generations. Programs include new-regeneration-energy experiences, understanding carbon points, solar heat application experiences, and green lifestyles. Programs are to be expanded since educational and satisfaction-level outcomes have been positive.

■ Low-Carbon Green Growth Ordinances
Timeframe: March 2012
No investment
Basic ordinances for low-carbon green growth have been enacted in Dobong-gu to expand development of climate-change actions policies, improve citizen quality of life and create pleasant urban environments. Ordinances call for green growth through the adoption of green habits in private and business life, organizing and operating green-growth committees for deliberation and consultation on major actions, establishing green economy and GHG reduction goals, and providing executive and financial support to climate-change adaptation and sustainable development industries.

■ PCitizen Organization Participation Policy
Timeframe: January 2012
Investment: US$ 234,000
In Dobong-gu, the 650-member Green Start citizen network plays an essential role in reinforcing climate-change capacities and preliminary compliance with low-carbon city/sustainable green growth guidelines. It has trained 77 green leaders who are the core human resource of the Green Start movement and who create awareness about green lifestyles, alongside 20 green leaders who mastered its professional education course and perform consultation services related to GHG emissions such as standby power diagnosis.
Osan

MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

■ Carbon Point System Operation
  Timeframe: January 2012
  Investment: US$ 3,590
  Domestic and commercial reduction of energy consumption is converted to point equivalencies; GHG emissions reduction incentives encourage citizens to reduce consumption voluntarily. The program’s 22,519 participant households reduced 1,067 tCO2 emissions in the period (the equivalent of 380,000 pine trees). Incentives granted totaled US$ 16,920.

■ Green Office Building Construction
  Timeframe: January 2011
  Investment: US$ 109,867,000
  To actively respond to government low-carbon, green growth policies by reducing GHG emissions and maximizing energy savings, the City is replacing its current lighting system with high-efficiency, environment-friendly LED lights. The program also includes the establishment of lighting control and efficient HVAC facilities. The City will soon replace 4th-floor AC installations.

■ Green Technology Research Lab
  Timeframe: August 2012
  Investment: US$ 35,900,197
  The City established a green technology research institute for low-carbon and green growth issues in order to promote green culture and develop as a green-technology industrial hub. Institute activities include introducing new and renewable energy technology and environment-friendly concepts as well as energy efficiency improvement via high-efficiency, environment-friendly energy systems such as PV power generation, combined heat and power generation, and GHP cooling and heating facilities.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

■ Green Leader Training & Support Project
  Timeframe: January 2012
  Investment: US$ 14,324
  Green Leaders are green activists who will play a pivotal role leading the ‘Green Start Movement,’ an eco-friendly GHG reduction campaign, and will create awareness of low-carbon, green lifestyles. Its activities include GHG emissions diagnoses and consulting for residences, commercial buildings and offices; green growth education on climate change and GHG emissions reduction; and promoting green education, development and educational program application

■ Habitat and Ecosystem Restoration Project
  Timeframe: July 2010
  Investment: US$ 51,647,819
  This project encompasses three main subprojects:
  (1) restoring the Gajangcheon wetlands, Daehocheon water purification facilities, odors and back-flow prevention facilities, ecological habitat restoration and improvement of alluvial islands
  (2) river improvements to prepare for flooding, ecological-space restoration and water quality improvement
  (3) restoration of urban streams, wetlands development, riverbed dredging, river facilities improvement, non-point source reduction facilities and reconstruction of the Geumgok irrigation reservoir

■ Eco-Friendly Osan-Segyo Housing and Land Development Project
  Timeframe: October 2006-December 2008
  Investment: US$ 21,584,993
  The development plan involves an environmentally-friendly spatial configuration which enables sustainable urban development through the improvement of the natural environment, landscape, ecosystems and green spaces and establishes a plan to promote urban community consciousness. Specialized strategies include green network conservation, the construction of a linear open space with which to connect a commercial zone and a housing area, and the development of a pedestrian-oriented street and bike path.

Participating Organization: Korea Land and Housing Corporation
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

■ Seongbuk Declaration of Freedom from Greenhouse Gases
Timeframe: June 2012
Investment: US $2700
To create a climate-change resilient city and promote citizen participation, the aggressive “GHG-Free Seongbuk” target objective was established via 25 city-designated projects led by fourteen departments and centered on six strategies, including the goal of a green values city that practices green lifestyles. The Seongbuk Action Declaration was made on World Environment Day (June 5th) in conjunction with the Green Seongbuk Network and Seongbuk-gu Green Start Network, which identifies city and citizen responsibilities and actively promotes climate change response movements.

■ Seongbuk Power-Saving Plant
Timeframe: March 2012-September 2012
Investment in US$ 4500
The Seongbuk power-saving plant, encompassing five apartment and one citizen community, established a cooperative agreement with local government. At the Seokgwang Doosan Eco Power-Saving Plant, changing the underground parking lot lights to LED units reduced electricity consumed by public facilities by 26%. The plant has also promoted bicycle cooperation with residents. LED lights and low-flow showerheads have been installed at Dongsomun Hydai Power Saving Plant.

■ Green Value Project Citizen Participation
Timeframe: October 2011-September 2012
Investment: US$ 50,000
An environmental education ordinance has been established and serves as a base for grassroots environmental values cultivation through the Green Value Project, which pursues sustainable development and helps to reach and activate required knowledge, skills, attitudes and values. As regards environmental education, three schools have been designated Seongbuk environment schools, three eco-friendly practices youth groups have been formed, and four additional programs have been established using fun environment-related educational tools.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

■ Jungnang River Ecological Stream Restoration Efforts
Timeframe: May 2012
Investment: US $13,500
To make the Jungnang River and its tributaries clean enough to swim in, heads of eight autonomous bodies, including Seongbuk-gu, met and established a conference whose aim is improving water quality and restoring aquatic ecosystems destroyed by artificial channel straightening and stream intubation. Ecological reserves were established in November 2011 and a proclamation ceremony outlawing fishing was held in May 2012 at the same time Jungnang River trustees were appointed.

■ Community Village Building
Timeframe: October 2011-September 2012
Investment: US$ 54,300
To support healthy dietary and leisure habits, an urban vegetable garden was built in the 2571m² empty lot at Seokgwang-dong featuring 1800 sets of eco-friendly gardening boxes made of recycled materials built adjacent to borough offices and the village creek. Litter has been cleared from a 4232m² parcel in Jangwi-dong, at which gardening boxes are being distributed in each household and alley. The project also includes education programs in which parents and primary school students jointly participate.

■ Residents Who Practice Green Living
Timeframe: April-September 2012
Investment: US$ 9000
Seongbuk-gu sponsored a contest in May 2012 to gather resident ideas about green living. Five outstanding ideas that included shared bikes within apartment complexes, energy bills that consider carbon emissions, and eliminating paper cups from public facilities were selected and are currently in practice. 20% of residents have subscribed to the eco-mileage project, which aims to reduce everyday GHG emissions by 10%. At borough headquarters, some 1350 employees are participating in the movement to use eco-friendly cups during meetings and when serving visitors. Mayor Yeongbae Kim commutes by bicycle.

PARTICIPATING ORGANIZATIONS: Korea University, Kookmin University, Sungshin Women’s University, Dongduk Women’s University, Hansung University, Seo Kyeong University, Korea’s National University of Arts
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

■ One Fewer Nuclear Power Plant
Timeframe: April 2012
Investment: US$ 2.9 billion from 2012 to 2014
On 26 April 2012, Seoul launched a multi-faceted initiative designated “One Less Nuclear Power Plant,” encompassing 78 action plans in six categories, mainly with a view to cutting energy demand and upping efficiencies as well as expanding new and renewable sources. Under the initiative, Seoul expects to retire one nuclear unit by reducing energy demand by 2 million TOE, while creating 40,000 green jobs and cutting emissions by 7.33 million metric tons as well. Participating Organizations: Ministry of Knowledge Economy, Ministry of Environment, Korea Energy Management Corporation (KEMCO), Office of Education, KEPCO, power plants, environmental NGOs, consumer groups, religious groups, feminist associations, cooperatives, the Seoul Chamber of Commerce, the Association of Department Stores, Associations of Franchise Shops, ESCO, large supermarkets (SSMs), and small-unit municipalities.

■ Eco-Mileage
Timeframe: January 2012 (model introduced in 2009)
Investment: US$ 2.8 million
The Eco-Mileage program engages homes and businesses in energy conservation (i.e. saving electricity, water, gas and district heating) by offering city government incentives. Eco-Mileage Members stay informed and motivated through regular e-mail and SMS reports of energy consumption data. As of August 2012, 627,000 homes and businesses have joined the program. The city government seeks to expand the program to 1 million members by 2014. Participating Organizations: KEPCO, KEMCO, Ministry of Environment, Ministry of Land and Maritime Affairs, AEGIS Enterprise, apartment offices, environmental NGOs, Office of Education, schools, private buildings, BC Card Corp., LG Housys, Dajin DMP.

■ LED Expansion and Development
Timeframe: January 2012
Investment: US$ 4.8 million
Seoul aims to be a Mecca of LED technology and commercialization. By the end of the current year, the city plans to install 64,000 LED lights in public buildings and subway stations, leading to a 7060 TOE’s worth of electricity by 2014. The city government is also encouraging multi-use facilities like supermarkets and department stores to replace their lighting sources with LED, and simultaneously works to replace signs and street lamps with LED illumination.
MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

■ Five-Year, Detailed Action Plan for Climate Change Adaptation
  Timeframe: January 2012
  Investment: US$ 1.7 billion
Seoul has established a five-year plan for effective collaboration between the public sector (including the city government itself), citizens and businesses to develop adaptation strategies considering various perspectives (e.g. health, water resource management, forest and ecosystem protection) based on climate change impacts and city vulnerabilities assessments.

■ Summer Shelters
  Timeframe: May 2012
  Investment: None
The Seoul Metropolitan Government has designated 3073 senior and community centers as “Summer Shelters” to protect senior citizens and homeless people from excessive heat. The designated shelters are highly accessible to senior citizens and are capable of accommodating up to 169,296 individuals. Seniors and homeless citizens can even stay late in the shelters on hot nights.

■ Air Pollution Forecast & Alert Reinforcement
  Timeframe: January 2012
  Investment: US$ 1.8 million from 2012 to 2017
In order to protect vulnerable communities from air pollution, Seoul issues air pollutant (e.g. fine particles, ozone) forecasts and alerts directed at 4018 education offices and schools, 4500 senior centers and 662 care centers for live-alone seniors. The information is released on a real-time basis via website, electric display boards and mobile apps. As of June 2012, YTN Weather Channel provides a TV air pollution report in partnership with city government.
  Participating Organizations: YTN Weather TV.

OTHER RELEVANT INFORMATION:
The mayor of Seoul was named Chair of the World Mayors’ Council on Climate Change, an alliance among committed local-government leaders who are concerned about climate change. The Council is made up of more than eighty members who advocate for an enhanced commitment from local governments and NGOs on behalf of multi-lateral efforts that respond to climate change and global-sustainability related issues.
MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **The 2030 Suwon Basic Plan for a Low-Carbon Green City Featuring Citizen Participation**
  Timeline: September 2012
  Investment: US$ 16,000
  Suwon set goals for baseline-2005 GHG emissions reduction through the creation of a GHG reduction scenario; a short-term goal of 5% by 2015, a mid-term goal of 20% by 2020, and a long-term goal of 40% by 2030. Additionally, the city established the nation’s first city plan involving citizen participation, the 2030 Suwon City Basic Plan, which seeks to create a low-carbon green city safeguarded from climate change. In August 2012 a dream map containing the future image of Suwon as wished for by its citizens was produced. The image encompasses an eco-friendly city with abundant green space; a low-carbon, high-tech industrial future; and people-centered eco-transportation.

- **Rain City Project**
  Timeline: September 2012
  Investment: US$ 5,110,000
  The Rain City Project is a project that installs small-sized rainwater storage and distribution facilities in buildings or forests to prepare for urban downpours, droughts and other abnormal weather conditions resulting from climate change. Suwon is implementing this project with an aim to achieve a 50% water self-sufficiency rate by 2030. The city completed establishment of a water recycling system by installing 14,000-metric ton rainwater storage tanks in the Suwon Sports Complex as well as 17,480-metric ton rainwater utilization facilities, 35,000-metric ton water purification facilities, and five reservoirs with a total capacity of 12,710 tons in Gwanggyo New Town.

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MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Carbon Sink Expansion**
  Timeline: September 2012
  Investment: US$ 70,500,000
  Suwon increased waterside greenspace by undertaking projects for the restoration of ecological streams and the recovery of old waterways. In addition, the city expanded greenspace in the urban area by creating school forests, planting trees in leftover lots and unused areas, and facilitating façade greening under overpasses. It also secured 225 ha of carbon sinks through an urban reforestation project in the area surrounding Hwaseong Fortress. As a result, an annual GHG reduction of 1487 tons is expected.

- **Low-Carbon Green Living System**
  Timeline: September 2012
  Investment: US$ 13,500,000
  Suwon introduced a Green Car Insurance System, a green financial product that partially refunds insurance premiums in proportion to fewer miles driven, as well as a shared vehicle system, in which drivers jointly own and use cars. The city has additionally rolled out incentive systems such as carbon points and green card systems to expand citizen participation in green living programs. 17,319 tons of GHG emissions are reduced annually. Furthermore, a Climate Change Experiential Education Center is under construction, with completion planned for 2014.

- **Renewable Energy Distribution Expansion**
  Timeline: September 2012
  Investment: US$ 272,000
  The city is promoting the construction of a 2000 kw photovoltaic power plant in unused public facilities areas. Additionally, renewable energy distribution facilities with a total output of 2340 kw were installed in Yeongtong Library in 2012, as well as in government office buildings including city hall and 101 private-sector buildings, which encompass photovoltaic, solar heat, geothermal, fuel cell, hydrological, and waste energies, producing an annual GHG emissions reduction of 4023 metric tons.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

**Wanju Local Food System**
Timeframe: January 2011 to date
Investment: US$ 9,783,604
The Wanju Local Food System overcomes limits to the agri-food, global food and large-scale distribution system. It is a new alternative for low-income rural residents at the same time it protects farmers and consumers, providing safe food and information while restoring trust in the producer-consumer relationship.

**Renewable Energy/Green Home Public Institutions**
Timeframe: January 2011 to date
Investment: US$ 2,433,449
Vitro and public institutions identified six locations for a 27 billion investment in 363 kw solar power generation facilities and a 320 m² solar system installed to promote renewable energy and photovoltaic generation use. It will save 1572 metric tons of carbon dioxide.

**Carbon Emissions Reduction Projects**
Timeframe: January 2011 to date
Investment: US$ 28,461
Low-carbon green growth is funded by actively participating in the Green Start Movement. The non-industrial sector accounted for 45% of GHG emissions. By the end of September 2012, 5276 households (148%) expanded Green Pledge participation.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

**Nature-Friendly River Maintenance**
Timeframe: January 2011 to date
Investment: US$ 37,241,727
Countermeasures were taken at the Wanju River and tributaries to mitigate frequent climate change related rains and drought. Actions included avoiding use artificial stone in favor of natural stone for re-covering and maintenance. A structure was also built to allow residents to enjoy the waterfront promenade's recreational areas.

**Rural Development of Energy-Independent Green Villager**
Timeframe January 2011 to date
Investment: US$ 5,896,845
An energy-independent green village was built in order to improve living conditions and expand employment. The project includes renewable energy sources (photovoltaic, solar, wind, etc.)

**Enhanced Adaptive Capacity Via Forest Species Composition and Forest Resources Protection/Management**
Timeframe: January 2011 to date
Investment: US$ 23,151,565
Project actions include new carbon sinks for enhanced GHG absorption, a fire monitoring system and planting a wide range of tree species such as chamaecyparis and lily trees designed to strengthen forests’ adaptive capacity.
### MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Podul Viilor Overpass**  
  Timeframe: February 2012-February 2014  
  Investment: US$ 11,000,000  
  The government has begun construction of an overpass across one of Pitesti’s largest thoroughfares to ease traffic to the city’s industrial zone.

- **Lunca Argesului Park**  
  Timeframe: October 2011-October 2012  
  Investment: US$ 8,600,000  
  The City has begun construction of a tree-covered 24-hectare park adjacent to the Arges River, near the future overpass, designed to provide recreation and CO₂ capture in this heavy traffic area.

- **Arges Bridge Modernization**  
  Timeframe: August 2012-December 2013  
  Investment: US$ 4,500,000  
  Arges Bridge is being modernized with wider lanes, sidewalks, updated lighting, and expansive green areas in the bridge’s center, a means of alleviating traffic and capturing CO₂.

### MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

The City has begun a study to phase in electrical buses and a monorail adapted to Pitesti’s metro area.

### OTHER RELEVANT INFORMATION

Pitesti City Hall has signed a contract with Constantin Brâncovean University to create a study and strategy for sustainable development of the Arges region with Pitesti as its capital. City Hall has additionally selected the Dacia-Renault Groupe for all its engine-update/emissions reduction technical projects.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Electricity Savings Campaign: Residential (Including Schools) and Commercial Sectors**
  Timeframe: Residential: May-August 2012; Commercial: March-June 2012
  Investment: US$ 300,000
  The City’s Electricity Savings Campaign, which targets residential and commercial consumers, aims to reduce consumption through a wide range of behavioral and technological changes. Through an intensive media campaign, website, posters, publications, exhibitions and events targeted at higher-volume electricity consumers, the campaign offers tips and financial savings information for saving electricity; information about energy saving technologies; etc. The campaign shows every sign of success (as borne out in significant electricity consumption reduction data and a strong increase in access to electricity savings information).

- **City-Owned Building EE Retrofit Program**
  Timeframe: January 2011-January 2012 and ongoing
  This program began with a preliminary audit of 16 large administrative buildings that were subsequently retrofitted in 2011 as part of a performance guarantee contract. Results indicate a seven-year payback period and a 22% energy savings (including technology and behavior change interventions). Implemented technology retrofits included the installation of high-efficiency lighting; regulation of air-conditioner operating hours; solar water heater installations; thermostat control and power factor corrections. A significant behavior change program for both staff and the public involved assessing buildings and was implemented along with monthly reports to staff and the public on savings achieved.

- **Traffic and Street Lighting Retrofit Program**
  Timeframe: Annual proportional retrofits
  Investment: US $1.9 million (street lighting); US $ 1.9 million (traffic lights)
  The city’s Traffic and Street Lighting Retrofit Program has been underway since 2010. Substantial electricity savings have been made by replacing incandescent traffic lights with light emitting diodes (LEDs). Since project implementation in 2010, almost 40,000 LEDs have been installed, saving 8144 MWh (megawatt hours) of electricity annually and avoiding 8,115 tCO₂. In 2011/12 14,000 streetlights and 15,000 traffic lights were retrofitted. By June 2012 all city traffic lights had been successfully retrofitted to LEDs.
MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

■ Climate Change Think Tank (First Phase)
  Timeframe: December 2011
  Investment: US$ 250,000
  The Climate Change Think Tank was established to facilitate a climate change mitigation and adaptation research group that fostered ongoing collaboration, interface and dialogue between academic institutions, researchers, specialists and local government officials to inform, shape and drive the implementation of progressive, pragmatic and effective policies, programs and on-the- local-level ground interventions for climate change awareness and preparation. The First Phase culminated in the completion of 11 research papers, available independently and as well as in a book entitled Climate Change at the City Scale—Impacts, Mitigation and Adaptation in Cape Town 2012 (published by Earthscan, Routledge).

■ Coastal Urban Edge
  Timeframe: June 2012
  Investment: US$ 100,000
  The City’s Environmental Resource Management Department led a five-year protocol that culminated in the first defined Coastal Urban Edge, formalized as part of the City’s Spatial Development Framework (SDF). The first Coastal Urban Edge for a 307 km coastline is a significant step ensuring the coastal asset remains a public common good, coastal and ecosystem processes are protected, coastal biodiversity is protected and that predicted sea level rise and associated storm surge event risks to the city and its communities are substantially reduced.

■ Climate Adaptation Plan Sector-Plans Signed and Approved
  Timeframe: February 2012
  Investment: US$ 100,000
  ERMD actions led to approval of a range of adaptation actions by relevant departmental Directors who thereby acknowledged their roles, accountability and responsibilities; approval was also gained on nine Climate Adaptation Sector Plans by their political Portfolio Committees. These nine officially approved sector plans include: biodiversity; river and storm-water recapture; health; coastal adaptations; disaster risk management; human settlements; spatial planning; transportation; water and sanitation.

Participating Organizations:
Sustainable Energy Africa, the University of Cape Town, Western Cape University and the University of Stellenbosch.
**Durban (eThekwini Municipality)**

<table>
<thead>
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<th>Mayor or local authority name</th>
<th>James Nxumalo</th>
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<td>Population</td>
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<td>Territorial extension</td>
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**MAJOR GREENHOUSE GAS-MITIGATION ACTIONS**

- **Solar City Framework**
  - Timeframe: June 2006 conception
  - Investment: US$ 122,085
  - The eThekwini Energy Office has developed a program called the “Durban Solar City Program” in order to better coordinate interventions that promote updating decentralized Solar energy, particularly photovoltaic. The aim of this program is to pilot a “Solar City” concept to promote the uptake of solar technologies in South African cities. This will be achieved through creating conducive policies/by-laws at a local-government level, detailed scientific data and the utilization of on-line tools.

- **KwaZulu-Natal Sustainable Energy Forum (KSEF)**
  - Timeframe: Ongoing
  - Investment: US$ 162,149.94
  - The KwaZulu-Natal Sustainable Energy Forum (KSEF) was initiated by the Energy Office and Imagine Durban in 2010, with contributions from the Durban Industry Climate Changer Partnership Project and the United Nations Industrial Development Organization (UNIDO). The main purpose of the KSEF is to facilitate the development of the SE sector in KZN though information dissemination and networking opportunities. See www.kznenergy.org.za

- **Low-Pressure Solar Water Heater Program**
  - Timeframe: Ongoing
  - Investment: N/A
  - ESKOM has developed this program to reduce the energy used to heat water in low-income households. The aim was to implement affordable solar water heater (SWH) installations in low-cost housing developments throughout South Africa. The Solar Water Heater (SWH) units are installed at no direct cost to the homeowner or the municipality. The eThekwini Municipality has participated in this program and there are currently some 30,000 units installed throughout the city.

**MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS**

- **Durban Adaptation Charter**
  - Timeframe: April 2011 to date
  - Investment: N/A
  - From 2 to 5 December 2011, Durban hosted the Durban Local Government Convention where the Durban Adaptation Charter (DAC) was signed. The charter commits signatory cities to the implementation of ten key principles and raises awareness regarding the need for adaptation, especially in the Global South’s vulnerable communities. For more information visit the DAC website: http://durbanadaptationcharter.org/index-desktop.php.

- **Durban CEBA**
  - Timeframe: November 2011 to date
  - Investment: N/A
  - The Durban Community Ecosystem Based Adaptation (CEBA) Program is an economic-based green project that combines a variety of habitat restoration and reforestation projects in order to improve ecosystem services for vulnerable communities and create poverty-alleviating employment opportunities. The Durban CEBA was created as an offset for Durban’s COP17/ CMP 7 hosting carbon footprint. Delegates were encouraged to buy offset credits that were equal to a specified number of work days, simultaneously bringing about mitigation and adaptation. See www.durbanceba.org.

- **Combined Adaptation and Mitigation Strategy Development**
  - Timeframe: Currently in procurement phase
  - Investment: US$ 100,000
  - The development of a combined, municipality-wide adaptation and mitigation strategy is being planned and is currently in the procurement process. This is a multi-stakeholder collaboration; through an identification of best practices, and blue-sky thinking, the municipality seeks to develop a strategy that accounts for planetary boundary and safe operating spaces concepts.
SOUTH AFRICA

MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Johannesburg Urban Communities Climate Proofing**
  Timeframe: March 2012
  Investment: US$ 1.8 million
  Climate proofing involves promoting development that reduces climate change risks. It involves rolling out low-pressure solar water heater (SWH) units as well as installing insulated Isoboard ceilings and distributing compact fluorescent lamps (CFL) to 700 low-income households in Cosmo City. This project is a continuation of a 2007 first phase installation of 170 Solar Water Heaters (SWH). The solar water heaters, CFLs and insulated ceilings will afford an estimated savings of 58,641 metric tons of carbon dioxide emissions yearly.

  **Participating Organizations:** Danish International Development Agency (DANIDA)

- **VCS Project for BRT Rea Vaya Phases 1A and 1B**
  Timeframe: 2010/2011
  The Johannesburg BRT (Bus Rapid Transit) Rea Vaya's objective is to establish an efficient, safe, rapid, convenient, comfortable and effective BRT-based modern mass transit system. Before the project, some 1 million vehicles plied Johannesburg streets, of which 800,000 were private cars, 40,000 motorcycles, 50,000 taxis and around 50,000 public transit mini-buses and buses. The city also has a rail system that reaches the city center from suburban areas. The project’s average expected emission reductions are 27,046 tCO₂ annually.

- **Joburg Landfill Gas-to-Energy Project**
  The project seeks to collect and destruct/utilize landfill gas (LFG) generated at Johannesburg landfills. The project will consist of two distinct stages. In the first, LFG will be captured and destroyed using a LFG flare; in the second stage, the captured LFG will be fed to the LFG flare and a modular electricity generation plant. The project is estimated to reduce GHG emissions by 362,016 tCO₂eq/year, on average, over the first 7-year crediting period.
JOHANNESBURG CLIMATE CHANGE ADAPTATION PLAN

- Johannesburg Climate Change Adaptation Plan
  Climate-model projections for the City of Johannesburg (CoJ) indicate that its temperatures may increase by some 2.3 °C in the near future (2056-2065) and approximately 4.4 °C in the far future (2081-2100). Additionally, there is a substantial risk that the CoJ will experience an increase in annual rainfall characterized by high-frequency storm events and longer rainy seasons. A number of risks have been identified as a result of these and other projected climatic changes, and have been categorized according to a four-tiered scale (or ‘Action Level’). A wide range of adaptations has been developed for each risk.

- PCity-Wide Flood-Risk Prevention and Management
  Recent climate and weather patterns in Johannesburg and elsewhere in South Africa show an increasing trend toward flash floods. Floods cannot necessarily be prevented; however long-term planning, medium-term interventions and short-term emergency measures can reduce their impact and devastating consequences. Short- to medium-term urban management measures currently in progress include physical infrastructure relocation or reconstruction (e.g. elevation, flood wall erection, land-use regulation, flood-line determination, stormwater master planning, stormwater regulation, flood-prone area identification, specific hydraulic assessments, public information management and training programs, rapid communication systems, food supply, shelter provision, medical care, debris management, financial assistance, trauma counseling, etc.

- Making Cities Resilient: “My City is Getting Ready”
  Timeframe: October 2011
  The City of Johannesburg participates in the World Disaster Reduction Campaign originally launched by the United Nations International Strategy for Disaster Reduction (UNISDR), which seeks to persuade mayors, local governments and national authorities to take actions that make cities resilient, as part of sustainable urbanization. The City of Johannesburg showcases the following key elements:
  • Risk reduction organization and coordination in place
  • Vulnerability and risk assessment in place
  • Investment in risk reducing infrastructure
  • Safe schools and health facilities
  • Risk-compliant building regulation and land use applied
  • Education programs and training in place
  • Ecosystems and natural buffers protected
  • Early warning systems and emergency management capacity
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Installation of Solar Water Heaters in Low Cost Housing**
  Timeframe: March 2012
  Investment: US$ 6.3 million
  The Solar Water Heater (SWH) rollout in Sol Plaatje Municipality (SPM) was driven by the Minister of Energy’s 31 December 2009 announcement to install 1 million SWHs in South Africa in response to energy efficiency savings targets of 10,000Gwh GHG by the year 2013 and also in complement its GHG reduction targets as stipulated by the South African Long-Term Climate Change Mitigation Strategy (LTMS). The rollout of 7837 100L passive SWHs began in January 2011 and finalized at the end of March 2012.

- **Energy Efficiency Monitoring and Implementation Project (Ongoing)**
  Timeframe: 2011-2014
  Investment: Part of US$ 14,000 Swiss Development Corporation (SDC) funding in collaboration with the South African Local Government Association (Salga)
  Sol Plaatje was one of five municipalities identified to lead a pilot project initiated by the Swiss Development Corporation (SDC), for eventual nationwide rollout. The overall objective is to contribute to achieving 10% improved energy efficiency in the residential sector by 2015 and that the commercial and public building sectors achieve a 20% energy efficiency improvement, also by 2015, while helping sustain national GDP growth and CO2 emission reduction targets. The project is still in development

- **Energy Efficiency and Demand-Side Management (Eedsm)**
  Timeframe: 2012/2013
  Investment: US$ 695,000
  The Sol Plaatje Local Municipality has been allocated US$ 695,000 by the National Department of Energy (DoE) to implement energy efficient technologies. Bids to retrofit the city’s streetlights have been requested.

- **The Sustainability Common Project Funded by USAID and Administered by the Wildlife and Environmental Society of South Africa (Wessa)**
  Timeframe: 2011/2013
  Investment: Funded through USAID + US$ 4,634 + US$ 2,317
  This project—a joint effort with WESSA, USAID and the SPM Libraries—effectively integrates development of training courses on climate change literacy, including adaptation courses focusing on vulnerability assessments and the use and application of a range of appropriate sustainability technologies, established through innovative “sustainability commons” concepts and supported by the development of shared support resource materials. An information portal will also provide a communication medium for all participants and role-players over the project’s three-year execution. The project has three interconnected elements: capacity building (training courses), sustainable technologies (established as sustainability commons) and resources materials (learning support materials).

**Participating Organizations**
Sustainable Energy Africa (SEA) Cape Town, the ICLEI - Local Governments for Sustainability SA, the Department of Energy (DoE) Pretoria, the South African Local Government Association (Salga) Pretoria, the Swiss Development Corporation (SDC) Pretoria, the Wildlife and Environmental Society of South Africa, Kimberley South Africa, Ozone Business Consulting.
MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

- **Renewable Energy Drive: Thermal-Powered Cooling Installed at Barcelona’s Polideportivo de Can Caralleu**
  Timeframe: 2011-2012
  Investment: US$ 362,860
  The project consists of installing solar-thermal sanitary cold and hot water production systems. Solar energy can power thermal absorption coolers that produce cold based on a heat source: a 90 m² solar thermal catchment system that feeds a solar cooling system with 17 kW residual heat recuperation to support a dehumidifying system in the existing pool. The residual heat will also cover 60% of the necessary energy to heat the pool and other sanitary water installations. In total an annual energy savings of 150,000 kWh is expected and will avoid emitting 30 metric tons of carbon equivalent yearly.

- **Local Government Building Savings and Efficiency Plans: Electricity and Natural Gas Energy Monitoring Plan**
  Timeframe: 2011-2012
  Investment: US$ 308,000
  Energy consumption at 23 building housing 28 municipal services was monitored and monitoring for 31 buildings housing more than 43 municipal services is projected. Additionally, readings are being made at temperature and humidity probes at a number of agency offices in order to detect operative dysfunctions in buildings that have since been corrected; consumption-impact visualizations have led to several upgrade investments. This measure also makes it possible to visualize the consumption curve as well as project photovoltaic plate production in order to evaluate a building’s self-sufficiency levels.

- **Renewable Energy Drive: Solar Energy Exploitation Production Facility Construction**
  Timeframe: 2011-2012
  Investment: US$ 691,912
  A pilot construction project for solar photovoltaic installations on shared walls that is timed to coincide with common wall auto-consumption mode rehabilitation and retrofits. The idea is that part of the electrical energy the plates produce is consumed by the building itself to help reduce neighbors’ dependence on outside energy sources. The energy the building does not absorb is redirected to cover future public energy consumption.
MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

- **Mayors’ Pact Support**
  Timeframe: October 2011-September 2012  
  Investment: US$ 500,000  
  Design and development support was provided for 26 sustainable-energy action plans as well as communication between local governments and the Mayors’ Pact European office. A number of sustainable-energy action-plans-awareness-building and communication activities were carried out in Barcelona-province communities. Finally, a government employee training program was realized. For more information (in Catalan): http://diba.cat/es/web/mediambient/ pactealcaldes

- **ERDIBA: Action-Implementation Support**  
  Timeframe: October 2011-September 2012 – 09/2012  
  Investment: US$ 1,120,000 (190,000 in personnel costs and 930,000 in external contracts)  
  Viability, pre-project and executive project studies were undertaken with regard to energy-efficiency and renewable energy actions in local government buildings and facilities. Legal and financial advice was provided for conditions documentation. For more information (in Catalan): http://diba.cat/es/web/mediambient/elena

- **EURONET 50/50**  
  Timeframe: October 2011-September 2012  
  Investment: US$ 118,000  
  The Barcelona regional government is spearheading a project involving eight other European partners to create a fifty-school network in which to apply the 50/50 concept, based on economic incentives for energy savings, applied at entities where users do not pay utilities bills directly, such as education centers, whose bills are paid by the local government. For more information (in Catalan): http://diba.cat/es/web/mediambient/euronet

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Citizen Awareness Campaign: “La red ahorra agua” (“The Water-Saving Network”)**
  Timeframe: February-December 2012  
  Investment: US$ 30,000  
  The Barcelona regional government and the Catalan Water Agency—together with fifty local communities—carried out the “La red ahorra agua,” a series of coordinated citizen awareness actions designed to further promote at-home water conservation. Local-level umbrella administrations lent each participating municipal government resources and technical support as part of a campaign operating under a single slogan and logo. For more information (in Catalan): http://www.diba.cat/web/xarxasost/estalviaigua

- **Local Governments United to Fight Drought**  
  Timeframe: since 2006  
  Investment: US$ 33,000  
  During the last extreme drought conditions in Catalonia—which saw local-level water-use restrictions—the Barcelona regional government and a local cities and towns network for sustainability drafted a number of support documents for local governments facing commitments imposed as part of those restrictions. Experiences were also shared with regard to adaptations for use in public greenspaces or non-potable water reuse for government use.

- **Forest Management at the Barcelona Regional Natural Park Network**  
  Timeframe: ongoing  
  The program involves the conservation of natural and cultural values via active management in balance with socioeconomic development and social land use as well as through an alliance with the local community and other public and private land stakeholders. The mission translates into three basic management lines: a) conservation and physical land stewardship; b) development and participation promotion; c) social uses and environmental education.
Málaga

Mayor or local authority name: Francisco de la Torre Prados
Population: 568 202
Territorial extension: 395 km²
Total climate-change-related budget: US $ 6,470,816

MAJOR GREENHOUSE-GAS MITIGATION ACTIONS

■ Ecociudad (“Eco-City”)
Timeframe: January 2011-December 2013
Investment: US$ 1,261,652
The program involves the development of a shared “eco-city” culture on both sides of the straight that—through decentralized processes—lead to key stakeholder interactions for improving and protecting natural spaces and environmental resources. Noteworthy actions include actions-based energy-efficiency upgrades using renewable energy sources; expressly promoted participation on the part of women and young people; and the use of reusable shipping containers to create an eco-center to serve as AMEV headquarters in Morocco, from where the eco-city model will be promoted.

■ Third Biogas Engine
Timeframe: January 2012
Investment: US$ 1,000,000
The project seeks to bring about a reduction of the polluting emissions associated with USW dumps and promote renewable energy use. Each engine’s installation contributes a 29,000 tCO₂eq reduction yearly; added to each generator’s production capacity, there is an additional 3500 metric ton per-year reduction. Overall, GHG emissions reductions reach 32,500 tCO₂eq/year.
Participating Organizations: Limasa III

■ Smartcity Málaga Sustainable Public Lighting Project
Timeframe: December 2011-May 2012
Investment: US$ 503,884
These initiatives, a part of the SmartCity Málaga project, respectively pursue the creation of a micro-network that optimizes wind energy generation and maximizes public-lighting energy efficiency. Wind generation was established with a 4 kW micro-generator and nine 680 W mini-generators for public lighting system elements. Additionally 200 controlled LED lighting elements were installed and allow operating hours and light intensity to be adjusted in real time in accordance with environmental factors or renewable energy availability.
MAJOR CLIMATE-CHANGE ADAPTATION MEASURES

■ Common Chameleon Biodiversity Project
Timeframe: October 2011-September 2012
Investment: US$ 10,704
The project centers on conserving common chameleon populations and led to the creation of a Conservation Center where chameleons that are wounded or exist in insalubrious conditions are rescued, acclimated in semi-wild conditions and reintroduced into their natural habitats. In parallel, essential environmental education activities are undertaken to guarantee the species’ survival.

■ CAT-MED
Timeframe: 2009-2011
Investment: US$ 364,727
The goal is to recover the classical Mediterranean city as the model for area development by combining complexity and compactness levels to allow for greater control over natural resource consumption. This is a trans-national and multi-level strategy with experiments in all participating territories and participation on the part of key city stakeholders who develop “green blocks” backed by a political commitment on the part of mayors.

MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

■ HILDA Apartment Cooperative
Timeframe: January 2011-September 2012
Investment: US$ 390,000
The HILDA Apartments Cooperative has undertaken multiple actions to decrease energy use and GHG emissions, e.g.: new heat re-using ventilation, individual hot water metering and an electric bicycle pool. There is also a program to migrate inhabitants’ behavior to more climate-friendly habits. “Climate coaches” are recruited and trained to inform and orient neighbors. Combined, these measures will decrease GHG emissions by 50%.

■ Photovoltaic Plant at City Hall
Timeframe: June 2012
Investment: US$ 566,000
A photovoltaic plant has been phased in since autumn 2011 for a total installed capacity of 89.28 kW, enabling some 77,000 kWh of production annually. The polycrystalline silicon plant was installed by Energy Consultants in Scania AB. Of the total 89 kW installed capacity, 40 kW is roof-mounted and about 50 kW are installed as over-window sun protection. The plant has produced some 6000 kWh since its commissioning.

■ SOHO: Local Development through “Neighborhood Recycling” to Create Arts Districts
Timeframe: January 2011-December 2013
Investment: US$ 1,773,062
The goal is to promote local cross-border development by converting degraded neighborhoods into arts districts that drive added value activities related to culture, commerce, and increased public/private partnerships. This includes defining the arts district concept as SOHO, a common brand for the neighborhood; a neighborhood project in the Moroccan zone and the neighborhood’s consolidation with Málaga; and public/private partnerships to reclaim run-down historic spaces, contribute to economic and sustainable tourism development and create a local cultural-tourism image.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

■ Open Stormwater System in Fosie Industrial Area
Timeframe: February 2012
Investment: US$ 680,000
All stormwater coming from the Skogholms ångar industrial area is diverted to Riseberga Creek along with all storm water from Malmö’s east side. Today it well exceeds capacity; erosion along the creek is a growing problem. An open storm water system has been built alongside Riseberga Creek. By opening stormwater pipes and creating collection areas along the creek, stormwater will be delayed before reaching Riseberga Creek. http://www.malmo.se/greenclimeadapt.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Mass Transport (Bus Rapid Transit-DART)**
  Timeframes: December 2011-December 2014
  Investment: US$ 225.65 M
  The city is implementing phase one improvements for a sustainable public transport system. This includes a first-phase 21 Km main transportation corridor with dedicated bus lanes fed by several secondary bus routes. The new corridor will create jobs and will reduce GHG emissions, particularly from the city’s 1500 commuter buses. Project is funded by the World Bank.

- **Reforestation and Mangrove Restoration**
  Timeframe: January 2011 to date
  Investment: US$ 0.6 m
  Every city resident is encouraged to participate in this tree-planting and mangrove-restoration campaign by planting and nurturing at least two trees. The project provides free trees and mangrove seedlings.

- **Gas Flaring at Mtoni Dumpsite**
  Timeframe: 2006 to date
  Investment: US$ 1.5 million
  This CDM project collects and flares methane from the now-closed Mtoni dumpsite. Dar es Salaam has experience with emissions trade via this CDM project; the City Council closed the Mtoni solid waste dumpsite and, in collaboration with a private company, Consorzio Stabile Globus, created mechanisms for tapping and flaring the gases produced there.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Sub Saharan African Cities: A Five-City Adaptation Network to Pioneer Climate Change Adaptation through Participatory Research and Local Action**
  Timeframe: 2010 – 2012
  Investment: US$ 0.5m
  Through studies and documents developed in conjunction with innovative approaches from a range of local level stakeholders, the project has enabled and enhanced interaction between community members, decision-makers and researchers focusing on local climate change related issues. Its methodologies have enabled and supported a broad range of fundamental climate change adaptation interactions and have encouraged partnerships between local stakeholder groups, motivating them toward proactive involvement in the fight against climate change.
  **Participating Organizations:** ICLEI

- **Kinondoni Integrated Coastal Area Management Project (KICAMP)**
  Timeframe: 2009 – 2012
  Investment: US$ 2m
  A key aim of this project is to formulate a comprehensive plan focused on land use and coastal water resources. It bans sands excavation in Kunduchi-Mtongani to prevent additional beach erosion. Households are made aware of mangroves’ value and get involved in protecting them; together with protection from KICAMP, mangroves are expanding. The project includes establishing environmental management societies in schools, markets and dispensaries. Schools had already planted trees and botanical gardens in their compounds.
  **Participating Organizations:** Roots and Shoots, World Vision, URAHU (Uchoraji na Ramani na Sanaa Shirikishi Dhidi ya Ukimwi), and the International Organization on Migration.

- **Dar es Salaam Adaptive Structures Construction**
  Timeframe: 2010 to date
  Investment: US$ 3m
  This project seeks comprehensive beach conservation; seawalls have been constructed in front of Aga Khan Hospital to prevent further erosion of Sea View Road. Seawalls and groins have also been constructed along a number of beaches, benefitting hotels by reducing beach erosion and property damage from waves, with a boon to adjacent fishing communities.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Bangkok Metropolitan Administration Existing Building Retrofits for Energy-Saving Buildings**
  
  **Timeframe:** July-October 2011  
  **Investment:** US$ 128,600  
  The Bangkok Metropolitan Administration (BMA) studied energy-saving retrofits on 700 BMA buildings. Preliminary analysis was carried out in at least twelve buildings and included data on basic and general information, energy consumption, and equipment, collected at at least 500 buildings. The study's report and analysis are based on sample building results that look at energy consumption and future retrofit investment economic value to reduce electrical power by 16 GWh/year or CO₂ by 0.01 Mton/year by 2012 (GOAL from Action plan on Global Warming Mitigation 2007-2012).

- **60 Earth Hours**
  
  **Timeframe:** October 2011-September 2012  
  **Investment:** US$ 64,000  
  Since 2007, BMA and the World Wildlife Fund (WWF) have campaigned for “turning off one hour to cure global warming,” for 5 years running, to raise awareness about energy conservation and global warming mitigation, e.g. bicycle riding, tree planting and using stairs instead of elevators. In 2011, the campaign was named “do more than turn off for the earth,” and featured +60 Earth hours in 2011 (culminating on 26 March 2011). The result was a 2346 MW electricity reduction, equivalent to 1,255 tCO₂ abatement.

- **Low Carbon School Network**
  
  **Timeframe:** October 2011-September 2012  
  **Investment:** US$ 126,000  
  BMA and the Foundation for Environmental Education for Sustainable Development (FEED) carried out activities in sixteen Bangkok primary and secondary schools to transmit the concept of a low carbon society to students. Activities included a multiple-day camping excursion aimed at positive behavior changes that fosters low carbon societies in schools. Additionally, young students are encouraged to spread this concept to their families, communities, etc.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Flood Barrier**
  
  **Timeframe:** 1996-2012  
  **Investment:** US$ 160 million  
  77-kilometer flood barriers along the Chao Phraya River were constructed to prevent overflow and will be completed in 2012. Additionally, pumping stations have been designed and installed at the mouths of canals along the Chao Phraya River to increase drainage capacity and alleviate internal stormwater flooding inside the total-1638-m² capacity polder area. BMA created twenty-five retention ponds, with a total storage capacity of 12.88 m³, to maintain storage volume for early rainfall detention that decreases peak runoff during the rainy season.

- **Drainage Tunnels**
  
  **Timeframe:** completed 2008  
  **Investment:** US$ 180 million  
  BMA has installed drainage tunnels in support of the overall drainage system. Tunnels will drain excessive stormwater at 15-22 m underground and will discharge to the river using high capacity pumps. Now there are seven 19 km-long drainage tunnels featuring 155 m³ of pumping capacity.

- **Coastal Erosion Protection**
  
  **Timeframe:** 2013-2014  
  **Investment:** US$ 84,000 (construction budget not included)  
  BMA will construct a bamboo barrier along the shoreline, estimated at 4.7 km, and will grow mangroves to protect the shoreline and increase coastal silt deposits. Project construction is scheduled from 2009 to 2016. Public awareness, capacity building and technical support such as the “3D Information System” integrated with GIS maps will also be developed. The Bangkok Master Plan on Climate Change Adaptation will be in effect from 2013-2023.

**Participating Organizations:**
- The Tokyo Metropolitan Government, the Global Environmental Facility, the World Bank, JICA, UNEP, C40 and the Clinton Climate Initiative, AFD, WWF, GIZ, the Southeast Asia START Regional Center (SEA START RC), the Institute of Catastrophic Loss Reduction, the University of Western Ontario, the United Nations Partnership Framework for Thailand (UNPAF) and the United Nations International Strategy for Disaster Reduction (UNISDR).
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- Transition to LED Traffic Lighting
  Timeframe: May 2009 to date
  Investment: US$ 52,115
  All existing traffic lights in Nevşehir have migrated to LED systems. A five-intersection budget was created for the city by municipal authorities; other lights were installed by the General Directorate of Highways and subsequently handed over to municipal authorities. All maintenance and other costs reside with the municipality. Savings reach approximately 75% when lamp power consumption and burnt-out bulb replacement are considered; the system includes all future street lighting.

- Transition to Energy-Saving Lamps
  Timeframe: 2008
  Investment: US$ 7,000
  Energy-saving lamps are used in all service buildings. 2000 incandescent bulbs have been exchanged for energy-saving lamps to ensure energy efficiency among targeted municipal employees.

- Waste Reduction Efforts
  Timeframe: 2005 to date
  Investment: US$ 12,000,000 approximately
  Waste reduction efforts are currently underway to protect natural resources. Each kind of waste—packaging waste, vegetable waste, batteries and medical waste, for example—is collected from houses separately. Efforts also include collecting discarded tires whose carbon impact is reduced through disposal at processing plants. Additionally, the Nevşehir wastewater treatment plant has become operational and a solid waste landfill is under construction, to be completed by the end of 2012.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- Reduced Coal Consumption
  Timeframe: October 2008 to date
  Investment: US$ 15,000,000
  Since 2010, insulation at new buildings is obligatory. Most service buildings have started using natural gas. Natural gas systems are installed in newly-opened and future buildings, minimizing fossil-fuel consumption. The aim of this study is to reduce fossil fuel consumption. There have been energy savings of 40% in the transition from coal to natural gas and 75% in the transition from fuel oil to natural gas. Natural gas now reaches 80% of the city.

- Proper Irrigation
  Timeframe: April 2010 to date
  Investment: US$ 8175
  Grass has been removed in city refuges and parks; planting work is underway. To date, some 17,600 m of mains have been installed to transition to a drip irrigation method chosen to decrease the amount of fuel oil consumed by irrigation trucks as well as subsequent water loss. Studies are underway to transition to this system in all central city areas as well as in the newly rebuilt parks.

- Solar and Wind-Energy Research
  Timeframe: March 2011 to date
  Investment: US$ 7220
  A 1.1 kW solar panel has been installed in a municipal service building to promote renewable energy resources use and test solar energy efficiency in the city. Measurement points are identified to determine city wind energy suitability. If wind-power is deemed appropriate for the city, turbines will be installed to provide energy production.

PARTICIPATING ORGANIZATIONS:
Numerous NGOs, elementary schools and the University of Nevşehir
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

■ Organic Transportation
Timeframe: September 2012 (official starting date of the project)
Investment: US$ 3.8 million
The ‘Organic Transportation’ project seeks to increase the use of bike and public transportation to reduce traffic and GHG emissions.

Within the context of the project, Yalova has completed a 44 km bike and pedestrian path. 110 free adult bikes have been put into service at shared-cycle stations located throughout the city. The City has also finished infrastructure for a card system that will be used for lending the bikes, including the acquisition of ten card readers. Middle school students received training on traffic, public transportation and bike usage. One thousand bikes will be made available to students and teachers. Bike parking areas will be installed at 27 primary and secondary schools. The project will also promote physical activity and enhance urban health.

To expand public transportation, the City has provided buses and minibuses for the disabled to be phased in over several stages, in cooperation with the Minibus Drivers’ Assembly.

MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

■ Greenhouse Gas Inventory
Timeframe: 05/2012
Investment: N/A
A new way to record the city’s energy use information was developed to assist in conducting GHG inventories. Energy-use sheets summarize consumption and cost by premise numbers that are keyed to facility names. A volunteer keys the data as it is received from the utilities. GHG inventories will be conducted periodically to observe trends in energy use.
Los Angeles

Mayor or local authority name: Antonio R. Villaraigosa

Population: 4,000,000

Territorial extension: 1,214 km²

MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **Renewable Energy: 20% Renewables by 2010; 33% Renewable Energy Portfolio by 2020**

  Timeframe: Ongoing project since 2005

  In 2005, Mayor Antonio Villaraigosa challenged the Los Angeles Department of Water and Power (LADWP) to provide 20% of its energy sales to retail customers from renewable sources by 2010. After achieving a 20% renewable energy portfolio in 2010, the Mayor increased standards for the City of Los Angeles to obtain a 33% renewable energy portfolio by 2020. Increasing the use of renewable energy—wind, biomass, solar, and geothermal energy—was essential to reducing the city’s GHG emissions. Once LADWP increases its renewable energy portfolio to 33% by 2020, the city’s annual emissions will be reduced by 4.5 million metric tons.

- **50 Parks Initiative**

  Timeframe: August 2012

  Investment: US$ 80.9 million

  The 50 Parks Initiative is a public-private partnership that will add over 170 acres of new park space to Los Angeles. The parks, a quarter of which are under an acre in size, include safety and environmentally sustainable features and are located in neighborhoods identified as most in need. To date, 53 sites have been identified for inclusion in the program, emphasizing that the title of the initiative is only a starting point for a program that can continue to grow.

- **LED Retrofit Program**

  Timeframe: February 2009-June 2013

  Investment: US$ 48 million

  This program will replace 4000 traffic signals and 140,000 HPS and incandescent streetlights with LED efficient units. The program is funded through a combination of energy rebates and street lighting assessment funds and loans. Over 200,000 light modules will be replaced and will reduce energy consumption by 85%. Currently 3662 traffic signals have been converted, thereby reducing 56,756 tCO₂/year emissions.

- **Measure R Transit Projects**

  Timeframe: April 2012

  Investment: US$ 40 billion over the next 30 years

  Overall, the first five years of Measure R transit projects are expected to eliminate 291,000 tCO₂/year of county-wide emissions.

- **ATSAC 100% Traffic Signal Synchronization**

  Timeframe: On-going project since 2008

  Investment: N/A

  In attempts to reduce transportation-related GHG emissions, the City put a mitigation measure to synchronize 100% of its traffic signals into action. This will reduce annual emissions by approximately 1 million metric tons. Currently 4259 traffic signals have been synchronized, reducing 888,889 tCO₂/year emissions.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **AdaptLA Climate Forecasting Studies**

  Timeframe: June 2012

  Investment: US$ 600,000

  The study examines Los Angeles’ regional climate between 2041 and 2060 at a neighborhood scale model (2 km). The results underscore that in 30 years the Los Angeles region’s summer season will be longer and hotter, with average temperature increases of 4°-5°F in inland areas; hot-weather days (over 95°F) will triple in downtown Los Angeles and quadruple in the San Fernando Valley.

  **Participating Organizations:** University of California, Los Angeles (UCLA)

- **Climate Adaptation Plan – AdaptLA: Sea Level Rise Vulnerability Assessment**

  Timeframe: October 2011

  A physical vulnerability assessment was conducted for affected city infrastructure and a social vulnerability assessment was conducted for impacted communities along the coast. City departments are currently reviewing the findings by USC Sea Grant, ICLEI and Scripps. The report is expected to be released before the end of 2012.

  **Participating Organizations:** The University of Southern California (USC) Sea Grant, the International Council for Local Environmental Initiatives (ICLEI), the Scripps Institute of Oceanography

- **2010 Bicycle Plan and CicLAvia**

  Timeframe: October 2010

  The plan calls for an additional 1680 miles of bikeways. It also introduces the concept of the Bicycle Friendly Street (BFS) to render neighborhoods more inviting to cyclists and pedestrians. There is a plan for a $16-million bike-share program that aims to put thousands of bicycles at hundreds of rental kiosks across the city. This bike-share program will add 400 stations and 4000 bicycles to the Los Angeles area. The City also hosts CicLAvia, where up to 10 miles of City roads are temporarily closed to vehicles and open for recreational purposes to enable the residents of Los Angeles to experience modes of transport other than fossil fuelled occupancy vehicles. An estimated 1.15 million fossil-fuel powered vehicle miles were avoided during one Los Angeles CicLAvia event.
MAJOR GREENHOUSE GAS-MITIGATION ACTIONS

- **City Fleet Conversion to Compressed Natural Gas**
  
  **Timeframe:** October 2011-September 2012
  **Investment:** US$ 110,000
  
  The project converted nine police vehicles and one wastewater response truck to compressed natural gas operation. To support alternative fuel vehicles (AFV), North Little Rock provides re-fueling infrastructure for cars, trucks and vans that are powered by either compressed natural gas (CNG) or electricity.

- **Solar Array Installation on City of North Little Rock Buildings**
  
  **Timeframe:** October 2011-September 2012
  **Investment:** US$ 91,400
  
  North Little Rock is committed to investing in renewable energy solutions. This year’s project installed sixty (60) BP Solar 3225 T solar panels at our City Services Building and thirty (30) Mage Powertec Plus 235 solar panels at the North Little Rock Electric Department. The two buildings are estimated to produce a total capacity of 20.05 kW. Also, in partnership with L’Oreal USA, the Arkansas Economic Development Commission’s Arkansas Energy Office and the North Little Rock Electric Department erected a 60-panel elevated solar canopy at the L’Oreal site.

- **Emergency Operations Center (EOC)/911 Facility Geo-Thermal Heating and Cooling System**
  
  **Timeframe:** May 2012 to date
  **Investment:** US$ 102,000
  
  As part of a $1.2 million Homeland Security grant, a geothermal heating and cooling system was selected for the Emergency Operations Centre/911 facility to help reduce GHG and reduce peak electricity demand.

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

- **Built Environment and Community Garden Initiative**
  
  **Timeframe:** October 2011 to date
  **Investment:** US$ 40,000
  
  The City facilitated a Built Environment committee tasked with proposing a strategic plan for building a more livable community. Plans for walkability assessments and community design brainstorming in neighborhoods. Goal: propose and promote land-use policy changes to encourage healthier development and give community stakeholders a voice when new facilities (such as trails and street crossings) are designed. Community Garden initiative gave funds to community groups for construction of twelve new garden sites for local food production.

- **Living Wise**
  
  **Timeframe:** October 2011-September 2012
  **Investment:** US$ 30,000
  
  North Little Rock seeks to educate the next generation in environmental awareness through its seventh-grade “Living Wise” curriculum. The program is a multi-resource education program designed to facilitate in-home installation of efficiency measures and create water and energy awareness.

- **Residential and Commercial Energy Evaluations**
  
  **Timeframe:** October 2011-September 2012
  **Investment:** US$ 129,000
  
  North Little Rock Electric offers free residential and commercial energy evaluations to customers interested in identifying how much energy their homes or businesses consume and what measures to take for enhanced energy efficiency.
University City

- Mayor or local authority name: Shelley Welsch
- Population: 35,371
- Territorial extension: 15 km²

**MAJOR GREENHOUSE GAS-MITIGATION ACTIONS**

- **Green House Gas Inventory**
  - Timeframe: 05/2012
  - Investment: US$ 2,500.00
  - The City conducted a baseline GHG inventory. The baseline years were 2005 and 2010.

San Carlos

- Mayor or local authority name: Gregorio Quintana
- Population: 37,000
- Territorial extension: 1,438 km²

**MAJOR GREENHOUSE-GAS MITIGATION ACTIONS**

- **Energy Grid Modification and Diversification**
  - Timeframe: 2010-2015
  - Actions that tend to GHG emissions reductions are one of two types. One calls for the modification of the energy grid via the partial substitution of thermal generation by hydro-electrical, wind or solar generation; a second type seeks to save electrical energy through a variety of savings plans.
  - With regard to the former, San Carlos installed 10 2-MW experimental wind dynamos connected to the transmission network. Electrical energy savings plans consist fundamentally of replacing conventional-lamp public lighting with LED lamps and sponsorship of solar-based household water heating. The first of the plans seeks to reduce public-lighting electrical consumption by up to 40%.
MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

City Integrated Environmental Risk Management and Climate-Change Adaptation Board
Timeframe: October 2011-September 2012
Investment: US$ 422,000 (approximately)
Major strategic stakeholders who contribute to environmental risk reduction and climate-change adaptations were organized and trained. To do so, training and transmission systems were designed that included elementary and higher education, communities and public officials.

Metropolitan Environmental Observatory (OAM)
Timeframe: October 2011-September 2012
Investment: US$ 365,000 (approximately)
The OAM was partially designed and equipped and currently features a proprietary meteorological station as well as a support stations network at which a metropolitan environmental bulletin is digitally published. All of the above is realized via framework conventions with universities in which a practicing community focus is applied by means of “VIDEO,” a research, teaching, extended education and organizational linking strategy.

San Carlos

MAJOR CLIMATE-CHANGE ADAPTATION ACTIONS

Flood-Zone Resident Relocations
Timeframe: October 2011-September 2012
Investment: US$ 800,000
The local government constructed more than thirty housing solutions to move resident neighbors from low-lying and flood-prone areas. In general, these citizens come from society’s most disadvantaged strata, meaning they could not have independently accessed housing in better locations. The new housing features basic electric utilities, drinking water and sanitary services.

Thoroughfare Methodology Adjustment to Adapt to Greater Adverse Weather Event Incidence
Timeframe: October 2011-September 2012
Investment: US$ 120,000
The city has had to adapt to increasingly intense rains that rapidly collapse the storm sewer system at the same time they erode and destroy granular materials-based pavement that lacks asphaltic treatment or other stabilizers. As a consequence, storm sewer engineering works are to be enlarged and pavements are to be waterproofed and sealed to reduce intense rainfall effects.

Extensive Public Trees Pruning
Timeframe: October 2011-September 2012
Investment: US$ 25,000
Given ever increasing storm-strength winds, the local government has implemented a pruning campaign for public trees that has drastically reduced their overall height and considerably reduced the risk of their blowing over and provoking damage to life and property.
ANNEXES
CARBONN CITIES CLIMATE REGISTRY
Raising the global level of ambition through measurable, reportable, verifiable local climate action

Carbonn Cities Climate Registry (cCCR) was launched at the World Mayors Summit on Climate in Mexico City on 21 November 2010, as the global response of local governments to measurable, reportable and verifiable climate action. 2011 and 2012 Annual Reports of cCCR that were presented at the United Nations Climate Conferences in Durban and Doha respectively, played a key role in the advocacy of local governments in the global climate negotiations.

As of 15 March 2013, 302 cities and local authorities, covering an aggregate community GHG emissions of 1.5 Giga tons of CO₂e per year with a population of 335 million people in 42 countries, reported 561 climate and energy commitments, 558 greenhouse gas inventories and 2,471 mitigation and adaptation actions and action plans at the cCCR. These figures enable cCCR to be recognized as the world’s largest global database of local climate action. Highlights of the aggregated information available at the cCCR as of March 2013 are summarized below;

- **Commitments**: 80% of the reported commitments aim to 2020 or an earlier date as the target year, 38% of which commit to a GHG reduction of more than 1% yr⁻¹, exceeding the value of even most ambitious Kyoto Protocol target of national governments
- **Performance**: The reported 300 community GHG inventories indicate a total of 1.5 GtCO₂e yr⁻¹ that is close to the combined total of annual GHG emissions of Germany and France in 2010. Cities with a population of 0.5-5.0 million inhabitants account for 56% of the total community GHG emissions reported.
- **Actions**: 90% of all entries for local climate action focus on sector-specific (mitigation/adaptation) measures, whereas 10% represent holistic action plans. More than 50% of mitigation actions are indicated with concrete co-benefits for local sustainable development and 61 cities of developing countries that represent 20% of all cCCR reporting cities contribute 47% of all reported adaptation actions.

This remarkable accomplishment has been achieved through 3 main drivers:

1. **Voluntary reporting pursuant to a global political commitment**: Article 4 of the Global Cities Covenant on Climate (The Mexico City Pact) envisages that signatories commit to report their climate information at the cCCR. As of March 2013, the information reported by 117 signatories of the Mexico City Pact constitute 39% of cities, 60% of population represented, 31% of the community GHG emissions and 56% of the actions compiled at the cCCR.

2. **Capacity building at the national level**: Local Government Climate Registry Japan is a good practice to demonstrate the value of partnerships between national and local stakeholders to leverage local reporting capacity in a global process. 33 prefectures and 91 cities reporting at the Japan Registry and cCCR represent 84% of the country’s population, 74% of its national GHG emissions and 60% of all community GHG emissions reported at the cCCR.

3. **Creating incentives**: The World Wide Fund for Nature (WWF) Earth Hour City Challenge acts as a powerful incentive to motivate local governments to openly share their progress in climate actions and highlights the value of stakeholder involvement. By the end of reporting period in 2012, 66 EHCC Candidate Cities from 6 pilot countries, constitute 21% of reporting cities, 47% of total GHG inventories and 48% of mitigation and adaptation actions compiled at the cCCR.

The cCCR clearly highlights the importance of local governments in raising the global level of ambition to reduce GHG emissions, increase climate risk adaptation preparedness and move towards low-emissions development. This immense potential can be rapidly mobilized if the global climate community engages with local governments and scales up direct technical and financial support.

www.citiesclimateregistry.org
THE WORLD’S LARGEST GLOBAL DATABASE OF LOCAL CLIMATE ACTION

- Mexico City Pact Signatories: 117
- Japan Registry Participants: 124
- EHCC Candidates: 66
- ICLEI Member Cities: 107
- Million inhabitants: 335
- GHG Inventories: 558
- Commitments: 561
- Actions: 2471
- GgCO₂/yr: 1.5
SIGNATORY CITIES/LOCAL GOVERNMENTS OF THE GLOBAL CITIES COVENANT ON CLIMATE AS OF FEBRUARY 2013

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**BREST MÉTROPOLE encompassed by 8 communes:**

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SIGNATORY CITIES / LOCAL GOVERNMENTS HOME NATIONS OF THE GLOBAL CITIES COVENANT ON CLIMATE:

1. Argentina 31. Japan
2. Australia 32. Kenya
3. Austria 33. Mexico
4. Bangladesh 34. Morocco
5. Belgium 35. Namibia
7. Bhutan 37. Norway
8. Bolivia 38. New Zealand
9. Brazil 39. Paraguay
10. Cameroon 40. Peru
11. Canada 41. Philippines
12. Chile 42. Portugal
13. Chinese Taipei 43. Puerto Rico
14. Colombia 44. Republic of Ireland
15. Costa Rica 45. Republic of Korea
16. Croatia 46. Republic of Mauritius
17. Denmark 47. Romania
18. Dominican Republic 48. Senegal
19. Ecuador 49. South Africa
20. El Salvador 50. Spain
21. France 51. Sri Lanka
22. Germany 52. Sweden
23. Guatemala 53. Tanzania
24. Haiti 54. Thailand
25. Hungary 55. Turkey
26. India 56. Uganda
27. Indonesia 57. Uruguay
28. Israel 58. United States
29. Italy 59. Venezuela
30. Jamaica 60. Zimbabwe

SIGNATORY CITIES/LOCAL GOVERNMENTS BY CONTINENT:

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<td>29.37%</td>
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<tr>
<td>Total</td>
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140. Palmerston North: Solar panels for structural energy efficiency.
141. Wellington: Birdseye view of the Wellington coast vulnerability zone.
143. Amuwo Odofin: Printed materials for environmental instructor training program.
145. Oslo: Food waste biogas and bio-fertilizer conversion plan.
146. Chancay: Special inorganic solid waste separation container.
147. Lima: “Bus Patrón,” the city’s efficient public transport system.
149. Lima: CICLOLIMA non-motorized transportation system promotion efforts.
150. Lima: “Mi Huerto” urban gardening project element.
152. Dagupan: Large-scale mangrove plantations.
153. Dagupan: River dredging.
154. Ligao: Biogas digester.
155. Ligao: Karagumoi leaf bag manufacture training courses.
158. Quezón: Government fleet vehicle emissions inspection.
159. Quezón: “Resilient Cities” campaign activities.
160. Quezón: “Resilient Cities” campaign risk-zone inspection.
161. Quezón: The mayor of Quezón at a public event.
162. Quezón: Housing for relocated vulnerable communities.
163. Almada: Solar panels at the municipal sport center.
164. Lisbon: Special containers for solid waste separation and recycling.
165. Lisbon: Electric vehicle charging stations in the city’s public spaces.
166. Lisbon: City fleet electric vehicle.
167. Lisbon: Introduction of efficient public space irrigation systems.
168. Lisbon: Urban agriculture park.
169. Lisbon: Footbridge and cycling park at the city’s Belavista Park.
170. Anyang: Environmental education and promotions efforts.
171. Anyang: Carbon point system promotions effort.
172. Dobong-gu: Citizen organization participation in environmental efforts.
173. Dobong-gu: Rooftop urban garden.
175. Dobong-gu: Environmental education days.
176. Dobong-gu: Climate change center for environmental education.
179. Seoul: Youth environmental education at Seongbuk-gu.
180. Seoul: Solar panel installation as part of the “One Fewer Nuclear Energy Plant” program.
181. Seoul: Electronic air-quality information panel.
182. Seoul: Appointment of Seoul’s mayor, Park Won Soon, as president of the Mayors’ World Council on Climate Change.
184. Seoul: City Hall interior green wall.
185. Suwon: Citizens participate drafting the low-carbon green city 2030 Basic Plan.
187. Suwon: Green areas as carbon catchments.
188. Pitesti: Podul Viilor underpass project.
189. Pitesti: Arges Bridge modernization.
190. Pitesti: Lunca Argesului Park project.
191. Cape Town: City electricity-savings program printed materials.
192. Cape Town: Cover of the publication entitled Climate Change at the City Scale – Impacts, Mitigation and Adaptation in Cape Town 2012, from the Cape Town Climate Change Think Tank.
193. Cape Town: City energy and emissions profile diagram.
194. Durban: Low-pressure, solar-powered water heaters in low-income housing.
198. Johannesburg: City dump biogas plant.
199-200. Johannesburg: Environmental education activities from the “Resilient Cities: My City Prepares” program.
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### ACRONYMS AND ABBREVIATIONS

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<tr>
<td>AFD</td>
<td>French Development Agency (French Agence Française de Développement)</td>
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<tr>
<td>BRT</td>
<td>Bus Rapid Transit</td>
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<tr>
<td>Carbonn</td>
<td>Bonn Centre for local climate and reporting</td>
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<tr>
<td>CDM</td>
<td>Clean Development Mechanism</td>
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<tr>
<td>CO₂</td>
<td>Carbon dioxide</td>
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<tr>
<td>CyMA-GTZ</td>
<td>Competitiveness and Environmental Program from the German Technical Cooperation Agency</td>
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<tr>
<td>GHG</td>
<td>Greenhouse gases</td>
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<tr>
<td>GIS</td>
<td>Geographical Information System</td>
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<tr>
<td>GIZ</td>
<td>German Agency for International Cooperation (Deutsche Gesellschaft für Internationale Zusammenarbeit)</td>
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<tr>
<td>GJ</td>
<td>Giga joule</td>
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<tr>
<td>GTZ</td>
<td>German Technical Cooperation Agency (Deutsche Gesellschaft für Technische Zusammenarbeit)</td>
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<tr>
<td>GWh</td>
<td>Gigawatt-hour</td>
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<tr>
<td>ICLEI</td>
<td>Organization ICLEI – Local Governments for Sustainability</td>
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<tr>
<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
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<tr>
<td>JICA</td>
<td>Japan International Cooperation Agency</td>
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<tr>
<td>kl</td>
<td>Kiloliter</td>
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<tr>
<td>kW</td>
<td>Kilowatt</td>
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<tr>
<td>kWh</td>
<td>Kilowatt-hour</td>
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<tr>
<td>kWp</td>
<td>Kilowatt-peak</td>
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<tr>
<td>LED</td>
<td>Light-Emitting Diode</td>
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<tr>
<td>lps₂₈lt/s</td>
<td>Liter per second</td>
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<tr>
<td>Mld</td>
<td>Million liters per day</td>
</tr>
<tr>
<td>MWh</td>
<td>Megawatt-hour</td>
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<tr>
<td>NGO</td>
<td>Non Governmental Organization</td>
</tr>
<tr>
<td>Nm³</td>
<td>Normal cubic meter</td>
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<tr>
<td>PET</td>
<td>Polyethylene Terephtlate</td>
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<tr>
<td>REDD+</td>
<td>Reducing Emissions from Deforestation and Forest Degradation “plus”</td>
</tr>
<tr>
<td>tCO₂</td>
<td>Tonnes of Carbon dioxide</td>
</tr>
<tr>
<td>tCO₂eq</td>
<td>Tonnes of Carbon dioxide equivalent</td>
</tr>
<tr>
<td>tCO₂eq/year</td>
<td>Tonnes of Carbon dioxide equivalent per year</td>
</tr>
<tr>
<td>TOE</td>
<td>Tonne of Oil Equivalent</td>
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<tr>
<td>UCLG</td>
<td>United Cities and Local Governments</td>
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<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
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<tr>
<td>UNEP</td>
<td>United Nations Environmental Programme</td>
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<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
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<td>USAID</td>
<td>United States Agency for International Development</td>
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<td>USW</td>
<td>Urban Solid Waste</td>
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<tr>
<td>WMCCC</td>
<td>World Mayors Council on Climate Change</td>
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<tr>
<td>WMCCC</td>
<td>Del inglés World Mayors Council on Climate Change, Consejo Mundial de Alcaldes sobre Cambio Climático.</td>
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Photo: NASA. Global view of Earth at night, compiled from over 400 satellite images.

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The Mexico City Pact

In Figures

286 Cities
60 Countries
5 Continents
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542 Climate Policies
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The Fundación Pensar, Planeta, Política, Persona is a non-profit organization, dedicated to promote two main activities: on one hand, it has a diplomatic role aimed at creating local and global linkages with international organizations, governments, representatives of civil society and business leaders in order to promote sustainable and equitable societies; on the other hand, the Foundation is a space for intellectual innovation that explores the links between different knowledge areas such as: the environment, economics, psychoanalysis, sociology, psychiatry, politics, art, neuroscience, and culture in general.

The Fundación Pensar is headquartered in Mexico City, and also operates a European chapter from its London offices. It is an international institution given its geographical scope and the nature of the projects it develops. It is governed by a Board which involves members from different professional disciplines who take over strategic areas of the Foundation. Most board members have over 20 years of professional experience in each of their areas of expertise.

In 2010, the Foundation organized the World Mayors Summit on Climate where the Global Cities Covenant on Climate or “Mexico City Pact” (PCM) was signed by mayors from five continents. The institution currently serves as the international Secretariat of the Covenant, performing actions to increase the number of cities in the fight against climate change, promoting linkages amongst them, and publishing, both digitally and in printed version, an annual report in Spanish and English of the climate actions performed by the signatories of the Pact.

In this document we present the Second Report of the Global Cities Covenant on Climate, “Mexico City Pact.”

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