

Learning from Cities

The 2nd Guangzhou
International Award
for Urban Innovation

Guangzhou Institute for Urban Innovation



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Five Cities Won the 2nd Guangzhou International Award for Urban Innovation







The Awarding Ceremony of the 2nd Guangzhou International Award for Urban Innovation





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The Guangzhou Institute for Urban Innovation was established under the framework of the Guangzhou Award. The Institute is conceived as an international network of experts and institutions dedicated to furthering urban innovation concepts, tools and methodologies. Its members include research and academic institutions, professional associations, community-based organizations, industry leaders and individual experts.

Preface

Guangzhou International Award for Urban Innovation (Guangzhou Award), jointly established by the city of Guangzhou, United Cities and Local Governments (UCLG) and the World Association of Major Metropolises (Metropolis), fully demonstrates global cities' creativity and responsibility amidst the wave of global urbanization. The 2nd Guangzhou Award was brought to a successful conclusion in Guangzhou in November, 2014, a high-profile event that involved 209 innovative initiatives from 159 cities of 55 countries and regions across six continents. Five initiatives, respectively from Antioquia (Colombia), Bristol (the UK), Dakar (Senegal), Hangzhou (the People's Republic of China) and

Christchurch (New Zealand) emerged to the top and won the awards. In addition, Hangzhou was recognized as the "Online-popular City", Bristol, the "Media-focused City", and Antioquia, the "Public-recommended City".

Creative ideas and wisdom of cities are pooled together for collective benefits and a win-win outcome. The Urban Innovation Database is a treasure trove of a vast number of lively urban innovation initiatives, which offer visionary perspectives on urban governance and sustainable development for cities around the world. Members of Guangzhou Institute for Urban Innovation have conducted field trips over the past year to fourteen shortlisted cities of



the 2nd Guangzhou Award, along with associated experts and reporters. Their in-depth analysis and first-hand experience have found their expression in a variety of case study reports, which are now compiled into this book entitled *Learning from Cities——The 2nd Guangzhou International Award for Urban Innovation*. Delving deeply into fourteen shortlisted initiatives, this book is designed to showcase what global cities can accomplish through innovation and creativity and to provide cities and local governments with invaluable inspiration on urban planning, development and governance.

Cities around the world present distinctive features and follow

different development paths. On the course of exploring the paths to urban innovation, we can always discover the glory of human characters and the immense power of wisdom. For instance, Bristol of the UK paints a blueprint of what a smart city can look like; Antioquia of Colombia reveals the meaning of education for life; Christchurch of New Zealand shows the world local people's resilience and wisdom against a natural disaster; Hangzhou of China revolutionizes its public transportation model; Dakar of Senegal achieves win-win situation between social development and economic benefits. It is our belief that the lively initiatives listed in this book will surely inspire us to think more

about the future development of cities. We look forward to more wisdom and creative ideas from participating initiatives of the 3rd Guangzhou Award.

A city's charm and cultural identity can be reflected in its innovation initiatives, and innovation represents the most powerful driving force behind the advancement of the times. With the dashing and enterprising spirit, we will move on to make innovation the centerpiece of our development programs, never relenting our efforts to nurture a pro-

innovation ecosystem and culture and pool together resources for innovation and designating innovation-driven development as the core strategy for the city's development.

Let us join hands together in this grand innovation endeavor for a better future.

Editorial Board
December, 2016

CONTENTS

Brief Introduction of Guangzhou International Award for Urban Innovation / 002

Report of the Technical Committee (TC) 2014 Guangzhou International Award for Urban Innovation / 006

List of 15 Shortlisted Initiatives of the 2nd Guangzhou International Award for Urban Innovation / 010

European Line >>

Great Britain [Bristol](#) — Smart City / 014

Germany [Hamburg](#) — The International Building Exhibition (IBA) Hamburg and its “Climate Protection Concept Renewable Wilhelmsburg” / 028

Sweden [Linköping](#) — Carbon Neutral 2025 / 040

Asian-African Line >>

China [Hangzhou](#) — Urban Public Bicycle Sharing Program / 052

Korea [Kwangju](#) — Greenhouse Gas Emissions Program in Household Carbon Bank in Gwangju / 068

United Arab Emirates [Abu Dhabi](#) — Estidama Program / 078

Indonesia [Jakarta](#) — The Pluit Reservoir Revitalization Project / 096

Senegal [Dakar](#) — Municipal Finance Program / 114

Australian-New Zealand Line >>

Australia [Melbourne](#) — 4°C Cooler: Using Green Infrastructure to Build a Climate Resilient and Prosperous Melbourne / 124

New Zealand [Christchurch](#) — Our Ever Evolving City: Public

Participation in Post-Disaster Construction / 140

The North American Line >>

The United States of America **Boston** — Youth Lead the Change: Participatory Budgeting Boston / 164

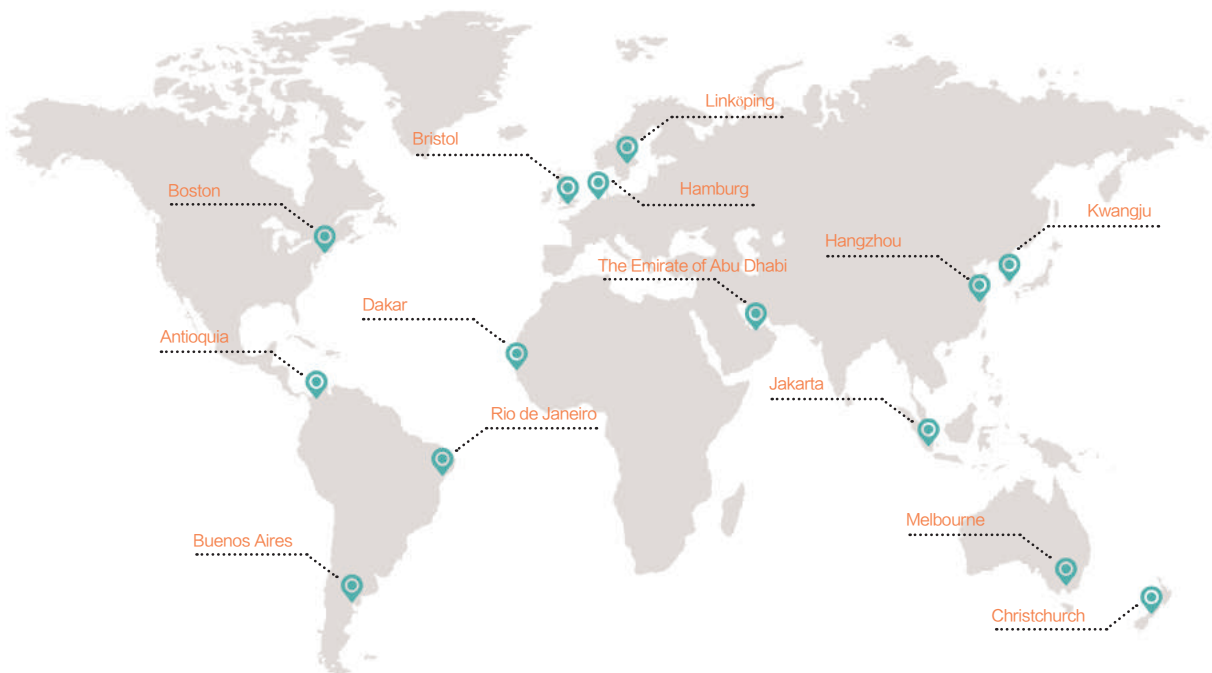
The South American Line >>

Columbia **Antioquia** — Educational Parks for Youth / 176

Brazil **Rio de Janeiro** — Rio Operation Center: Integrating Data and Monitoring Public Utilities in a Truly Intelligent System / 188

Argentina **Buenos Aires** — Collaborative Roundtable for Innovation and Creativity / 204

Annex: List of 30 Deserving Recommended Initiatives of the 2nd Guangzhou International Award for Urban Innovation / 220







Brief Introduction of Guangzhou International Award for Urban Innovation

I. Mission and Objective

The Guangzhou International Award for Urban Innovation (the Guangzhou Award) is co-sponsored by the United Cities and Local Governments (UCLG), the World Association of the Major Metropolises (Metropolis) and the City of Guangzhou. The aim of the Guangzhou Award is to recognize innovation in improving social, economic and environmental sustainability in cities and regions and, in doing so, to advance the prosperity and quality of life of their citizens. Presented biennially, the award encourages innovation in public policy, projects, business models and practices.

II. About the Guangzhou Award

1. Award Set-up

Presented biennially, the Guangzhou Award is discerned to 5 city initiatives in public policy, public management, partnership and citizen participation, smart cities, sustainable development and other areas for each award cycle. Each of the winning initiatives will receive a USD 20,000 cash prize, a trophy and a commemorative certificate designed for the award.

2. Eligibility

The Guangzhou Award is open to all

cities and regions worldwide, including members of UCLG and Metropolis.

An initiative that is entered for the Guangzhou Award should meet the following eligibility criteria:

- a) It should be an original undertaking such as a new policy, project, business model or practice that promotes social, economic and/or environmental sustainability in a city or region;
- b) It should be an ongoing or recently completed initiative (within the past two years);
- c) It should provide evidence and/or indicators of substantial impact and/or success in meeting the initiative's stated objective(s).

3. Selection Process

The assessment of initiatives of the Guangzhou Award is carried out by the assessment institutions — a Technical Committee (TC) and a Jury which consist of experts with extensive experience in different domains.

The Guangzhou Award strictly abides by the principles of impartiality, equitability and openness, in an effort to ensure operational transparency and independence. For each award cycle, the TC will establish a list of qualifying initiatives based on compliance with the submission guidelines. After that, the TC will identify no more than 45 outstanding initiatives and, from those 45, a list of 30 deserving initiatives and 15 shortlisted



city initiatives. An independent Jury will make a final selection of up to 5 award winning cities or regions from the shortlist of 15 outstanding initiatives. This step will involve an evaluation based on the presentation of each of the 15 short-listed cities during the Guangzhou International Urban Innovation Seminar.

III. About Previous Guangzhou Awards

The 1st Guangzhou Award was held in 2012, with 255 initiatives from 153 cities across 6 continents and 56 countries and regions around the world. In October, a Technical Committee comprising urban innovation experts made a list of 30

deserving initiatives and 15 shortlisted city initiatives. In November, 5 winning cities of the 1st Guangzhou Award were selected, including Kocaeli (Turkey), Lilongwe (Malawi), Seoul (South Korea), Vancouver (Canada) and Vienna (Austria).

In 2014, the 2nd cycle of the Guangzhou Award received 259 initiatives from 177 cities, 57 countries and regions in 6 continents around the world. The initiatives range from the city to the metro-region scale and covered a wide range of the fields including urban resilience and post disaster reconstruction, urban and environmental planning, smart city and smart mobility, housing and transportation, infrastructure and social services, partnerships and civic engagement, etc. The Technical Committee

Meetings of the 2nd Guangzhou Award was held in Guangzhou from September 25 to 29. By the principles of impartiality, equitability and openness, the TC chose 30 deserving initiatives and 15 shortlisted city initiatives. In November 2014, five winning cities of the 2nd Guangzhou Award cycle were selected, including Antioquia (Colombia), Bristol (UK), Christchurch (New Zealand), Dakar (Senegal), Hangzhou (China).

In addition, in order to promote public involvement in the Guangzhou Award selection process and to promote

more worldwide awareness and participation in urban innovation, the Organizing Committee of Guangzhou Award decided to recognize up to three of the short-listed initiatives for their popularity with netizens, the media and participants attending the Guangzhou International Urban Innovation Conference. In 2014, the online-popular city went to Hangzhou (China) while Bristol (U.K.) was the preferred city of the media and Antioquia (Colombia) the preferred city-region by the attendants to the Conference.

Report of the Technical Committee (TC) 2014 Guangzhou International Award for Urban Innovation

(Guangzhou , China , 25–27 September 2014)

I. Introduction

The TC met in Guangzhou from 25 to 27 September 2014 to select outstanding and deserving initiatives with a view to enhancing the implementation of sustainable urban development through inspiration and knowledge sharing. It took into consideration the goal of the Guangzhou International Award for Urban Innovation (Guangzhou Award) to recognize innovations in improving the social, economic and environmental sustainability in cities and local governments worldwide and more specifically: To highlight exemplary models of innovative policies and practices; To motivate cities and local authorities to further promote innovation; To improve city governance. The TC took also into consideration the objectives of the City of Guangzhou to promote the

sharing of lessons learned from urban innovations between cities, regions, countries and thematic areas.

The TC wishes to express its appreciation to the City of Guangzhou, the United Cities and Local Governments (UCLG) and Metropolis for their vision in establishing the Guangzhou International Award for Urban Innovation.

It wishes to thank the City of Guangzhou for its generous hospitality to the TC. The TC commends the secretariat for the Guangzhou Award in the way it handled the call for submissions, the transparency in its guidelines and processes. It further commends the City of Guangzhou for its intention to invite all 15 shortlisted cities to present their initiatives to the International Seminar on Urban Innovation as was the case in 2012, and to allow the Jury to make its final decision after the seminar.

The TC reviewed all 209 initiatives submitted from 159 cities and from 55 countries and regions. Of these 209 initiatives, 45 were identified as deserving initiatives. It further selected 15 submissions of excellence from the 45. These are considered of comparable merit and constitute the shortlist of cities to be submitted to the Jury for its consideration and final selection of 5 award-winning cities.

II. The Evaluation Process

The TC assessed each submission using the main criteria established by the Guangzhou Award for Urban Innovation, namely:

- **Innovativeness:** the extent to which knowledge and information has been applied to develop new policies, practices and/or business models to address major urban issues and challenges;

- **Effectiveness:** the extent to which the initiative has achieved its stated objective(s) and other socially desirable outcomes;

- **Replicability:** the value of the initiative in inspiring others to adopt new ideas, policies or practices, including replication in other locations of the city, region or country for greater impact and sustainability;

- **Significance:** the importance of the initiative in addressing problems of public concern.

III. Selection Procedure for the Short-listed Initiatives

In its first plenary session, the TC divided into three groups (A, B and C). Each group reviewed about one third of the submissions on a regional basis with a view to determining the qualifying

initiatives. The work of the three groups resulted in a consolidated list of 77 initiatives from 71 cities and regions.

In its second plenary session, the members of the TC re-organized into two groups (D and E) with the purpose of identifying 45 outstanding cities. Each group came up with a list. The two lists were compared in plenary. Those common to both lists were unanimously admitted to deserving initiatives list. Those remaining were discussed in plenary until consensus of the final list of 45 cities was reached.

In its third plenary session, the members of the TC were re-organized into Groups F and G with the purpose of identifying 15 outstanding cities. The same methodology was applied and resulted in the shortlist.

The TC also came up with a draft agenda for the International Seminar on Urban Innovation which will feature the

15 shortlisted cities. The draft agenda is contained in a separate report.

The TC commends the leadership of Guangzhou for organizing study tours to all of the 15 shortlisted cities of the 1st cycle of the Award and strongly recommends that it continue this practice.

V. TC Members

1. Mr. Qiu Baoxing (China), Chair of TC

Former Deputy Minister of Ministry of Housing and Urban-Rural Development of the People's Republic of China (MOHURD)

2. Ms. Sue Brownill (UK), TC Member

Reader in Urban Policy and Management Department of Planning, Oxford Brookes University

3. Mr. Zengke He (China), TC Member



Deputy Director of National
Research Center of Innovation, Peking
University; Doctorate in Political Science

4. Mr. Eric Huybrechts (French),
TC Member

Responsible for International Affairs
at the Regional planning agency of Paris/
Ile de France region (IAU-IDF)

5. Ms. Fernanda Magalhaes
(Brazil), TC Member

Senior Urban Specialist of Inter-
American Development Bank

6. Mr. Neal Peirce (America), TC
Member

Founder of *Citiscopes* (Global news
site on innovation in cities), Editor and
Writer

7. Mr. Vidhyandika Perkasa
(Indonesia), TC Member

Senior Researcher of Centre for
Strategic and International Studies (CSIS)

8. Mr. Stefan Schurig (Germany),
TC Member

Director Climate Energy at the World
Future Council

9. Ms. Wandia Seaforth (Kenya),
TC Member

Former Chief of Best Practices
Programme of the UN-Habitat

10. Ms. Geci Karuri-Sebina (South
Africa), TC Member

Executive Manager of South African
Cities Network

11. Ms. Azza Sirry (Egypt), TC
Member

Director of UTI at Housing and
Building National Research Center,
Professor of Urban Planning

List of 15 Shortlisted Initiatives of the 2nd Guangzhou International Award for Urban Innovation

(By Alphabetical Order)

City

Initiative

Abu Dhabi (UAE)	Etidama Program
Antioquia (Colombia)	Educational Parks for Youth
Boston (USA)	Youth Lead the Change: Participatory Budgeting Boston
Bristol (UK)	Smart City
Buenos Aires (Argentina)	Collaborative Roundtable for Innovation and Creativity
Christchurch (New Zealand)	Our Ever Evolving City:Public Participation in Post-Disaster Construction
Dakar (Senegal)	Dakar Municipal Finance Program
Eskisehir (Turkey)	City Memory Museum
Gwangju (South Korea)	GHGs Emission Program in Household Carbon Bank in Gwangju
Hamburg (Germany)	The International Building Exhibition (IBA) Hamburg and its “Climate Protection Concept Renewable Wilhelmsburg”

Hangzhou (China)

Jakarta (Indonesia)

Linköping (Sweden)

Melbourne (Australia)

Rio de Janeiro (Brazil)

Urban Public Bicycle Sharing Program

The Pluit Reservoir Revitalization Project

Carbon Neutral 2025

4°C Cooler: Using Green Infrastructure to
Build a Climate Resilient and Prosperous
Melbourne

Rio Operations Center: Integrating Data and
Monitoring Public Utilities in a Truly Intelligent
System





**European
Line**

A white hexagonal label with a black border containing the text 'Great Britain'.
Great
Britain

□ Overlook of Bristol

/ Bristol / Smart City

A historic city beset by problems of congestion, an aging population, climate change and energy resilience, Bristol is making itself a place set apart by new initiatives. It voted to become one of the few cities in England to adopt a mayoral

form of government. Bristol's innovative approach to becoming a smart city is based on people and not on technology: a Public-Private-People approach. It has two primary aims: To contribute to the reduction of Bristol's CO₂ emissions

by 40% by 2020 from a 2005 baseline; To use projects to ensure sustainability placed at the heart of community concerns and to make sustainability an integral way of improving individual's lives.

Bristol is advanced under the the Bristol Climate Change and Energy Framework (which provides climate change solutions including strategic activities in 19 dimensions). The program is delivered under the auspices of the Covenant of Mayors (The Covenant of Mayors is the mainstream European movement involving local and regional authorities, voluntarily committing to increasing energy efficiency and use of renewable energy sources on their territories). Moreover, the city was awarded European “Green Capital” status for 2015.

-
-  Name of City: Bristol
 -  Name of Country/Region: Great Britain
 -  Geographic Region: Western Europe
 -  Population: 442,500 (2015)
 -  Surface Area: 110 km²
 -  Population Density: 3,892 people/km²
 -  GDP per capita: GBP 27,100
 -  Title or Slogan of the Initiative: Smart City
Bristol
 -  Start Date of the Initiative: 2011
 -  End Date of the Initiative: in the Process
 -  Thematic Area: Society, Economy, Environment
Technology

Background of the Initiative

Similar to other large cities, Bristol faces a series of challenges of climate change, energy resilience, congestion, health and well-being of a diverse, aging population and the transition to the low carbon economy. As the 7th largest city in England, Bristol faces additional challenges around a “super diverse” population and increasing inequality of society-economy deprivation between areas of the city.

Bristol’s Smart City Program therefore aims to utilize innovative solutions to help tackle some of these major issues. The novelty of the approach is to focus on public-private-people



 Bristol former mayor George Ferguson is at the scene of the Event Make Sundays Special

partnerships, promoting innovative solutions through the smart deployment of information and communication technology (ICT) and digital connectivity.

There have been a number of significant social-political changes in Bristol in the last two years which have served as a spring-board for the further action. For example, having recently been awarded “Green Capital” status for 2015, Bristol is about to embark on an ambitious program of showcasing Bristol’s achievements as a “smart city”, as well as using this as an opportunity to attract further inward investment.

In 2012, the city voted for its first directly-elected mayor, therefore providing greater leadership and

opportunity to drive the smart city agenda forward.

Finally, and most crucially, the individual projects being delivered under the smart city agenda and the Green Capital program have been brought together under the overarching objective of increasing the city’s resilience to challenges posed by a large urban area.

A major flood and infrastructure failure (energy, ICT, transport and tap water) pose the most significant risks for Bristol in the short term, whilst in the long term, the city systems will become increasingly stressed on account of energy security, disrupted food systems, public health risks and economic vulnerability. Population growth and increased



□ Bristol former mayor George Ferguson guides the students how to plant a tree

demographic diversity will present many other challenges to the city's resilience.

Bristol sees "city resilience" as more than a quick response to the status quo; It's an opportunity to transform our social and economic systems in the long term to achieve social justice and well-being within the environmental limits.

Building the resilience of Bristol is central to the Mayor's plans for the city, which has strong engagement, cooperation and input from a wide spectrum of stakeholders.


As above, the strength of the city's approach is in its ability to combine expertise and deliver activities in connection with a variety of public, private and "third sector" organizations. Till now, Bristol has delivered activities with over 50 partners to secure positive outcomes for each of Bristol's citizens.

▾ Implementation of the Initiative

Every city has its own history and natural endowments. The growth of a city lies in its constant self improvement and self upgrading, rather than in the abdication of its traditions for utter revamp and regeneration. The success in building a low-carbon city is predominantly dependent on the

application of renewable energy sources, the increase of energy efficiency and the control of energy demand. In each of these three areas, it is possible and practical to improve upon what has already been built to achieve overall enhancement and renewal. Against the background of a globalized, information-based and networked world, public policies will be hard to be implemented in real sense if they are disconnected with the real needs of the people. In the case of Smart City Bristol, efficient energy usage is placed at the center of carbon emission control, with specific purposes including the reduction of unnecessary energy demand, the improvement of energy efficiency and the incentives for the application of renewable energy sources. Specific measures include the reduction of carbon emissions in commercial buildings, transportation vehicles and industries by fostering cooperation between citizens, social organizations and enterprises. In terms of industry-related emission control, Bristol, in addition to providing incentives for green technology innovation by enterprises, has set up the Bristol Prize, a new annual award for the best new clean technology. The city has launched an international festival for Clean Technology Business, for a number of high profile sectors which have the greatest scope for boosting growth. The



 Bristol has become the first City of Bicycle in Great Britain

city has also held a series of international high profile summits on Climate Change, which were attended by the Prime Minister, other leading politicians and top-level global climate change stakeholders. As regards the reduction of emission in industries, commercial buildings and energy supply, Bristol mainly adopts improvement and upgrading measures of economical nature, which can be vividly seen in the chart below.

Bristol places people at the center of its overall endeavor to build a low-carbon city, which means that the government guides market-based factors and ordinary citizens into participating in low-carbon projects by establishing a friendly policy environment and popularizing the concepts of cross sector collaboration and cooperation. As Smart City, Bristol is people-centered rather than technology-

led; Every program under the initiative is gauged and appraised on the basis of whether it is in conformity with public interests and whether it is able to draw citizens, businesses and social organizations into the implementation process. This is critically important in that it can determine the success and failure of the overall endeavor of building a low-carbon city through partnership systems.

Effect and Challenge

1. Effect of the Initiative

Smart City Bristol has two primary goals. First, to develop smart projects that will contribute to a reduction in Bristol's CO₂ emissions. Success is measured by the Bristol Climate Change and Energy Framework 2012-2015 which was adopted in March 2012 and sets out how

Bristol's Improving and Upgrading Situation of Economical Type

Key Areas	Major Ways and Measures
Residential Areas	3E Houses (Energy-efficient Transformation of Residences; Renewable Energy Utilization Home; Energy Conservation and Circular Utilization)
Office Buildings	Establishing a Green Building Labeling System; Beefing up Energy-saving Requirements for Newly-constructed Projects; Upgrading the Energy-saving Capabilities of Old Buildings
Energy Supply	Encouraging Waste Classification and Recycling for Power Generation and Heating; Formulating New Plans and Policies to Incentive Renewable-energy-based Power Generation; Transitioning to Distributed and Sustainable Energy Supply Models

the City Council will work with partners to reduce the city's CO₂ emissions by 40% by 2020 from a 2005 baseline, and how the city will adapt to climate change. Second, to use projects and the green capital status to ensure that sustainability is placed at the heart of communities, working in partnership with public and private organizations and using ICT and digital connectivity to support this. The aspiration is to ensure that sustainability issues become an integral way of improving individuals' lives, supporting and enriching experiences rather than being at odds with them.

Accomplishments include:

- ◆ Securing an additional GBP 7million in funding for Green Capital activity
- ◆ Becoming one of the inaugural 100 Resilient Cities, a pioneering initiative funded by the Rockefeller Foundation
- ◆ Achieving the 20% energy reduction target as part of 3E Houses
- ◆ Decreasing in energy consumption by schools and council offices as part of the “smart space” project
- ◆ Increased awareness and engagement with climate change issues



□ Colorful Hot Air Balloons Bristol Amazing the Sky in the Bristol International Balloon Fiesta

via smart city projects in general.

The city plans to create resilient systems—more decentralized, less prone to cascade failure—and will future-proof investment decisions. Bristol has already been the most energetic and waste-efficient major UK city, and we plan to meet future needs by managing resources even more efficiently. The city aims to empower individuals and communities to help themselves, support capacity building and local decision making, and protect local amenities. Many building stocks are old, but the city is working to enable owners to future-proof buildings

to support and protect life and enable commerce. The city is using a system led approach to build in capacity, flexibility, safe failure, and constant learning. Being a resilient city is central to the Mayor's vision.

2. Challenge of the Initiative

During the advancement of smart city projects, one of the major obstacles to success is ensuring good communication with the project customers. It needs to be done in a way that means something to them and so they understand the benefits and their role. One way of ensuring the



project stakeholders are engaged with the goals of the program is to formulate and devise an effective dissemination and communication strategy. By linking the smart city agenda to Bristol's status as Green Capital, the profile of the various projects has been raised significantly on a national level. At a local level, the election of a directly-elected mayor has helped distil messages about the necessity for a "smart city" approach to carbon reduction.

When it comes to the employment of innovative technological solutions, there are a number of political sensitivities to consider, especially in the context of decreasing authority budgets and the perception that smart city projects are somehow non-essential expenditure. This cynicism has been largely overcome by establishing successful links with other internal council departments, securing buy-in from senior managers as to how the technology in question can actually



□ Bristol former mayor George Ferguson drives the electric vehicle for energy conservation and environment protection

increase efficiency. Then the government has provided a more effective service for Bristol's citizens.

Practice and Innovation

1. Progressive and Revolutionary Innovation

Smart City Bristol is remarkable in that it combines evolutionary and revolutionary aspects.

Smart city Bristol is evolutionary in that it builds upon the lessons learned from previous projects. A good example of this is the "smart metering" suite of projects that has been deployed in Bristol, beginning with a project called "DEHEMs" (2008—2011) and further developed in "3E Houses" (2011—2014). Both projects were funded under European Commission funding initiatives, with DEHEMs trialling the use of smart meters in council-owned properties. The lessons from this project were used to inform the 3e houses work, which used smart metering in combination with a user "interface" to enrich the user experience and increase levels of participation and engagement. Again, the learning from this project has been used to develop a bid for a further smart metering project which aims to develop smart metering "apps". It is hoped that this project will be funded

under the new Horizon 20:20 programme.

It is revolutionary in that the projects being delivered are innovative and are applied within a Bristol context using our own approach to smart cities, putting people at the heart of a smart city, rather than centering on technology. For example, the So La Bristol smart grid project is the first in the world to use bespoke technology in residents' homes to connect solar photovoltaic power generation to battery storage units. The smart city approach places people and communities at the center of technological innovation as the city believes that it is how people interact with technology that helps inform behavior change and helps City to achieve its aims. To that end, the So La Bristol project works with a local community based on charity with the specific aim of stakeholder engagement. Furthermore, Bristol's Green Capital status will allow the city to revolutionize its approach by raising the profile of Bristol on a wider international scale and attracting investment in innovative technologies within the city.

2. Characteristics

Smart City Bristol was launched in 2011 focusing on Smart Energy, Smart Transport and Smart Data. It includes pilot projects (smart metering, smart grid, electric vehicles, open data), alongside

permanent initiatives (Traffic Control Centre and Freight Consolidation Center). Bristol is advantageous in that its companies in microelectronics, environmental technology and digital creativity collaborate with the community. For example, Bristol's Living Lab in Knowle West consists of a group of people actively involved in the creation and evaluation of technologies which they will ultimately use.

The city was awarded European "Green Capital" status for 2015. The European Green Capital 2015 programme will also contribute to these targets, promoting Bristol as a center for innovation in Green technology. Some of the projects which will be funded and delivered as part of the Green Capital 2015 include:

- ◆ The Bristol Prize: a new annual award for the best new clean technology. This will help deliver solutions for cities to dealing with and alleviating climate change.

- ◆ A sustainable living program in UK schools to educate up to 4.5 million children about climate change and about how cities can contribute to tackling this issue.

- ◆ An international festival for Clean Technology Business, in Bristol, for a number of high profile sectors which have the greatest scope for boosting growth.



□ Bristol International Balloon Fiesta is now one of the largest in Europe. Various hot air balloons decorate Bristol as the colorful sea full of hot air balloons

- ◆ The Grass Roots Catalyst Fund, to incubate and develop sustainable urban living initiatives which can be scaled up and applied to cities across the world.

- ◆ A series of international high profile summits on Climate Change with the attendees including the Prime Minister, other leading politicians and top-level global climate change stakeholders.

- ◆ A volunteer program to SMEs and frontline businesses to help Bristol

prepare and deal with the influx of visitors during its tenure as the European Green Capital in 2015.

▾ Highlight

Bristol is using smart technologies to help meet its target to reduce CO₂ emissions by 40% which is a significant challenge as our population is rising twice



and opportunities for innovation. We are leveraging local partnership and absorbing new investment to make Bristol a Low Carbon City. Measures include investment in digital infrastructure (Council's citywide fibre network and GBP 11 million Government investment in Broadband and Wi-Fi), energy devices in 500 plus offices and 28,000 homes owned by the Council and a £2.5 million grant from the European Investment Bank to develop a Bristol energy service company and citywide investment program, as well as through transport schemes and business inward investment and innovation.

The European Green Capital Award was launched in 2008 by the European Commission to promote and reward the efforts of cities and their local authorities to improve the environment. All recipients of the award have a consistent record of achieving high environmental standards; They are committed to on-going and ambitious goals for further environmental improvement and sustainable development; They can act as role models to inspire other cities and promote best practices to all other European cities. Past winners include Stockholm, Hamburg, Vitoria-Gasteiz, Nantes and Copenhagen (2014).

Bristol has been awarded the title of European Green Capital (EGC) for

the UK average. Bristol has a Climate Change and Energy Security Framework and has reduced CO₂ emissions by 15% from 2005-2009, against a 6% population rise. But the 2020 target is a real challenge requiring significant action and we see smart technologies as integral to make further reductions. We recognise smart technologies bring new opportunities i.e. integrating complex systems, opening up information supporting better governance



2015 due to its ability to demonstrate rapid progress and continuing ambition, across a wide range of quality of life, environmental and green business criteria.

In addition, Bristol is developing its own energy company which will form an independent entity from the authority in January 2015.

By being selected to become a member of the 100 Resilient Cities network, Bristol has demonstrated an understanding and commitment to building urban resilience, the desire to actively engage multiple-stakeholders across the city and to positively impact upon the lives of poor and vulnerable residents.

▾ Experience and Inspiration

1. Establishing Broad-based and Multi-layered Public-private-people Partnerships

One of the prominent features of urban administration in the UK lies in the employment of small-sized teams for accomplishing big projects, which means setting up organizational platforms and deploying volunteers to do more things with lower costs. A typical example of this is “Bristol Green Capital Partnership”, an organization launched by Bristol seven years ago when it was applied to

“European Green Capital” status. By connecting about a hundred companies of varying sizes, “Bristol Green Capital Partnership” has created a cooperation platform that brings together people from different sectors, who aspire for exchange of views on the building of green cities. The platform also brings companies with similar business and functions together for brainstorming, in-depth discussion, promotion and seeking opportunities. As an indispensable part of the innovation system, the platform is created by the government for the overarching purpose of achieving the effective flow and integration of technology, information and capital needed for building a low-carbon city. For instance, in terms of city health issues, “Bristol Green Capital Partnership” launched Healthy City Week Program. In the early stage of the program, initiatives were taken to contact companies and social organizations involved in the health industry, promote their activities on Bristol Green Capital Partnership’s official website and distribute promotion brochures. Bristol Green Capital Partnership may seem like a large organization both in concept and in practical work it has done, but in reality, it is an organization run by only two formal staff members, who are responsible for contracting partners and keeping its daily operation. It is thanks

to the dedication and commitment of many interns and volunteers that the organization has been able to handle such a heavy work load. The organization will continue doing its work after Bristol is awarded the “European Green Capital” status. Another striking example of small-sized team operation in Bristol is Bristol’s Living Lab in Knowle West, which is based on a specific community and mainly involves volunteers and community representatives.

2.Setting up Project Companies through Public-private Partnerships between Social Organizations and National Organizations

A typical example of such endeavor constitutes Bristol 2015 Limited, a company established for “European Green Capital” status appraisal. When the appraisal work was completed in 2015, all of the employees were required in principle to leave the company. After it was founded, the company helped make possible low-carbon social events under different themes each month, including

the Bristol Walking Tour in April, Bristol Food Connections and Bristol Art Festival in May, Shaun the Sheep during summer vacations, etc. These thematic events are not sponsored by Bristol 2015 Limited. Rather, they were sponsored and held by large organizations in relevant fields, which were given greater freedom and leeway, while Bristol 2015 Limited played the role of recruiting volunteers and event promotion. Bristol 2015 Limited has set up a studio and an exhibition hall in the busiest pier area of the city, in which a thematic green activity and a workshop are held on a weekly basis. With only one permanent manager, the exhibition hall is operated mainly by the volunteers on a daily basis. The partnership system has been able to pool the strength and wisdom of all stakeholders together at the minimum cost possible, for revitalizing the economy and coordinating social development through low-carbon city programs, including the European Union, non-governmental organizations, enterprises, local communities and volunteers.














□ Cityscape of Hamburg

/ **Hamburg** / **The International Building Exhibition (IBA) Hamburg and its “Climate Protection Concept Renewable Wilhelmsburg”**

In 2005, Hamburg decided to support the redevelopment of the Wilhelmsburg neighborhood through hosting the International Building Exhibition (IBA) and the International Garden Show, for which over 70 projects were developed around 3 themes including cities and

climate change. Wilhelmsburg has 55,000 inhabitants living in an island on the Elbe vulnerable to flooding. It is also an ethnically diverse and low-income community with an environment affected by industrial and transport infrastructures. The building of this island has become



-
-  **Name of City:** Hamburg
 -  **Name of Country/Region:** Germany
 -  **Geographic Region:** West Europe
 -  **Population:** 1774,242 (2015)
 -  **Surface Area:** 755.26 km²
 -  **Population Density:** 2,300 people / km²
 -  **GDP per capita:** EUR 62,000
 -  **Title or Slogan of the Initiative:** Hamburg International Architectural Exhibition (IBA) and Climate Protection Concept “Renewable Wilhelmsburg”
 -  **Start Date of the Initiative:** September 1st, 2006
 -  **End Date of the Initiative:** November 3rd, 2013
 -  **Thematic Area:** Environment
-

a new urban development program of the City of Hamburg, called “Leap over River Elbe”. Hamburg established an energy efficient scheme from 2008 to 2010, maximizing the use of local energy resources such as energy savings and energy efficiency thereby strengthening the local economy. The aim is 100% local renewal supply by 2025 and 100% renewable heat by 2050, making the Elbe Islands carbon neutral. The IBA provided an opportunity and structure to further the scheme, which brought 150 private companies and the local community together to build an “IBA Partnership”. To implement the IBA project, the Hamburg government spent 90 million Euros and private investors have spent 700 million Euros. Hamburg undertakes to continue the project and launches new projects after 2013. The present projects are expected to generate a renewable power production of 54% and a renewable heat production of 14% of the overall demand by the end of 2015. The IBA Hamburg Model and the Climate Protection Renewable Wilhelmsburg’s strategy have already been used in other parts of the City. Additionally, the IBA is sharing the knowledge generated with other partner cities.

▾ Background of the Initiative

To support the new urban development program of Hamburg, “Leap over River Elbe”, and to connect the city centre with the southern administrative regions, the Hamburg Senate decided in 2005 to present the International Building Exhibition (IBA) and the International Garden Show (IGS) in Wilhelmsburg.

In order to realize the coordinated organizing, the Hamburg government founded two city-owned companies cooperating in structure and management in 2006.

In 2013, to facilitate the development of over 70 projects in Wilhelmsburg, IBA specified three themes and one of them is “cities and climate change”. This theme is selected based on the following considerations: first, it’s concerned with governance; second, 55,000 inhabitants are living in an Island near the Elbe which suffered from the flood in 1962.

The foundation for making the IBA area a more energy efficient environment is the “Climate Protection Concept Renewable Wilhelmsburg”, which was implemented by an international committee of experts in collaboration with IBA from 2008 to 2010. The idea behind the resulting “Energy Atlas” is that we need to utilize the city’s (or district’s) local energy resources to supply



□ Cityscape of Hamburg

renewable energy and at the same time to considerably improve the utilization efficiency of local energy consumption.

▾ Implementation of the Initiative

The major part of “Climate Protection

Concept Renewable Wilhelmsburg” was implemented by an international committee of experts in collaboration with IBA from 2008 to 2010. It is estimated by this project team that the population in the island will grow from 55,000 up to 73,000. The initiative’s aim is 100% local renewable electricity supply by 2025 and 100% renewable heat by 2050, making the Elbe Islands carbon neutral. The goal can only be realized by adequately exploiting local energy resources and renewable energies, and by substantially improving the utilization efficiency of local energies. For this end, the project team is committed to the survey of Hamburg itself and draws “Energy Atlas”, which analyzes future energy demands, energy saving potentials, renewable energy utilization in distinct building environments within Hamburg, and strategic measures of energy supply. For instance, in the security housing community of Wilhelmsburg, the roofs in the community are all covered with solar panels, and the supply of heat and electricity is additionally supported from the nearby renewable Energy Bunker and Energy Hill for wind power generation transformed from a toxic waste landfill; and in terms of energy conservation, the old community has added closed balcony and specially-designed window which makes sunlight rooms, offering more

space for residents and improving the utilization efficiency of daylight, hence reducing the consumption amount of electricity.

Energy Bunker is transformed from a deserted air raid bunker which is built in WW II as residents’ shelter from air raid, aircraft port and anti-aircraft battery. With a height of 42 meters, and a thickness of 4 meters on top and 3 meters of outer wall, it can accommodate 20,000 people. The bunker was demolished by Allied Forces in 1947. However, due to its strong main structure and the huge cost of demolition, the main part of the bunker remained intact but abandoned since then. In 2006, Hamburg International Building Exhibition Company and Hamburg Energy Company proposed the program of Energy Bunker and launched the building in 2011 with the funding of European Regional Development Fund and Climate Protection Concept Organization. The top and side walls are covered with solar panels and solar hot water facilities of 3,000 square meters, and the interior was equipped with two sets of cogeneration systems fueled by waste wood and marsh gas. Additionally, the waste heat from nearby factories is transported there to heat the water tower with a capacity of 2 million liters, producing and storing heat. At present, as one of the most representative community



□ Energy and Network Center in Wilhelmsburg, Hamburg

renovation projects in Hamburg, Energy Bunker can not only meet the heating requirements of around 3000 households and the electricity needs of around 1000 homes, but also become a technology and history tourist attraction with anti-war memorial, tourist center, roof café and sightseeing deck.

The prospective green-concept architectural group includes various commercial residential buildings as symbols of the idea of low carbon. The

following are some distinct concept buildings launched by Hamburg International Building Exhibition Company:

Seaweed House

A prospective building with transparent algae breeding boxes is as the component of the external wall. The small algae in the tanks produce, through photosynthesis, bubbling methane from the bottom, which moves

the green algae just like a dynamic jade screen. Meanwhile, the methane is then transported to the generator under the building which produces electricity for the heating and lighting of the house. The production of methane by algae is 5 times more efficient than by the traditional vegetations. The present efficiency of

light energy conversion of this building reaches 10%, and light heat conversion efficiency is 38%.

Tidal House

This reinforced concrete building built on a gigantic floating concrete platform moves up and down along the tides of Elbe. This design brings a new idea to the architecture in flood-frequented areas. The energy generated by the tidal fluctuation can meet the requirement of heat supply and refrigeration of the whole building while the solar photovoltaic panels and the solar heating equipment on the roof can supply the remaining needs of heating and electricity.



Seaweed House



Wood Cube



Green Smart House

Sunflower House

The whole building consists of wood structure duplex apartments whose sun blinds over the roofs and balcony are covered with solar hull cells, which can move progressively along the direction change of sunshine to realize the maximum conversion efficiency. The sun blinds can absorb additional sunlight and can send off heat when the indoor temperature drops, just like an air-conditioner.

Other Commercial Residential Buildings of Renewable Concept

Some buildings are made from light



□ The International Building Exhibition (IBA) Hamburg brings out three-layer Dock building, floating up and down as the Elbe's tide rises and ebbs.

precast slabs whose indoor space can be adjusted within hours; For example, a one-bedroom apartment can be transformed into a three-bedroom apartment. Some are totally made from plywood and are specially capable of heat preservation and energy saving. Some change colors of outer walls to absorb natural heat. Some are transparent on all sides, offering a sunshine home office. Some look like Rubik's cube, the projecting direction of which can be designed personally by the resident. These houses, with a higher price than ordinary ones, have been sold

or rented well, marking its popularity among the new community residents.

↘ Effect and Challenge

1. Effect of the Initiative

The already realized or already scheduled projects in 2013 were expected to generate a renewable power production of 54% and a renewable heat production of 14% of the overall demand by the end of 2015.

After the realization of the IBA

projects, a new “Implementation Plan” will be the second Action Plan until 2020 or 2025. The Plan includes:

- ◆ continuing on-going IBA projects
- ◆ starting the schematized projects
- ◆ transferring existing IBA structures, concepts and networks into a “post IBA period”
- ◆ developing totally new projects
- ◆ attending the general German and Hamburg development

After the Implementation of the IBA projects, we will step into a brand new development stage where different situations have to be met.



□ The Firstly Built Energy Box in Hamburg

2. Challenge of the Initiative

The financial situation of house owners prevents even highly-economically efficient refurbishments or technical installations, for which IBA delivered information and consultancy to facilitate the implementation of the measures.

Another barrier is the risk of investments in district heating grids in existing areas with a great number of house owners. IBA organized a number of round table discussions as well as joint and integrated planning workshops to achieve best resolution and ensure the interests for all stakeholders.

Practice and Innovation

1. Progressive Innovation

After the realization of the IBA exhibition in 2013, a follow-up organization has used the existing competence and network to develop and market several new development areas, both within the borders of the exhibition area (central Wilhelmsburg area) and in areas located outside the former area.

Combined with the evaluation and monitoring concept, the lessons learned from IBA will be used to upgrade and adjust the “Climate Protection Concept Renewable Wilhelmsburg” to reach the goals in 2050.

2. Characteristics

The IBA Hamburg examines ways in which maximum use can be made of local renewable energy sources within the border of the city or districts, such as energy savings and energy efficiency, and how local economies can be strengthened as a result.

The working group undertaking the study “Energy Optimisation of the IBA Hamburg Model Region”(University of Applied Sciences Nordhausen) analyzed the following factors: future energy demand, the potentials for energy savings, increased efficiency, the use of renewable energy in the various types of urban building environment on the Elbe Islands, and strategic measures for energy supplies.

Highlight

The main objective of the “Climate Protection Concept Renewable Wilhelmsburg” is to tackle the challenges of global climate change by the development and the implementation of measures within the border of the city or districts, energy savings and energy efficiency, the use of local renewable energy sources and how local economies can be strengthened as a result.

The working group undertaking



□ Energy Box of the International Building Exhibition (IBA)

the relevant studies were working on a district level and analyzed future energy demand, potentials for energy savings, increased efficiency, and the use of renewable energy in the various types of urban building environment on the Elbe Islands, and the strategic measures for the optimization of energy supplies.

The working group undertook a concrete examination of two different reference scenarios, applying Germany-wide trends in renovation, efficiency and the introduction of renewable energy to the Elbe Islands.

Two so-called excellent scenarios were developed as alternatives to the reference scenarios to advance the concrete implementation of IBA projects and also to monitor different areas of emphasis in renewable energy supplies. The two scenarios share the fact that they are local and decentralized solutions adapted to the special local ability to achieve autonomy in renewable energy.

The results of the study, undertaken in close cooperation with the IBA's specialist Energy and Climate Advisory Board, form the most important basis for the "Energy-Atlas" of the Elbe Islands, and represent the strategic instruments and projects of the Elbe Islands' future energy supply systems. The aim is the presentation of a spatial energy model for the IBA's demonstration region.

In fact, the results of the study demonstrate the possibility to supply the Elbe Islands by local renewable energy

sources by 2050 even if the population will grow from 55,000 up to 73,000. In detail, a 100% supply by renewable power is possible until 2025, a supply of 85% renewable heat until 2050, to make the Elbe Islands nearly carbon neutral until 2050.

The first project like "Energy Bunker", the conversion of a former World War II aircraft shelter into a power station and heat storage and "Energy Hill", the transformation of a toxic landfill into a location of wind turbines and



□ The Firstly Built Energy Mountain in Hamburg

PV as well as a public park , have been realized in close cooperation with local people and will be continued.

↘ Experience and Inspiration

1. Low-carbon Buildings based on Technology Optimization

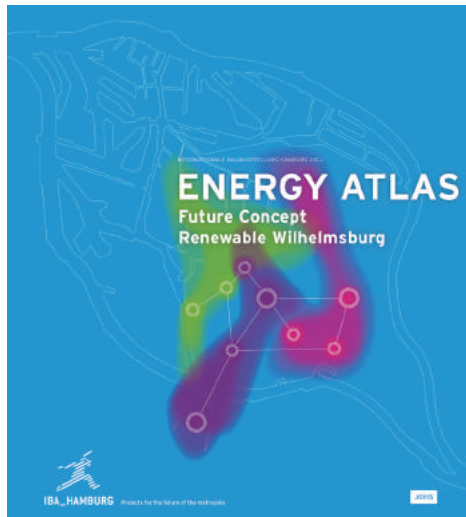
The core of the low-carbon city and society is low-carbon technology. We shall focus on the research & development and application of low-carbon technologies. Specifically, high-tech strategy shall be undertaken with certain mature high technology as the breakthrough making a new example of

development, and such strategy shall be upgraded as policy to lead the low-carbon development of the entire industry and region.

The prevalence of low-carbon office building in Europe is attributed to the guidance and promotion of governments. At the very beginning, the government actually did not enforce any policy or law to regulate the specifications of low carbon technology. Instead, they gradually enhanced the industry entry barriers after being approved by the public affairs ministry, private organizations and citizens. For this end, the government and companies have spared no effort to make investment in new low-carbon



□ Citizens participate in the International Building Exhibition (IBA) Hamburg programs



Energy Atlas IBA Hamburg GmbH

technology.

In brief, low-carbon urban development in Germany is to build urban image, local identification and national cultural capital through “earth-friendly” clean technologies. A high-tech industry benchmark is established to foster an urban environment attractive for global investment capital, offering numerous opportunities of development and revival for enterprises, cities and nations against the global economical recession.

2. Ideally-planned Low-carbon Development

Due to the shortage of capital and technology, most cities choose the development of demonstrative low-carbon community and low-carbon industry park to gradually advance low-carbon development. However, in terms of requisites for the establishment of a low-carbon city, the reduction of carbon dioxide emission is a complex systematic project, and for an effective implementation, low-carbon development must be multidimensional and shall be integrated into all aspects of urban development. Otherwise, the costly green technology and products may be swamped and crowded out by rudimentary technologies. In this sense, the ideally-planned low-carbon development represented by Hamburg’s new district can foretell a good achievement, though abundant capital, technology support and long-term investment are needed.












Sweden

□ Cityscape of Linköping

/ Linköping / Carbon Neutral 2025

Linköping has a bold goal: to become an absolutely carbon neutral city by 2025. The city council's road to that goal was launched through broad-based collaboration and partnership with residents, employers, universities, other cities and national and international

networks. The municipality has sought to lead by example: it uses renewable fuels (over half of its vehicles use biogas); it specifies climate criteria in its procurement processes; it regularly communicates climate and environmental issues to its employees and residents;

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-  Name of City: Linköping
 -  Name of Country/Region: Sweden
 -  Geographic Region: North Europe
 -  Population: 150,202 (2013)
 -  Surface Area: 1,436 km²
 -  Population Density: 130 people / km²
 -  GDP per capita: USD 54,240
 -  Title or slogan of the Initiative: Linköping
Carbon Neutral 2025: Concept Revival
 -  Start Date of the Initiative: 1990s
 -  End Date of the Initiative: in the process to
2025 to realize of carbon neutral
 -  Thematic Area: Society, Environment,
Governance/Management
-

and it works closely with Linköping University to develop methods and technologies to reduce CO₂ emissions and to establish a Biogas Research Centre. Two new combined heat and power plants have been built, with 95 percent of homes already connected. Buses are fueled by biogas produced from livestock manure and food waste. The results are already emerging: CO₂ emissions are down by 25 percent since 1990, energy consumption in schools and hospitals have been reduced by 5 percent and are on a trend for further reductions.



▾ Background of the Initiative

Linköping Municipality has a long tradition of pro-active climate and environmental work. In 1993, a cross-party group was established to develop a local *Agenda 21* plan, resulting in the “Plan of Action for a Sustainable Linköping in the Long Term” in 1998. In 2011, the Municipal Council adopted its long-term climate goal to make Linköping a carbon-neutral community by 2025.

For the urban area, this goal is based upon the long-term climate and environmental strategy that has been an important part of the municipality’s political ambition since the 1970s. Reflected in all policies, it acts as the basis for a number of policy documents. The Municipal Council has therefore adopted a range of programmes for environmental development:

- ◆ Long term strategic plan for sustainable Linköping
 - ◆ General Plan for Physical Planning including Traffic Strategy
 - ◆ Climate Strategy to Reduce Greenhouse Gas Emissions
 - ◆ Nature Conservation Programme to Preserve and Promote Biodiversity
 - ◆ Action Programme for Improved Air Quality with Special Focus on Particulates
 - ◆ Waste Management Plan based



□ Urban Public Transportation in Linköping utilizes the methane from livestock manure and dumped food

on the EU’s “Waste Hierarchy”

◆ The collaborative contribution of local government departments, residents (over 2000 residents assisted in the formulation of *Agenda 21* plan) and local businesses as the key to achieve the climate goal.

▾ Implementation of the Initiative

1. Energy

Municipal Council collects food waste as the primary supply for producing biogas, which acts as the power source for city buses and the bio-fertilizer can be used to produce organic food. Most of the gas, produced mainly from livestock manure, industrial food waste and slaughterhouse waste, fuels the city’s 70 public transport buses. Garbage trucks and approximately 1,000 other vehicles

also run on the gas. The Council works closely with Linköping University to develop methods and technologies to reduce CO₂ emissions and to establish a Biogas Research Centre. Two new combined heat and power plants have been built, with 95 percent of homes already connected. In 2012, the Municipal Council introduced sorting at source for domestic food waste. Placed in a special bag that is separated from other fractions by an optical sorting process, food waste is a substrate for biogas production and agricultural bio-fertiliser. 80% households sort food waste at source.

2. Sustainable Housing

The Environmental and Quality Programme for Vallastaden designs a footpath and bicycle path convenient for travelling. For climate issues, routine communication and advertisement with employees and residents have been conducted. They offer free advice for house owners, undertake mobile management, make energy survey and advice for local enterprises, and hold contests for children and adolescents on energy and climate knowledge.

3. Local Economic Development

Östra Valla, a former industrial area, is earmarked for sustainable redevelopment. There will be residential premises here, but primarily Östra Valla will be a business incubator for small and medium-sized enterprises and serve as a platform for entrepreneurship and innovation, and a testing ground and demonstration area for sustainable solutions in environmental technology.



□ The well-designed Cycle Track in Linköping makes it convenient for people to go out

↘ Effect and Challenge

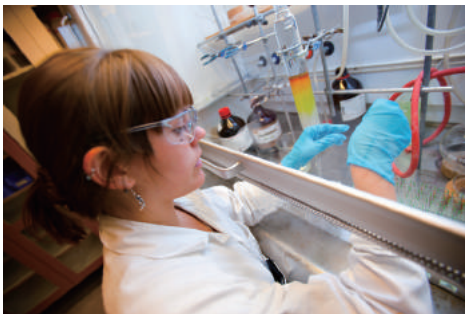
1. Effect of the Initiative

The long-term climate and environmental initiatives have had many positive effects:

- ◆ Annual waste per capita waste has



□ Citizens in Linköping classify the kitchen garbage



□ Enterprises have close cooperation with the universities to develop the new technologies and measures to reduce the CO₂ emissions

fallen from 305 kilos to 208 kilos since 1992

- ◆ Waste fractions sorted at source and collected from households as paper, plastic, metal, batteries, light bulbs and electronic equipment have increased

- ◆ Nitrogen and phosphorus

emissions from treated wastewater have decreased by 60% and 35% respectively since 2001

- ◆ Nitrogen dioxide concentrations in urban environments have fallen from 29 $\mu\text{g}/\text{m}^3$ to 8 $\mu\text{g}/\text{m}^3$ in the air since the late 1980s

- ◆ The number of kilometres driven per vehicle/year has decreased from 13,000 to 12,000 km over the past 10 years

- ◆ 50% increase in new “green car” registrations

- ◆ 56% of all the electricity used is produced locally from renewable sources and in a climate efficient way

- ◆ 25% reduction in CO₂ emissions between 1990 and 2010

2. Challenge of the Initiative

First, garbage classification, including the sorting of food waste in households, takes a long time to be widely accepted in the entire society. To advertise such environmental concept and deeds, it needs the contribution of manpower and resources of the government, primary and secondary schools and local resident administrations. Meanwhile, the government fund is also required to boost the advertisement, making sustainable development concept rooted in people’s mind.

Second, companies, especially those

technology-based companies of waste treatment and energy supply, need the financial support of government and the technology support of institutions at their preliminary development stage. Otherwise, if too much time and manpower of their own are spent in the preliminary stage, their productivity and market share may be impaired, thus damping their initiative of performing

green innovation and sustainable development.

Practice and Innovation

1. Progressive Innovation

The most important factor behind the success of Linköping's climate and environmental work is the combination of



□ The basic facilities like the gas pipeline in Linköping develop well and there are five public gas-filling stations

a long-term approach, a highly innovative driving force, broad-based collaboration and high political consensus, in which areas Linköping leads Sweden and even the world. Collaboration and partnership with residents, trade and industry, other municipalities, universities, authorities and national and international networks has high priority in Linköping's sustainability efforts.

2. Characteristics

In close cooperation with Linköping University, this project is featured by the reduction of carbon dioxide by developing technology and processes.

Highlight

In 1997, one of the world's largest facilities for producing biogas for vehicle fuels opened in Linköping. Most of the gas, produced mainly from livestock manure, industrial food waste and slaughterhouse waste, fuels the city's 70 public transport buses. Garbage trucks and approximately 1,000 other vehicles also run on the gas.

Biogas, a renewable fuel, currently supplies 6% of Linköping's vehicle fuel needs. The infrastructure is well developed with gas pipelines and five public gas filling stations. This



□ Tekniska Verken, a public serving company own methane production factories and gas-filling stations in many municipal districts

large-scale investment has attracted two biogas companies active in the Swedish and international markets to Linköping, thus becoming a regional hub for the development of biogas. The utility company Tekniska Verken owns production plants and filling stations in several municipalities.

In 2012, the Municipal Council introduced sorting at source for domestic food waste. Placed in a special bag that is separated from other fractions by an optical sorting process, food waste is a substrate for biogas production and agricultural bio-fertilizer. 80% of the households sort food waste at source.

The Environmental and Quality Programme for Vallastaden was approved in 2013. Vallastaden's first

450 apartments, reflecting ambitions for resource efficiency and social sustainability, are scheduled for completion by 2017. This unique area is conceived as an eco-village; everything is within easy reach and social interaction is stimulated by making it simple to move around on foot or by bicycle. Central road space is reserved for a car park. Infrastructure for charging electric vehicles will be in place throughout. In a unique solution to the challenge of minimising the space needed for utility infrastructure, all electric cables, fibre optics, district heating, water, sewerage and vacuum waste collection systems are bundled in a single, prefabricated culvert (2.5 metres in diameter). Cables and conduits are prefabricated so the

infrastructure is 100% recyclable. Space-saving culverts mean plot ratio can be increased. Also, subsequent servicing of utility infrastructure will not require excavation work that disturbs the environment or consumes resources unnecessarily.

Vallastaden lays the foundations for building tomorrow's society. Throughout the entire planning process citizens' dialogues have been held with residents, builders and researchers.

Another innovative initiative is Östra Valla, a former industrial area earmarked for sustainable redevelopment. There will be residential premises here, but primarily Östra Valla will be a business incubator for small and medium-sized enterprises and serve as a platform for



□ Long-term Strategic Sustainable Development Plan of Linköping



□ The cooperation among the government, enterprises and universities in Linköping promote the sustainable development and innovation

entrepreneurship and innovation, and a testing ground and demonstration area for sustainable solutions in environmental technology.

▾ Experience and Inspiration

1. Acceleration of the Development and Utilization of Renewable Energy and Adjustment of Energy Consumption Structure

Since 2001, Linköping has made various classifications of rubbish and constantly improved its ability of waste recycling, including the degradation of kitchen waste into biogas, and the

incineration of unrecyclable wastes into fuel energy. This eliminates the impact of urban waste management upon the environment, and decreases the dependence of urban public transport on chemical fuel, making a win-win situation.

2. Advance of the Innovation in Sustainable Development Sector through the Cooperation Mode of “Government + University + Enterprise”

Linköping takes the operation mode of state-owned enterprise. That is, the government makes investment to build facilities and renovate massive waste incineration and biochemical treatment



□ The diversified garbage classification can become the lifestyles and cultural tradition for the common citizens



Technology is changing our life

facilities, which are then handed over to solely state-owned company Tenkniska Verken for operation. In terms of technology innovation of waste classification and treatment, Linköping established a municipal Environmental Center co-funded by the government, university and enterprises, which serves as a scientific research platform based on mutual help for waste treatment companies and research organizations, making the waste treatment technology of Linköping forerunning in Sweden. A proof is that the city is sufficiently capable of receiving the waste of other countries like Britain to both make money out of treating their wastes but also supply enough fuel for heating in cold winter.

3. Improvement of the Utilization Efficiency of Energy

The most important energy source of Linköping is two combined heat and power plants which generate electricity and supply centralized heating very efficiently. Centralized heating started from 1954. Now 95 percent homes are already connected with the centralized heating system. The most distinctive feature of Linköping energy supply is resource efficiency, and its energy system can be listed among the most energy-efficient systems in the world. The energy in households and commercial wastes are reused in cogeneration plant to produce heat and power for most of local needs.

4. Making Waste Sorting a Lifestyle and Tradition of Common People

As the education in childhood and adolescence is extendable for the whole lifetime, the integration of a right development value into their elementary education can both help establish the sustainable development ethics deep into their mind for a lifetime and influence their parents and the whole family lifestyle. This is a best advertisement mode for sustainable development, low-carbon development and green development.





**Asian-
African
Line**

China



□ Hangzhou and the West Lake integrate in harmony

/ Hangzhou / Urban Public Bicycle Sharing Program

With 80 percent of residents and commuters identifying a serious traffic problem in the city, Hangzhou launched China's first public bicycle project. Serving some 280,000 passengers daily, the system (free for the first hour) complements the city's extensive bus

system. Run by the newly-formed Hangzhou Public Bicycle Development Company, it represents a model of government-led enterprise, claimed to be the world's largest bike-sharing program that doesn't require government funding beyond initial capital. Beyond fees on



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-  Name of City: Hangzhou
 -  Name of Country/Region: People's Republic of China
 -  Name of Province or State: Zhejiang
 -  Geographic Region: Asia Pacific
 -  Population: 7,969,500 (2012)
 -  Surface Area: 16,645 km²
 -  Population Density: 479 people / km²
 -  GDP per capita: RMB 113,063
 -  Title or Slogan of the Initiative: Urban Public Bicycle Sharing Program
 -  Start Date of the Initiative: March, 2008
 -  End Date of the Initiative: in the Process
-

bike use (imposed after an hour of use), the company raises significant private funds through selling advertising space on the bike docking station kiosks. A key feature is that partnerships provide technology supports and improving recommendations. .

Background of the Initiative

In recent years, with the rapid social and economic development and the acceleration of urbanization, the increasing urban population has resulted in a rising demand for outdoor trips year by year. In spite of more investment by local governments, the urban construction still lags behind remarkably the public demands for urban traffic resources. The pressure of urban traffic keeps growing to give rise of the problem of “Two Difficults” in urban traffic (“difficult to drive” and “difficult to park”).

In order to relieve the traffic congestion and reduce the public travel costs, the CPC Hangzhou Committee and Hangzhou Municipality have given strong policy support to bus companies and financed them on the basis of their service quality. After years of effort, public transport in Hangzhou has made great progress in facilities such as vehicles and service quality, taking a leading

position in public transport in China. The passenger share ratio of Hangzhou's public transportation increased to 22.2% in 2007 from 7.8% in 1987, making great contribution to the social and economic development of Hangzhou. Nevertheless, a survey conducted by local organizations indicates that 80% of the interviewees are still unsatisfied with the current traffic situation of Hangzhou and 84.74% of them think the traffic congestion has lowered their life quality. Such public opinions thus make a new way of convenient, economic, and safe public transportation extremely urgent. The CPC Hangzhou Committee and Hangzhou Municipality started to plan a public bicycle program in March, 2008, which was for the first time in China, so as to alleviate the “Two Difficults” problem in urban traffic.

Implementation of the Initiative

1. Planning and Preparation

(1) The Founding of Hangzhou Public Bicycle Service Development Company (in 2008)

Coordinated by Hangzhou Public Transport Group Co., Ltd., the CPC Hangzhou Committee and Hangzhou Municipality established Hangzhou



□ Citizens and travelers cycle along the beautiful West Lake

Public Bicycle Service Development Co., Ltd. (abbreviated as “Hangzhou Public Bicycle Service”) in April, 2008. The company is responsible for the total construction, operation and service management of Hangzhou's public bicycle system, introducing the practice of free rent within one hour and staged rent beyond one hour. The first row of 61 public bicycle service outlets was open to the public in May 2008 and a total of 2800 public bicycles were put on trial.

(2) Making Long-term Public Bicycle Development Planning (2008 to 2010)

The CPC Hangzhou Committee and Hangzhou Municipality developed the Opinions on Strengthening Construction and Management of Public Bicycle System and Opinions on Further Practice of Preferential Development Strategy of

Public Transport and Building of “Quality Public Transport” in 2008 and in early 2010 respectively. According to the Opinions, the 1st-stage of the construction program would be completed at the end of 2009 with up to 1,000 renting outlets in main urban districts of 50,000 bicycles. By 2010, the public bicycle system should be extended to Hangzhou Economic & Technological Development Area (Xiasha District), Hangzhou Hi-tech Development Zone (Binjiang District), Xiaoshan District and Yuhang District. By 2012, the system should cover all five counties with a total of 60,000 public bicycles from 2,400 renting outlets, of which the

central area of these five counties should afford 200 to 400 public bicycles from 10 to 20 outlets. By 2015, the number of public bicycles in Hangzhou should total up to 90,000 and the outlets reach 3,500, of which the central area of these five counties should be home to 500 public bicycles from 25 outlets. It is planned that there will be 175,000 public bicycles at least in Hangzhou and the sum is expected to be 200,000 if possible.

(3) Exploring the Sustainable Development of Public Bicycle (in 2009)

To ensure the sustainable development of public bicycle, at the very beginning, the government has put forward a plan



Public Bicycle Serving Spots in Hangzhou

of financial support to infrastructure construction of the system and the rest of costs should be covered by enterprises so as to reduce the financial pressure of the government. However, the government will give preferential policy on trial, including the commercialization and the development of service outlets. The model of “public financing and corporate management” lays a sound foundation for the sustainable development of Hangzhou public bicycle system.

2. Coordinated Participation

(1) The governing authorities at all levels, including Hangzhou Urban and Rural Construction Commission, Hangzhou Urban Planning Bureau and Hangzhou Municipal Commission of City Administration and Law Enforcement, provide great support to the development of service outlets.

Hangzhou Urban Planning Bureau laid out the plan of service outlets and developed the plan connecting the public metro system. As for those places where public bicycle service outlets are to be placed, according to the urban planning, Hangzhou Construction Committee requests the designers to specify the land for public bicycles in the engineering designing and pre-empt the space for the development of public bicycle system when examining projects such as stations,

large recreational areas, large residential quarters, scenic spots and sports venues. Hangzhou Municipal Bureau of City Administration is responsible for the coordination among departments such as traffic police, civil affairs and sub-district administrations, the collection of public opinions on site location and the coordination work of site location, providing its support to the early construction of the public bicycle system.

(2) Hangzhou Public Bicycle Company, a subordinate to Hangzhou



□ Lingerin Charm of the West Lake Bathed Under the Spring Dew

Public Transport Group, is in full charge of the project.

Since its establishment, Hangzhou Public Bicycle Company has been engaged in continuous innovation in service, management and operation under the great support from the local governing authorities at all levels. Based on the high technology, it has been continuously improving the quality of the system by developing general planning, giving standards, creating new models, optimizing services and exploring

potentials. At the early stage, there were only 61 outlets with 2,800 public bicycles and the highest daily rent times are about 5,000. After six years of development, the system boasts 3,111 outlets with 78,000 public bicycles by July 2014, making the plan of the distance of 300 meters for every single outlet. The highest daily rent of bicycles reached 411,400 times and the accumulated quantity for the past six years up to 410 million times. The ratio of public free use is 96% and the survey shows 95.09% of the public





□ The serving spot of east railway station in Hangzhou is the first one to utilize the turnstile facility in China

are satisfied with it.

3. Resource Utilization

(1) Financial Source: Stable Financing Through Municipal Supporting Funds

At the time of the establishment of Hangzhou Public Bicycle Company in 2008, the CPC Hangzhou Committee and the Hangzhou Municipality proposed to support the infrastructure construction of public bicycle system with public investment and all the other resources and the advertisement and service outlets should be developed by enterprises for free while the income should be used for the operation of the system. Meanwhile, the central and local governments also arranged great financial supports for green energy characteristics of the public bicycle system, and Hangzhou Municipal Bureau of City Administration also

exempted and reduced the cost of road occupancy for the renting outlets, which greatly reduced the operating costs.

(2) Technical Support: Cooperating with Colleges & Universities to Improve Intelligent Management

Through cooperation with colleges & universities such as Hangzhou Dianzi University and Zhejiang University of Technology, and by means of data analysis, we have developed systems for smart bicycle scheduling, rent management and system to identify possible mechanical failure to achieve the intelligent management of the public bicycle system and provide technical support for the challenge of “difficult to drop off” and “difficult to repair”.

(3) Human Resources: Colleges & Universities, Communities and Social Elites Participate in Voluntary Activities

According to the agreement jointly

signed by seven colleges & universities, including Zhejiang Gongshang University and Hangzhou Public Bicycle Company, the Collegiate Volunteer Service Center for Public Bicycle System will be set up with volunteers participating in cleaning and maintenance of public bicycles, promoting green travel concept, and guiding and encouraging green travel. With the promotion of voluntary services and the scale expansion of public bicycles, all kinds of communities, middle schools

and primary schools are now active in voluntary activities.

Effect and Challenge

1. Effect of the Initiative

Since the traffic service system of public bicycles in Hangzhou was put into operation, through analysis on the public reaction it can be concluded that the results are far beyond the original intention



□ Citizens and travelers cycle along the beautiful West Lake

of solving the problems of “the last kilometer after bus travel” and relieving the two problems of “the urban traffic”. Certain outcomes have been achieved, such as in promoting energy conservation and emissions reduction, constructing low carbon cities, advocating green travel, improving the urban grade, advancing the city image and improving the physical quality of the citizens.

(1) Integration with the public transport system of the city basically solves “the last kilometer after bus travel”. Through the positioning of public welfare of bicycle transport system along with technology, the autonomous service of renting a public bike at one place and returning at another has been realized, which is combined with the existing public traffic system. At present, analyzing from the situation of public bicycle rental, the lease area has been transferred from scenic areas to urban areas and renting period also begins to focus on travel peak in the morning and evening (accounting for about 45% of daily rents), suggesting that public bicycle rental has transferred from the initial visit in the scenic spot to the normal travel. It is proved from this change that traffic system of public bicycle can solve the problem of “the last kilometer after ‘bus trip’”.

(2) To further improve the share rate of the bus trip and alleviate the “two difficult” of urban traffic

Combine the favorable terms of public bicycle rental with bus trip to attract more people to choose buses and improve the share rate of bus trip. At present, the highest day rent amount of public bicycle is up to 411,400 times with an accumulative total rent amount of more than 410 million times in six years. The share rate of bus trip is increased further, which plays a certain role in reducing the



□ Seeking Dreams in the North Street

pressure of urban road traffic, improving road traffic conditions and easing the two problems of traffic.

(3) To advocate green travel and promote the development of urban low-carbon economy

According to statistics in 2013, the annual average daily rent amount was 282,800, the average rent time 33.6 minutes and the average trip distance about 3.0-5.0 km, which could save 12,600 tons of standard coal and reduce 34,200 tons of carbon dioxide emissions

compared with bus trip; and save 50,900 tons of standard coal and reduce 137,400 tons of carbon dioxide emissions compared with sedan cars. If each car carries two persons on average it means that 141,400 cars are decreased every day. And the fuel charge saved in a year is equivalent to all the investment of the government for public bicycles and it is incalculable for the demonstration of city ecological construction and guidance effect.

(4) Public travel should be convenient and reduce the cost of public transportation

The traffic service system construction of public bicycles in Hangzhou through scientific and technological innovation has effectively reduced the system running costs, has reduced the trip cost of hirers to an extreme and carried out a policy that citizens can rent public bicycles for free in an hour after getting off the bus. According to statistics, more than 96% of the public bicycle rental has been free since this system was released. At the same time, the company also associated the favorable terms of free rent for public bicycles with conventional public bus trip and formulated a measure that the free time transferred from regular bus to public bicycle is extended to one and a half hours so as to attract more and more





□ Happy Public Bicycle Riding Activity in Hangzhou

people to choose bus trip.

2. Challenge of the Initiative

In the process of practice we have come across five major problems, namely “difficult to distribute”, “difficult to return”, “difficult to react”, “difficult to repair” and “difficult to manage”.

(1) Difficult to distribute

The outlets of public bicycles in Hangzhou are all on sidewalks. Because of the limited urban road resources, the outlet distribution gradually became a

problem. To find a solution, the local government adopted a method of planning in advance and had put the public bicycle space into consideration in the early years of urban rail transit and the newly-built community planning.

(2) Difficult to return

As the public bicycle project became widely recognized, more and more people are dedicated to low carbon travel and therefore the riding time has been concentrated on the peak time in the morning and evening. Because of

the systematically unattended operation and renting at one place and returning at another and the peak “tide” in the morning and evening, a problem of “difficult to return” came into being. To solve this problem, people are assigned to the manual service in more than 100 service outlets to help customers rent and return bicycles and at the same time, the information technology is applied to establish a real-time dynamic scheduling management mechanism to strengthen the vehicle scheduling, and a mobile phone APP was developed to guide people to return bicycles to the nearest place.

(3) Difficult to react

Of the 3000 plus outlets only some 100 have been staffed with people on duty, so people who have problems in the process of bicycle rental cannot get direct and quick response. What they can do is merely consult with the hotline for help and such a way of reaction has negative affection on efficiency. To improve it, the company has opened an official website, upgraded the hotline platform and opened SMS and Wechat platform to strengthen the communication with citizens to improve the reaction.

(4) Difficult to repair

Along with the increasing dependence on public bicycle, as well as the rising frequency of use that causes continuous damage of these bicycles,

“difficult to repair” has become a major problem in operation. To find a solution, the company appoints maintenance staff at the service outlets to repair and maintain bicycles, resets the bicycle after being dismantled that has been used for a certain fixed number of years, makes industrial improvement and improves the quality of the bicycles.

(5) Difficult to manage

Most of the public bicycle projects in other cities are supported by the long-term fiscal subsidies from the government. It brings a great burden to the government when the system completely depends on the fiscal subsidies at the same time. However, the system in Hangzhou adopts a model of “government invests and companies manage”. After the government completes the disposable investment of construction funds, the company through the marketing operation meets the public welfare demand. That is the major innovation for the public bicycle system in Hangzhou, but how to maximize the use of existing resources becomes a difficult problem troubling the company. For this problem, in 2010 Hangzhou Public Bicycle Service allowed, through public bidding, the 1035 booths, tents and the 50,000 bicycles to be coated with advertisements at a price of 28 million RMB per year (an average annual increase of 10%). Meanwhile, the

service pavilion increases the construction of commercial services such as tourism consulting, selling beverages and packaged food, and selling lottery tickets. It also served as registration sites for car training, achieving a goal of “one pavilion with multi-purpose”, and the advertising is put on the service pavilion to raise more funds. In 2011, the financial report of the public bicycle system showed the basic balance and thus laid a foundation for sound operation and sustainable

development of this system. On this basis the company continues to be innovative in management in 2014 by developing Yinting in cooperation with banks and exports their service to other domestic cities to increase revenue.

Practice and Innovation

1. Revolutionary Innovation

The Program, to some extent, is



□ Melted Snow Mirroring the Three Pools

revolutionarily innovative. Borrowing the idea from Paris, Hangzhou Public Bicycle Company has not ever been to France or had any email exchanges at the early stage. The company merely downloaded pictures of Paris' public bicycles from the Internet and then independently developed "YAO Guofang" lock device with many national patents and Hangzhou Public Bicycle Intelligent System and changes the means of travel of many Hangzhou citizens. Ten riding routes are promoted to provide a more leisure travel to visitors who can ride to visit the West Lake and ten old City Gates. Meanwhile, the development scale, service modes and results achieved in the later period go beyond those of many cities in the world. According to the "Activity Time", an American Professional Outdoor Activity Website, analysis and contrast have been made on public bicycle programs of 553 places around the world in Oct. 2013, and the comprehensive scores based on six criteria made Hangzhou the top one among the 16 places with the highest scores.

2. Characteristics

Hangzhou public bicycle innovation program is originated from Paris yet it only borrows its concept of "Public" and makes improvements on specific management, service and operation

based on the Chinese characteristics. The innovation program has formed its unique characteristics and Hangzhou characteristics in target, system, construction, management, operation, technology, policy, etc.. Playing a leading role in the program, the government sets up professional teams based on the public transport and guarantees the non-profit service by means of commercialized operation of resources, laying a foundation for sound operation and sustainable development of the public bicycle service system. This system is recognized as "the Hangzhou Model" by the peers and the media at home and abroad and has a broad influence.

Highlight

In recent years, the project of sharing public urban bicycles has been promoted in a growing number of cities and most cities have achieved excellent results in the promotion; However, most of the successful cases tend to be based on the unlimited financial investment of urban government at sectors. Although, to a certain extent, it alleviated the urban traffic congestion and improved the urban air quality, it also can be seen that with the expansion of projects and aging of facilities, government need to invest more

and more, resulting in heavier and heavier burden, which will eventually restrict the quality of the urban public bicycle project in the promotion. Take the public bicycle system in Wuhan for example. To reduce financial stress when promoting the public bicycle project, the local government fully delegated the right of management of the public bicycle project to the local private enterprises. In the absence of government leading, enterprises pursue profits blindly, making the “Wuhan model” of public bicycles paralyzed and reformed in April, 2014, thus giving rise to the loss of state-owned assets.

The business model of public bicycle in Hangzhou completely avoids the above problems. After the government makes a one-off financial input to public bicycle infrastructure, it mainly administrates from planning and regulations while

enterprises are oriented by public welfare. The rent is basically for free and the ratio is over 96%. Being market-oriented, it transfers the right of management of service booths and advertisement on bikes to the private sectors and explores to establish kiosks. The operation income is spent for system maintenance, labour costs and vehicle maintenance. After realizing a basic balance in 2011, they gradually make earnings, without spending a penny from taxpayers any more.

Experience and Inspiration

1. Government Leading, Scientific Planning

Hangzhou Municipal Government integrated the cycling lanes into its urban



Public Bicycle Sharing Facility

transportation planning and accelerates its construction in parallel with the construction and transformation of urban roads and riversides improvement. In addition, the government made a one-off investment in the infrastructure and new bicycles and entrusted Hangzhou Public Bicycle Service Development Company for implementation. The company operates by itself and affords the costs for labour, vehicle and system maintenance. The government supervises and supports in terms of planning and policy, etc., scientifically distributing the outlets, strictly authorizing and regulating other commercial bicycle renting, and prohibiting bicycle renting if it occupies the public resources like roads.

2. Advanced Technology, Regulated Management

The public bicycle system in Hangzhou operates in three layers, containing six functional modules like renting, network, monitoring, etc., 14 sub-systems and 3 affiliated systems. It applies IoT technologies integrated with FRID, ICT, automatic control and search, management, account settlement, etc. to support the systematic operation, including developing lockup device,

computer management system, database management system, IPC management system, monitoring system and identification system. These measures offer not only self-service for people to rent bicycles, but also effective system management, realizing the concept of “no one on duty, self-service, renting at one place and returning at another, convenient and smart”.

3. Non-profit Position, Market-oriented Operation

The public bicycle system in Hangzhou is regarded as a public product and thus gains a special fund for its own construction. Citizens could rent bicycles for free within one hour and this preferential policy extends to the transfer between bicycle and bus trips within one and a half hours. This measure attracts more people to take the bus, which reduces the running cost for the company and the transportation cost for renters to the largest extent. To guarantee its sustainable development, the public bicycle program turns to market-oriented operation, making full use of advertisement on bikes and service booths to realize the maximum interest, so as to reach a financial balance.



Korea








□ Kwangju City Hall

/ Kwangju / Greenhouse Gas Emissions Program in Household Carbon Bank in Gwangju

Can a government-initiated program to spark voluntary carbon-saving steps by citizens actually generate significant returns? Gwangju's Carbon Bank system

indicates a strong “yes.” Initiated in 2008, it has expanded participation by some 330,000 households, representing 1.5 million Gwangju citizens, accounting

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-  Name of City: Kwangju
 -  Name of Country / Region: South Korea
 -  Geographic Region: Asia-Pacific
 -  Population: 1,477,780 (2014)
 -  Surface Area: 501.24 km²
 -  Population Density: 2,900 people / km²
 -  GDP per capita: USD 24,520
 -  Title or Slogan of the Initiative: GHGs Emission Program in Household Carbon Bank in Kwangju
 -  Start Date of the Initiative: April 10th , 2008
 -  End Date of the Initiative: 2012
 -  Thematic Area: Environment
-

for 62 percent of the city's population. While the city paid for educational and operating costs, a Green Star Network was responsible for implementing the education and promotion activities. Greenhouse gas emissions have decreased each year, most recently by 135,000 tons.

Background of the Initiative

In Kwangju, more than 40 percent of all greenhouse gas emissions come

from non-industrial sectors, including emissions from home and business. It is an urgent need for Kwangju to reduce greenhouse gas emissions from households. In addition, in terms of greenhouse gas emissions, the non-industrial sector is more likely to succeed than the industrial sector, which also shows the urgent need to implement an effective project of greenhouse gas emission reduction in local area.

In order to transform public awareness and induce the public to actively participate in greenhouse gas reduction activities, Kwangju signed a climate change model city agreement with the Ministry of Environment on April 10th, 2008, with the target of reducing greenhouse gas emissions to 10 percent (66.1 tons) that of 2005 (661.5 tons) by 2015. The city also introduced the "carbon bank system". "Carbon bank" is a system that pays for participated families the points which are converted by the amount of reduced carbon dioxide due to the saving energy (electricity, gas and water supply Lines). This system can reduce the cost of water and electricity by energy conservation; Families can also get bonus points; The earth can be healed, as well. They can be regarded as "killing three birds with one stone" effect. "Carbon Bank" points are compared with the average amount of the same period

within the previous two years. The energy savings of the current year are converted into points, and the Kwangju Bank would pay to carbon green card issuers once a year.

▾ Implementation of the Initiative

1. Planning and implementation

In order to build a model city which can adapt to climate change, Kwangju introduced the carbon bank system. Carbon bank system calculates the reduced carbon dioxide emissions through spontaneous energy saving behaviors within the family (including electricity, city gas or water, etc.) and converted them into points. Points will then be returned to the involved families. Each household can reduce certain fees according to the number of points. Kwangju Bank issued the carbon green card to participated families, which is used to record points. Kwangju carbon bank project is an innovative environmental policy.

By taking advantage of the carbon bank system, Kwangju is able to analyze and evaluate the reductions of greenhouse gas emissions each year and can constantly promote the development of the system through continuous monitoring.



□ Wonhyosa Temple is located under the Wonhyo Peak, the northern foot of Mudeungsan Mountain in Kwangju

2. Multilateral Collaboration

Kwangju is responsible for the operation of carbon bank system. 62% of the families in the city have participated in the Carbon Bank project. Kwangju Bank offers points to participated families while the data is provided by the three institutions (Korea Electric Power Corporation, Kwangju water company, Hae Yang city gas company). “Green On” Alliance (including 31 non-governmental organizations) is responsible for the promotion and publicity of the system. In addition, local organizations, including local community Leaders Union, Saemaetul Women’s Union and carbon



emissions coordinating organizations, all encourage residents to actively participate in the project.

From 2008 to 2012, the Kwangju Bank is responsible for the cost converted through points in the carbon bank project. Kwangju is responsible for system

management and operation. The city takes the responsibility for promotion expenses, and “Green On” Alliance is responsible for concrete implementation of promotion and publicity. Since 2012, the Ministry of Environment, Republic of Korea (50%) and Kwangju (50%) takes charge of the cost of conversion points.

Effect and Challenge

1. Effect of the Initiative

Domestic greenhouse gas emissions can be effectively reduced by the Carbon Bank project which has been widely promoted by local governments worldwide. In Korea, the banking system has laid the foundation for the country's carbon point system.

Carbon Bank system allows Kwangju to become a “carbon neutral city”, adapting to climate change, which is



□ The Sparkling Kwangju River



□ Classified Waste Collection of Kwangju Residential Areas



□ According to the point system of Carbon Bank, Kwangju residents use the facility to separate the kitchen garbage

also a global trend to local governments. The system allows Kwangju citizens to enhance their ability of adapting to climate change. The operation manner of the system also consolidates the cooperation between organizations, which jointly promote urban development. In the end, the flow of carbon points has undoubtedly stimulated local economic development.

2. Challenge of the Initiative

Carbon Bank project encourages active participation of local residents. Initially, many local residents have not realized the importance of adapting to climate change, so it is very difficult to attract them to participate. Also, it is a very critical part to make sure that the government can obtain reliable

systematic data. In order to realize that, the government has to obtain personal information of the residents and this also leads to residents' unwillingness of participating.

To solve these problems, Kwangju vigorously promotes the project of carbon bank via television or radio ad, the ad city, metro or bus banners, residential elevators labels, brochures and other forms. These promotional practices through multi-form and major efforts have achieved good results, and the number of local residents to participate in the carbon bank project greatly increased.

Another obstacle is to ensure that the project can effectively reduce emissions. The analysis of related data in the year after the implementation of the project has shown that effective results have been achieved in

reducing greenhouse gas emissions.

Practice and Innovation

1. Progressive and Revolutionary Innovation

Carbon Bank system, as a policy is not only progressive, but also innovative. Every year, people would make an assessment of the implementation results and continue to improve it. In 2008, the number of families participating in the project was about 20,000. In five years,

that number has risen to about 330,000 (62% of households in the city), greatly improving the public's participation.

In all families participating in the project, 60% of them have successfully completed their emission reduction targets. Accordingly, greenhouse gas emissions are also reduced year by year. The emission has been reduced by 135,000 tons till now.

The project is also an innovative one. Organizations, responsible for providing the data of family carbon reduction, cooperate with each other closely, so that the project can proceed smoothly.



□ Kwangju World Cup Stadium once served as one of the World Cup stadiums



□ Bustling Night of Kwangju

2. Characteristics

Carbon bank system is managed by a unique approach, with members of the public spontaneously participating in activities adapting to climate change.

The involvement of Kwangju Bank effectively solves the most important issue — financial resources. Kwangju Bank is committed to building “Green Star Network” (including 31 non-governmental organizations). Carbon points are issued through the carbon green card, and such management is first

applied in the world, so this project is very unique. In the process of implementing the project, the cooperation with “Green Star network” is very important, for it can ensure the supply of financial resources. Meanwhile, the annual assessment of the project guarantees continuous improvement of the project.

↘ Highlight

In the process of adapting to climate



Project, which is a trading system, can be extended to non-industrial sectors. The project focuses on collaborative operation to encourage local communities to strengthen communication and cooperation.

Local banks are also involved in the project, creating a “green bank” image, stimulate the local economy and effectively reduce emissions.

Spontaneous participation of the public and effective combination of local resources is an important factor in the success of the project. As all the conditions are ripe, carbon bank project is an important part of urban innovation.

▾ Experience and Inspiration

change, cities play a key role. But those urban projects which can effectively reduce greenhouse gas emissions can be counted. Kwangju Carbon Bank Project is a fruitful public project which encourages citizens to participate in actions of emissions reduction voluntarily.

If a city wants to build a Clean Development Mechanism, the projects regarding reduction of greenhouse gas emission in non-industrial areas are very important. Based on a reliable data system, the Kwangju Carbon bank

1. “I want” Defeats “Want me”

Although Kwangju carbon bank was initiated by the government, it is a project that benefits the people of the city. When implementing the carbon bank project, Kwangju did not push it strongly as it were an administrative order, and instead, the government waited for the public to take the initiative to follow after they saw real benefit, changing from “want me” to “I want”. The implementation of the project greatly reduces the expenses of everyday life of the people, and the people also obtain



□ Time-honored Hwanbyeokdang Pavilion

additional carbon credits concessions. In the implementation process, the representatives of the residents offer their willingness, and they construct after vote; in promotion, the government tended to use flexible promotional tools, such as television or radio advertisement, the city advertisement, metro or bus banners, residential elevators labels, brochures and so on. During the five years from 2008 to 2013 since the implementation of the project, the number of families involved in the project increased significantly.

In addition, Kwangju has appointed a number of “carbon coordinators”, who are assigned to various communities, assisting the implementation of emission reduction. While bringing benefits to the public, the city has also successfully reached the goal.

2. “Multilateral” Defeats “Unilateral”

During project planning and implementation, members of the public consciously participated in decision-

making process. Apart from that, the government also takes full account of the role of civil institutions in formulating policies, changing from “unilateral” to “multilateral”. In this way, the government achieves a great success while also reducing its burden. In addition to the government and the public, parties involved in the project are Kwangju Bank, Korea Electric Power Corporation, Kwangju water company, Hae Yang city gas company, “Green On” coalition (including 31 non-governmental organizations), local community Leaders Union, Saemaeul women’s Union and carbon emissions coordination organizations. During the Five-year period from 2008 to 2012, the Kwangju Bank is responsible for the cost converted through points in the Carbon Bank Project. The city takes the responsibility for promotion expenses, and “Green On” coalition is responsible for concrete implementation of promotion and publicity. Since 2012, they are the Ministry of Environment, Republic of Korea (50%) and Kwangju

(50%) that are responsible for the cost of conversion points.

3. “Extended” Defeats “Closed”

If a city wants to build a clean development mechanism, projects regarding the reduction of greenhouse gas emission in non-industrial areas are very important. Based on a reliable data system, the Kwangju carbon bank project, which is a trading system, can be extended to the non-industrial sectors. In contrast, the carbon bank enjoys great ductility, and can add more content compared to some of the specific policies. As in the original energy saving fields such as electricity, city gas, water, etc., carbon bank continues to include food waste recycling program. In the future, it will be further expanded from the household sector to 315 schools, 36,855 commercial enterprises and 4,280 manufacturing facilities. The system plans to cover all areas except the traffic, and each individual item is included in the system at a low cost.

A white hexagonal label with a black border containing the text 'United Arab Emirates'.

United
Arab
Emirates



□ Abu Dhabi—the International Metropolis

/ Abu Dhabi / Estidama Program

In one of the world's most rapidly growing cities, a new government-mandated program—Estidama (Arabic for “sustainable”) aims at making all new buildings in UAE

more environmentally responsible and sustainable. The program targets energy use reduction of 31 percent, water use saving of 37 percent, and 65 percent construction waste diverted

from landfill. There's a mandatory audit procedure for each project. The rules ran into initial resistance from industry groups that feared increased costs and more difficult project approval. But independent analysis has confirmed that cost increases are negligible.

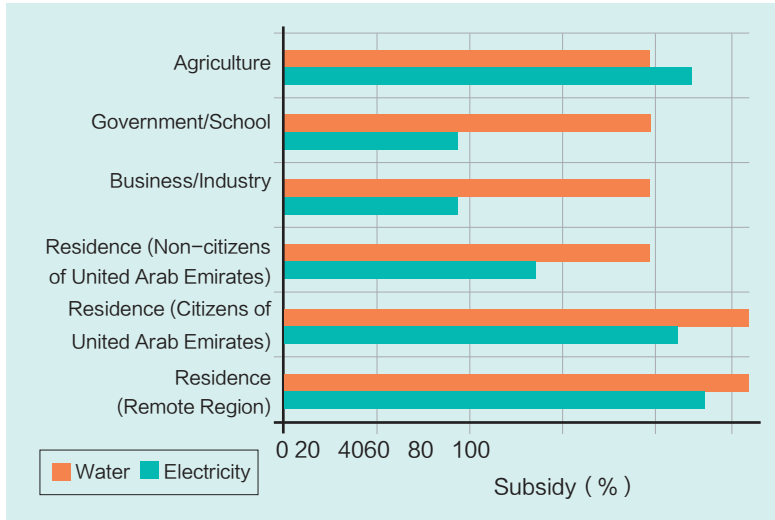
Background of the Initiative

As the capital of the United Arab Emirates, Abu Dhabi has maintained a fast pace of economic growth by tapping into its rich reserves of oil and natural gas, with its GDP per capita amounting to US\$ 49,600. In recent years, the government of Abu Dhabi has launched a series of pro-sustainability programs, which are designed to help build up a new socio-economic development model featuring low energy consumption and sustainability.

Previously, the region followed a predominantly nomadic herding, fishing and pearl diving culture, with date and vegetable plantations contributing to the local economy. Bedouin life, whilst hard and without many of today's material comforts, required little from the land and made little impact in return. Wasting nothing, the Bedouin way of life was truly sustainable, but it is now unadaptable to the needs of socio-economic development in the modern times. Abu Dhabi has undergone a dramatic change in the last fifty years, with the economic rewards from oil and gas reserves propelling it from a backward region into a modern megalopolis today. Despite such extraordinary progress, Abu Dhabi still

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-  Name of City: Abu Dhabi
 -  Name of Province/State: Emirate of Abu Dhabi
 -  Name of Country/Region: United Arab Emirates
 -  Geographic Region: North Africa and Middle East
 -  Population: 2,490,600 (2012)
 -  Surface Area: 972 km²
 -  Population Density: 947 people / km²
 -  GD per capita: USD 49,000
 -  Title or Slogan of the Initiative: Estidama Program
 -  Start Date of the Initiative: 2008 (Mandated 2010)
 -  End Date of the Initiative: in the Process
 -  Thematic Area: Society Economy Environment Governance / Management Technology
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Subsidies provided by the Abu Dhabi Government for the Public Affairs



faces many challenges going forward, most prominently natural and resource constraints.

The first challenge facing Abu Dhabi constitutes a harsh climate and water scarcity. Abu Dhabi Emirate is located in a desert environment and experiences a climate that is extremely hot, and simultaneously humid and arid, for much of the year. Temperatures range from 10-48 degrees Celsius, summer humidity levels are near 100% and average rainfall is less than 100mm/year. Water scarcity is severe – virtually all potable water is desalinated from the Arabian Gulf – and the challenge of providing human comfort, both within buildings and for pedestrians, is extensive. Lack of resource management, from individuals

to businesses, resulted in the UAE having one of the largest carbon footprints internationally.

The second challenge is the huge government operational costs induced by the government's massive subsidies for public utilities. In recent years, the number of government funded projects, which include housing for citizens, represents 72% of all new development. The total cost to government for these projects includes capital and a significant proportion of operational expenditure as a result of the substantial subsidies. Statistics show that the electricity subsidy in residential buildings ranges from 55% to 99% and the water subsidy ranges from 79% to 100%. In this connection, reducing energy consumption and

government spending is a key factor supporting the business case for sustainable development in Abu Dhabi.

To respond to these challenges, the Urban Planning Council (UPC) has developed “Vision 2030”, a plan to evolve the city into a vibrant metropolis with global reach, teaming with world class industry, commerce, education, healthcare, transport and tourism. It represents a holistic framework that enables the implementation of sustainability principles to all scales of development and promotes a new mindset for building a forward thinking global capital. It is the symbol of inspired governance and community

improvement.

The ultimate goal of Estidama is to preserve and enrich Abu Dhabi's physical and cultural identity, while creating an always improving quality of life for its residents on four equal pillars of sustainability: environmental, economic, social, and cultural. This touches all aspects of life in Abu Dhabi—the way we build, the way we resource, the way we live, the choices we make—all in an effort to attain a sustainable state of living. By working closely with all stakeholders, Estidama has already improved the mind-set and implementation practices of the construction industry and will



Urban Climate Sensor Model

continually develop to encourage improvement for all of society.

▽ Implementation of the Initiative

A set of effective working mechanisms and rating systems have been put in place during the implementation process of Estidama Program, as is vividly indicated in the success story of building Masdar City.

1. The Working Mechanism: Multi-party Collaboration

Given its nature of being an extremely complex project, it would be difficult for Estidama Program to be effectively advanced single-handedly by the government or by the private sector. Therefore, from the outset of its implementation, the Urban Planning Council (UPC), as the initiator of the program, has acknowledged the importance of multi-party collaboration.

First, intra-governmental collaboration. As sustainable development bears on the interests of every citizen and involves all governmental departments, it would be practically impossible to make speedy headways in advancing Estidama Program if the

implementation task was undertaken by the UPC alone. In this connection, it was of critical importance for Estidama to win the endorsement at the regional level of Abu Dhabi, which was granted at last. As far as Abu Dhabi is concerned, Estidama Program is in close alignment with “Vision 2030”, so the Pearl Rating System (PRS), the centerpiece of Estidama Program, received Abu Dhabi Government mandate in July 2010, immediately after it was submitted by the UPC as a policy proposal.

Second, collaboration between public and private sectors. Although Estidama Program is able to produce tangible socio-economic benefits in the long term, the enforcement of the compulsory Pearl Rating System inevitably results in a short-term increase of engineering and management costs. Therefore, the government of Abu Dhabi faced a challenge of how to communicate this trade-off between short-term and long-term benefits to the business community in a way that would not discourage their investment in urban construction. In regard to costs, the government of Abu Dhabi decided to reduce subsidies for construction projects of all sorts, which was conducive to incentivizing businesses to incorporate as many

	Community	Building	Villa	
1 Pearl	ALL MANDATORY CREDITS			OPTIONAL
2 Pearl	+ 55	+ 60	+ 30	
3 Pearl	+ 75	+ 85	+ 44	
4 Pearl	+ 100	+ 115	+ 57	
5 Pearl	+ 125	+ 140	+ 70	
	159	177	90	

□ Pearl Rating System of Abu Dhabi

energy-efficient designs and materials as possible during the construction process, a move that, if adopted, would cut operational and management costs in the later stage of a project. In terms of gains, the government of Abu Dhabi promised more land development rights to developers that would meet

the requirements of the Pearl Rating System. Moreover, although Estidama is a government-led program, some of its larger-scale projects are left to the private sector to be advanced. For instance, Masdar City is undertaken by Masdar, a subsidiary company of Mubadala, while Saadiyat is developed by TDIC.

Third, collaboration between government and trained consultants and experts. Estidama Program needs the government to bring trained consultants and experts from various fields together. Particularly important is that before projects are officially incepted, stakeholders, such as designers and builders should be brought to the table for an in-depth exchange of views. This

Differences between Integrated Development Process and Conventional Design Process

Integrated Development Process	Conventional Design Process
Team members engage in the process from the get-go.	Team members engage in the process only when necessary
Time and energy is committed in early stages.	Little time, energy and cooperation is committed in early stages.
Decision-making is highly influenced by team members.	Decisions are made by just a few members.
Regenerative processes	Linear processes
Holistic thinking	Isolated thinking
Seeking synergy	Few opportunities for synergy and collaboration
Life cycle costs	Emphasis on preliminary costs
Processes continue even after the completion of construction.	Processes come to an end when construction is completed

is because enabling these stakeholders (oftentimes with divergent views and visions on how to advance a project) to agree on a plan that meets the requirements of Estidama Program is a crucial step towards the successful implementation of the project. Pearl Qualified Professionals (or PQR) are often brought in to facilitate the collaboration between government and experts. Well-versed in various PRS requirements and with a high degree of independence, these PQRs can serve as facilitators of communication among experts and between government and experts. It is also important for the government to help local experts develop a more internationalized vision. To this end, the government encouraged local experts to make a comparison between the PRS and LEED (Leadership in Energy and Environmental Design) to see which set of standards are more favorable for sustainable development and in which aspects. In this way, the local experts could develop a better understanding of the adaptability of these rating standards to local conditions.

Fourth, collaboration between government and ordinary citizens. The success of Estidama Program relies, in the final analysis, on the ideals of sustainability being accepted by the

vast majority of ordinary citizens. In this sense, it is of particular importance to educate the public on details of the Pearl Rating System. On top of education and training, the government also encouraged public involvement in discussions before launching Estidama Program, with a view to winning public understanding and support.

2. The Evaluation Mechanism: The Pearl Rating System (PRS)

To support and to accelerate the implementation of sustainability principles, a key component of the Estidama program is the Pearl Rating System (PRS), which received government mandate in July 2010. Adherence is therefore compulsory to ensure that all new projects and communities are in compliance with at least the minimum requirements of the PRS. Meanwhile, competition among projects is boosted to incentivize real estate developers to pursue higher goals pertaining to sustainability. In actuality, in the early phase of devising the Pearl Rating System, the UPC just expected it to become suggestive norms governing new projects. To the UPC's surprise, upper-level authorities, deeming the PRS to be of paramount importance, decided to implement it as a mandatory regulation all across the



□ Microclimate Design

region of Abu Dhabi.

All aspects of sustainable development pertinent to Abu Dhabi are encompassed in the PRS, namely, the integrated development process, natural systems, livable buildings, precious water, resourceful energy, stewarding materials and innovative practices. A unique emphasis is placed on energy and water saving, which makes up a 50% share in the overall scoring system. Requirements in all sections except the innovative practice section are compulsory. A project will

be granted a higher rating if it meets the requirements in the innovative practice section. A striking example in this regard is Masdar City Project, which has been granted one pearl in terms of innovative practices, mainly because free PRS training is provided to employees working for the project. As for the construction waste, the PRS requires a project to recycle at least 30% of its construction waste.

The Executive Council Order of May 2010 states that all new applicable buildings must meet the one Pearl requirements starting in September 2010, while all government funded buildings must achieve minimum of 2 pearls.

Three rating stages have been established under the PRS, namely, design, construction and operational stages, for the overarching objective of making sustainability run through the entire life cycle of a project. PRS requirements have already been implanted into the first two stages (design and construction), while the third stage (operational) is still in a trial period. As of 2010, PRS requirements became compulsory and bound with the issuance of construction licenses.

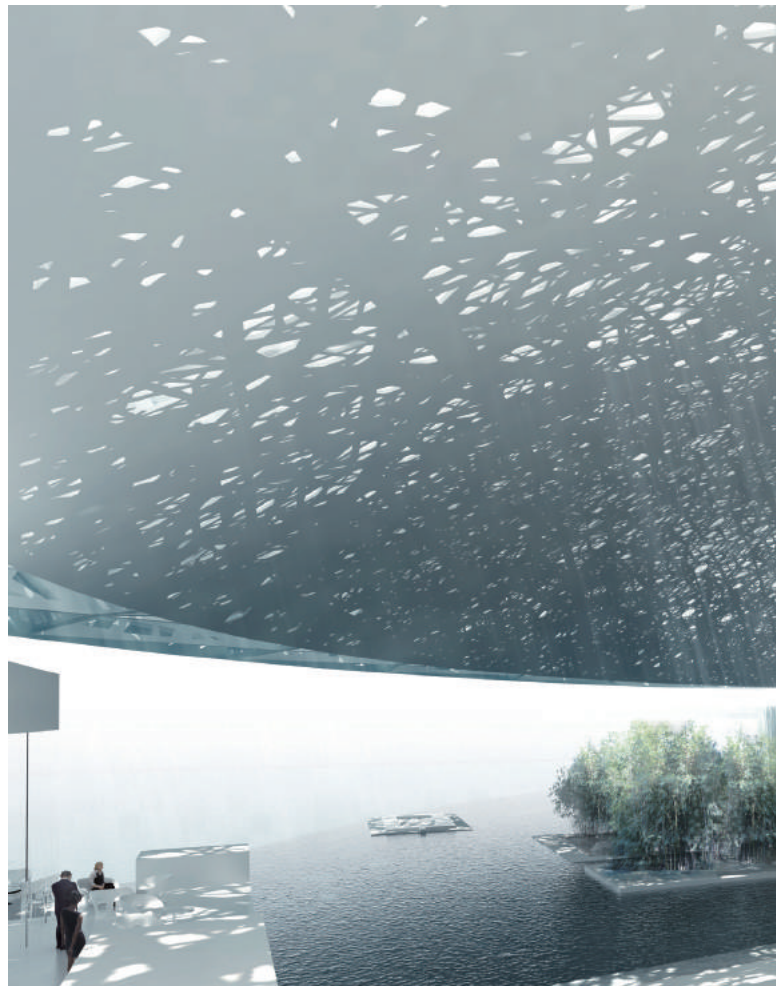
Four on-site audits are conducted during the construction stage to reduce defects and liability issues and removes

instances of non-compliance. This in turn improves the efficiency of the construction process and reduces maintenance and operational costs. The Pearl Operational Rating System (PORS) is another unique element to Estidama and the Pearl Rating System. Resource use during buildings operation far outweighs that during the design and construction phases. The continual efficient operation of building systems is critical to ensure that the resource savings calculated during the design process become real.

The first on-site audit is to lay a solid framework and foundation for a project; the second audit is to establish the top-level and exterior structures; the third audit is for internal maintenance and MEP (mechanics, equipment and pipelines) engineering; the fourth audit is for readjustment and document transfer. On-site audits are carried out jointly by UPC staff members and Pearl Qualified Professionals. If a project fails to pass an on-site audit, the UPC will mandatorily put a stoppage on the project and convene a meeting, in which all stakeholders will attempt to detect the crux of the matter and work out a proper solution.

The Pearl Qualified Professional (PQP) is a member of the design team who facilitates the Pearl Rating System

for both Design and Construction stages. To be an PQP, the individual must pass an exam which will test their administrative and technical knowledge of the Pearl Rating System. All pearl rating procedures must be undertaken by a certified PQP, who is regarded as a mediator between the project team and the Urban Planning Council. As an integral member of



a project team, a Pearl Qualified Professional facilitates the Pearl Rating System throughout the development process. Generally speaking, a PQP's responsibilities are:

- ◆ Ensure technical quality control on documentation submitted for assessment, including calculations, drawings and specifications.
- ◆ Provide expert advice on the

Pearl Rating System credits and their application to projects.

- ◆ Guide and lead the integrated development process
- ◆ Submit Credit Clarification Requests as appropriate
- ◆ Facilitate the Pearl Rating process (attending and recording evaluation meetings or on-site audits, for example)

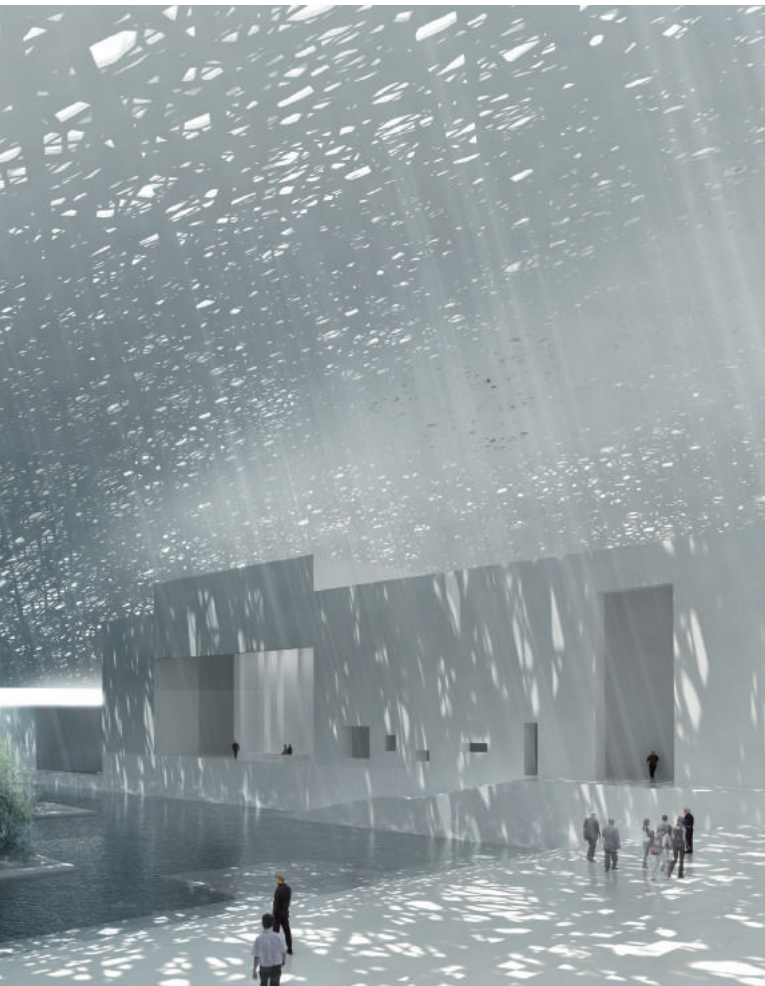
Overall, in comparison with other green rating systems, the Pearl Rating System displays several distinctive characteristics.

The Pearl Rating System is highly adaptive to the local conditions as it is tailored for Abu Dhabi in light of its unique climate, culture and reform ambition.

It receives government mandate, with all its requirements embedded into all new buildings.

From the moment of its inception, it emphasizes integrated designs and incorporates an integrated development model rather than a conventional design model.

It is expanded on the basis of regular rating systems to encompass not just the economic, ecological and social aspects, but also the cultural aspect, thus acknowledging the importance of traditions, religions and social values.



Estidama is advanced by the government across the entire construction sector to ensure that all projects are included and receive necessary assistance. Training is also actively provided to raise awareness among people working in the construction industry and the general public.

▾ Effect and Challenge

1. Effect of the Initiative

After several years of implementation, Estidama has evolved from a vision to an accepted sustainability framework.

(1) Effective Pearl Ratings and Personnel Training

Since Estidama Program was inceptioned, it has included over 1,100 projects either under construction or already completed. The Pearl Rating System has engendered positive changes to over 1,000 buildings, with the gross floor area amounting to 11.3 million square meters; 1,250 villas have been rated with pearls, with the gross floor area reaching 4.9 million square meters. Over 10,000 individuals have received training pertinent to Estidama Program, and 1,750 individuals have been certified as Pearl Qualified Professionals.

(2) Significant Improvement of Buildings' Hygienic Conditions

Estidama buildings have designed energy use reduction of 31% and designed water use reduction of 37%. More impressively, 65% of construction waste has been diverted from landfill. There are unquantifiable impacts such as improved health of buildings and quality of life for residents due to mandatory reduction of unhealthy materials and the encouragement of passive design measures. These and many other improvements occur at all scales from single homes to whole communities through the Pearl Rating Systems for Villa, Building and Communities.

Take Masdar City as an example. As it stands now, Masdar City Free Zone has been home to over 250 corporations, most notably International Renewable Energy Agency, GE, Siemens, Mitsubishi, SK Energy, Lockheed Martin. Located in the heart of Masdar City, Masdar Headquarters constitute an energy-efficient building characteristic of zero waste and zero carbon emission, a groundbreaking project designed by an integrated design team that comprises leading architects from Adrian Smith + Gordon Gill Architecture (AS+GG). Masdar Headquarters is designed in an



□ Abu Dhabi prepares for the next generation

environment-friendly way that enables it to utilize only 30% of water used in other same-level buildings while generating its own energy, so that dependence on outside power sources can be reduced and surplus energy can be supplied to power adjacent projects. The eight-story Masdar Headquarters building includes offices, retail space, shaded public gardens and direct access to the city's transportation systems. The building's signature architectural feature is a collection of eleven towering, glass-enclosed wind cones that perform many critical functions. At the top, they provide the structural support for the building's curvilinear roof. At the ground plane,

they delineate courtyards that serve as entrances, orientation points, and giant intakes to bring ground-source cool air into the building. In between, they siphon warm air up and out of the building and allow diffused daylight from the rooftop into the office floors below. In addition, to reduce energy consumption in the construction process, the photovoltaic rooftop and cooling tower have been completed ahead of schedule, thus ensuring that follow-up work could be advanced under the overriding principle of putting environmental friendliness first.

Covering a floor area of 18,000 square meters, Siemens Middle East Headquarters is the home of over 700 Siemens employees. The building delivers amazing results in terms of resource-efficiency and waste reduction: 60% reduction in energy demand; 40% reduction in water demand; 90% construction waste diversion from landfill. Siemens Headquarters has received LEED EB rating and a 3-Pearl Estidama rating. The IREA (International Renewable Energy Agency) Headquarters also feature cutting-edge designs that enable it to massively save energy and water usage. It has received a 4-Pearl Estidama rating.

(3) Full-fledged Data Management and Training Systems

Early empirical studies were commissioned by Estidama to understand the cost implications and to support industry in early implementation of Estidama. Resource use is measured in the design process using multiple tools developed by Estidama. These include MS Excel based Energy Model Template, Water Calculator, Waste Calculator and U-value (thermal performance) Calculator.

A pearl Qualified Professional is an individual who has passed official exams that test their administrative and technical knowledge of the PRS and is responsible for submitting calculations and specifications during the design process. All design data is logged by Estidama so predictions of resource use can be determined. As Estidama requires the measuring of actual resource use in new buildings, empirical data will be used as soon as sufficient information has been collected from buildings that will lead to even greater improvements in the design and operation of buildings.

In addition to calculation tools, multiple training, support and submission documentation has been developed by Estidama for industry

and all at no cost for the user or end client. Free training is provided that introduces even non-technical individuals to sustainability principals and how implementing Estidama will improve the built environment. An extensive website provides all information required and encourages communication between Estidama and design teams. As Estidama develops inLine with Abu Dhabi's E-Government initiative, it will become even easier for project teams to submit projects for approval and knowledge sharing to facilitate continual improvement.

(4) Extensive Influence and Spillovers

Estidama is revolutionary as it is the only sustainability program designed and implemented in the middle east and has many unique features that other rating systems do not have. It has been mandatory for all buildings from day one. Estidama has a primary focus on delivering results on the ground to safeguard the prosperity of future generations and also represents Abu Dhabi's contribution to the global sustainability agenda. Echoing the ideals of its founders' ecological and cultural principles, Abu Dhabi is well on its way to nurturing a first generation green society. Innovation has been required for

multiple aspects of Estidama Program and has been shared with multiple stakeholders. These include global stakeholders, and the World Green Building Council recently awarded Estidama the Regional Leadership Award recognizing the impact it is having on the Emirate of Abu Dhabi and the MENA region. As Estidama becomes more recognised, it is also being implemented in other Emirates and countries in the region including Bahrain and the Seychelles.

2. Challenge of the Initiative

One of the key challenges facing Estidama Program is policy constraint, as many of the existing policies are outdated, failing to reflect the reality of the day and the development needs for the future. Another challenge lies in how to make stakeholders realize the feasibility of the program, which is a very critical step leading to the success of Estidama. Challenges were identified during the initial roll out of policies and regulation in the first 2 years of implementation. Early resistance came from the industry sector who believed that new sustainability requirements would increase costs and make approval for developments more challenging. Estidama extensively supported new developments to

facilitate compliance and demonstrated through independent empirical analysis that increased costs were negligible. Early resistance has given way to acceptance and support for the program and benefits can be demonstrated through evidence of resource savings and improved design.

Practice and Innovation

1. Revolutionary Innovation

Estidama is both evolutionary and revolutionary. There are sustainability rating systems implemented all over the globe that Estidama was able to learn from and it also evolved from Abu Dhabi's founding fathers' original vision for the Emirate to be sustainable and responsible with resources to benefit not just today's society but generations to follow.

Estidama is revolutionary as it is the only sustainability program designed and implemented in the Middle East and has many unique features that other rating systems do not have. Estidama has been mandatory for all buildings from day one so that bore potential significant risks and required a significant shift in attitude by a rapidly developing and ambitious construction industry.



□ Knowledge Sharing Globally

2. Characteristics

As a holistic sustainability program, Estidama requires innovation in government strategy and policy and also in the planning, design and implementation of all development projects. Innovation is required in the operation of buildings as Estidama will also implement an Operational Rating System that will require innovative technology and behavioral change.

The Government of Abu Dhabi is also committed to improving the management of services through its

E-Governance Program that will enable improved connectivity for commerce and citizens. Estidama and the PRS are in the process of migrating to this online platform that will integrate with all other government services for improved performance and customer service that is truly innovative.

▾ Highlight

A unique and innovative feature of Estidama is the Construction Audit Protocol, a mandatory element of the

PRS. To ensure technical compliance with original design intent during the construction stage, construction audits are carried out at five key stages.

These are:

- ◆ Site set-up and Substructure
- ◆ Superstructure and Building Envelope
- ◆ Internal Fit-out and Services
- ◆ Commissioning & Documentation
- ◆ Final Site Visit & Sign Off

The technical features of sustainable buildings are increasingly complex and the design and construction process requires verification of systems to ensure the design intent is realised during the operation of buildings. On-site audits of the construction process reduce defects and liability issues and removes instances of non-compliance. This in turn improves the efficiency of the construction process and reduces maintenance and operational costs.

The Pearl Operational Rating System (PORS) is another unique element to Estidama and the PRS. It is widely understood that resources used during a building's operation far outweighs those during the design and construction phases. The continual efficient operation of building systems is critical to ensure the original design intent is realised and the resource

savings calculated during design become empirical numbers and do not remain theoretical.

The PORS set out policies and procedures for the building owners and operators. Guidance is also provided for facilities management teams and building users to undertake tasks on a regular basis throughout the lifetime of the building. These include continual monitoring of building performance through mandatory operational maintenance protocols and procedures for remedial works. All building performance data is supplied to Estidama for monitoring purposes and is fed back into the application of the design tools to ensure continual optimization of the design, construction and operation processes.

Experience and Inspiration

In recent years, the Chinese government has been advocating for building a sound ecosystem, placing equal emphasis on economic development and environmental friendliness. Estidama Program from Abu Dhabi offers great food for thought on how to balance economic growth against ecological protection for green and sustainable development.

1. It is economically viable to strive for a future that is both green and commercially vibrant

There is no trade-off between environmental protection and economic development. An environment-friendly economic model is conducive to propelling the development of energy-saving industries and new energy sectors as well as to facilitating industrial restructuring and upgradation. To put it another way, environmental protection should not be pushed to the extreme where economic vibrancy is damaged, because continual economic growth is fundamentally significant for the achievement of ecological sustainability.

2. Striving for sustainability can produce extra costs, which seem insignificant as measured against long-term benefits

Shifting to a new economic growth model driven by low-energy-consuming and eco-friendly industries will inevitably result in an increase of economic costs, but such extra costs are temporary in nature and will be cancelled out by the saved costs in the later stage of a pro-sustainability economic model.

3. Integrated development processes that run through the life cycle of a project should be adopted

When it comes to urban planning and construction planning, a pro-sustainability plan should start at the design phase. It is critical to make an evaluation of the currently-demanded costs and the costs for maintenance in the future. On-site audits should be delegated to independent environmental experts, which shall decide which part(s) of a project will be the most energy-consuming. These independent environmental experts shall have no converging interests whatsoever with the project designers. All-dimensional and holistic thinking should be embedded into the entire project process, from conception to completion, so that the most viable energy reduction targets can be achieved.

4. Collaboration and synergy should be fostered between government, businesses and civil society

While formulating policies for sustainable development, the government should adopt a visionary and farsighted approach on one hand



□ Endorsed by Leadership

and take into full account the interests of businesses and ordinary citizens on the other hand. During the process of policy implementation, the government should work jointly with businesses and civil organizations to ensure that the ideal of sustainability wins broad-based acceptance and recognition.

5. It is necessary to enforce a viable, mandatory green rating system

Enforcing a green rating system is no easy task, a feat that takes multiple steps to accomplish. This should start by enforcing green rating standards

on not-so-costly projects. The entire rating process should be free of charge to ensure that the efficacy of green rating standards is utilized to the fullest. Moreover, the government should provide training to construction industry practitioners and a wide range of non-technical individuals to popularize the ideals of sustainability. To encourage compliance with green rating standards, the government shall bring all stakeholders of a project together from the get-go and grant proper rewards to businesses and developers that comply with the standards.

Indonesia



/ Jakarta / The Pluit Reservoir Revitalization Project

Lying in the delta of 13 rivers, Jakarta, with 40% of the land below Sea Level, is confronted with the severe crisis: flood, water bloom, and water pollution problems. In order to improve water storage, reduce urban flood and

improve drinking water quality, Jakarta has made arduous efforts, which can be represented by the Pluit Reservoir Revitalization Project. The project aims to improve the water storage, relocate 3000 shack-dwellers on both sides of



□ Independence Square, also called Dataran Merdeka, is located in the center of Jakarta

the reservoir, and change these places into parks and other public open place of good quality. The project starts now and continues until 2030, so as to copy with climate change in a socially responsible way. Involving the cooperation between government and enterprises, this project strives to reduce threats to environment through innovative development modes with the help of public support.

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- 🏠 **Name of City:** Jakarta
 - 📍 **Name of Province/State:** Daerah Khusus Ibu Kota Jakarta
 - 📍 **Name of Country/Region:** Indonesia
 - 🌐 **Geographic Region:** Asia-Pacific
 - 👤 **Population:** 9,607,787 (2010)
 - ⚙️ **Surface Area:** 66,233 km²
 - 👤 **Population Density:** 13,000 to 30,000 per km², unevenly distributed
 - 📊 **GDP per capita:** USD 12,600
 - 🗣️ **Title or Slogan of the Initiative:** The Pluit Reservoir Revitalization Project: Socially-Inclusive Coastal Protection Today and for 2030 (Climate Adaptation and Resilience in Jakarta)
 - 🕒 **Start Date of the Initiative:** 2012
 - 🕒 **End Date of the Initiative:** 2015
 - ⚙️ **Thematic Area:** Society Environment Governance/Management
-

📄 Background Information of the Initiative

As the Indonesia's capital, Jakarta, with a population 9,607,787, has 66,233 square kilometers of land area and 69,775 square kilometers of sea area. In terms of economic structure, Jakarta mainly relies on financial services, trade and manufacturing industries. In 2008,

finance, stockholding company and business services accounted for 29% of Jakarta's GDP. Due to the electronics, automation, chemical industry, mechanical engineering and biomedical industries, manufacturing industries are very diverse in Jakarta. At present, Jakarta's GDP per capita is USD 12,600.

As to the geographical conditions, Jakarta, the junction of South-East Asia and Oceania, is located in Jakarta Bay along the north coast of Java Island. Jakarta is in a low and flat basin, with an altitude ranging from -2 meters to 50 meters (an average of 8 meters above sea level). 40% of Jakarta, especially the northern region, are below the sea level. On the contrary, the south is more mountainous. Jakarta lies in the delta where 13 rivers converge with rivers flowing from Puncak Highlands towards the north into the Java Sea. Among them, the most important river is the Ciliwung, which divides the whole city into two administrative districts—the eastern part and the western one. Jakarta belongs to tropical rainforest climate, with the average temperature of 27°C. Under the influence of the equator, there will be west monsoon season from November to the next April and the east monsoon season from May to October. The average annual precipitation is 2000 millimeters and the highest rainfall happens in January.



□ The National Monument is in the centre of Merdeka Square, Central Jakarta, symbolizing the fight for Indonesia

Dense rivers, abundant rainfall as well as lowland structure make Jakarta vulnerable to urban inland inundation. More severely, Jakarta itself is sinking. Brinkman, the engineer of Academy of Water Resources in Delft, Netherlands, believes that although the rise of sea level is caused by global warming, but the main reason for Jakarta invaded by sea water is the over development of the city, resulting in the subsided ground under the unbearable weight of buildings. In fact, except for the pressure of buildings, factories, hotels and wealthy squatters of Jakarta have extracted underground water in an uncontrolled way, which has further aggravated the problem. Dr. Shaffwan, the researcher in Institute of Academy of Sciences of the Earth Science and Oceanography Research Center in Bandung, Indonesia, said according to the measurement from 1925 to 2003, sea level in Jakarta has risen by

0.5 cm per year on average. Meanwhile, during the past 30 years, several ground planes in Jakarta have sunk by 5 to 12 cm each year, thus a number of areas are inundated by sea water. Dr. Hashanuddin, an expert in geodesy at Bandung College of Science and Engineering, said based on the results of his research from 1982 to 2010, some places in Jakarta have sunk by 1-15 centimeters per year on average, some even by 20-28 centimeters. Allegedly, during nearly 30 years, some places in Prewitt (Pluit), Jakarta have sunk by 1.8-3 meters; the rise of sea level has flooded some luxury residential areas at the Pearl of the North Coast, with the inundated part below the ground deepest to 80 centimeters.

According to the prediction of United Nations Intergovernmental Panel on Climate Change, by 2025, sea level will only rise five centimeters. But Brinkman believes that Jakarta would

sink by 40-60 centimeters. In accordance with a research report released by World Bank, if no preventive measures have been taken by the Indonesian authorities, by December 6, 2025, sea water will advance five kilometers towards inland. By then, the historical city in the north of Jakarta will be completely submerged. Because of the heavy rainfall, lowland structure and ground subsidence, Jakarta has to face the urban inland inundation almost every year. Consequently, it is particularly important to establish and maintain completed the water facilities. In terms of water resource system, canals in the lowland areas of Jakarta were initially built on the basis of the system originating from the colonial period in Netherlands. However, it has already expanded to become a fairly complicated system. Jakarta is responsible for the building of some canals, irrigation and water gate, while Indonesian Ministry of Public



□ 75% area of Pluit Reservoir is covered by algae



□ A large number of sediments in Pluit Reservoir

Works takes charge of the rest part. As an increasing number of foreign population live along the reservoir, and production and domestic waste are thrown into reservoirs and rivers, the state of water facilities, out of repair for a long time in Jakarta, is not ideal.

Flood disaster has caused great damage to Jakarta's production and people's life. Take January 2013 as an example. At that time, the continuous heavy rain within just two days made more than 50 blocks in Jakarta suffer from devastating floods in Jakarta, three-fourths of urban area ponded. More than 20,000 homes were flooded, and even the Presidential Palace was waterlogged for the first time. Worse still, people there also have to be confronted with the traffic

gridlock and power failure, which led to the suspension of the affairs for many government departments, business for enterprises and shops, and the supply of daily necessities for the people was cut off. Data from police station show that because of the heavy floods in Jakarta, 340,000 people there fled from their homes and 36 people were killed. River blockage led to poor drainage, making the whole city filled with a pungent smell. In the aftermath of the flood, squatters there saw the outbreak of many diseases due to the contact with pollution brought by the flood.

Apart from the climate, geology and engineering, another important cause for the flood in Jakarta is the excessive urbanization. On one hand, population



□ Jakarta's residents take part in the resettlement program



□ Jakarta's residents take part in the resettlement program

explosion enforces the government to change its pre-settled urban planning. An urban forest covering an area of 130 hectares was cut down and replaced by high-rise buildings, resulting in the loss of water storage function for the forest. The marine outfall for rivers in Jakarta used to be a large area of marshes with the role of regulating rainwater. But the changes in urban planning made this area a wealthy residential area now. On the other hand, a large number of poor people swarming into Jakarta who could not find a safe haven in the city centre had to build houses along the rivers and reservoirs, leaving the space increasingly narrow. And the drainage and water storage functions of rivers and reservoirs are thus largely curtailed.

Obviously, the flood disaster has become a bottleneck for the development of Jakarta. How to effectively solve the flooding problem is the most troublesome

task for the administration innovation in Jakarta city. Against this backdrop, Jakarta began to implement the Pluit Reservoir Revitalization Project since 2012, trying to improve the city's capacity in fighting against climate change and mitigating flood disasters.

▽ Implementation of the Initiative

The main purpose of launching the innovative project of Pluit Reservoir Revitalization is to restore and reinforce its capacity of water drainage and storage capacity. Covering the catchment area of 2,083 hectares in North Jakarta originally, the reservoir is, however, currently surrounded by the thousands of illegal houses (squatters), nearly 75% of the reservoir covered by algae, and sediments in the river with the poor water performance. Thus, the reservoir is vulnerable to fight against the flood.

The Pluit Reservoir Revitalization Project can improve the living quality of 15,000 households currently besides the reservoir banks. The government provides proper subsidized apartments nearby in order that these households are able to maintain their social and economic activities. It seeks to rejuvenate the area through the integrated blue and green

infrastructures for a more sustainable living where people can have close contact with nature.

1. Think tank takes part in the policy-making consulting and puts forward project alternatives

Think tank plays a pivotal role in the process of making modern public policy. The Pluit Reservoir Revitalization Project is promoted by Jakarta Research Council, a think tank in Jakarta. Jakarta Research Council is a policy research institute set up by the Governor of Jakarta, involving the research of common questions, such as transportation and garbage treatment, as well as some matters of urgency. Jakarta Research Council is the only think tank directly accountable to the governor and belongs to the statutory body. The think tank has long been concerned with water issues. After research, it has put forward the Pluit Reservoir Revitalization Project together with Region Planning Board and won great supports from the provincial government.

2. Multiple subjects participate in the project and put forward the effective measures

Although the Pluit Reservoir Revitalization Project is dominated by the government, the enterprises, communities and non-governmental organizations also

play an important part in its development. Actually, the main performers for the project are government-controlled companies, who take full charge of the planning and organizing for the project. In addition, private enterprises, especially those in property business, and the local state-owned enterprises also participate in the project in several ways.

Private companies with real estate licenses have an obligation to participate in the project under the cross-subsidy scheme. According to the corporate social responsibility, they can donate furniture or equipments for the settlement housing. In order to gain government's approval for real estate development, the private enterprises are always willing to join in the activities like reservoir dredging and the development of surrounding areas. In addition, the government assigns the person to communicate with the local community leaders who are also invited to talk and discuss with the Governor, realizing the two-way communication. Community leaders play an essential role in this project. They are invited for dinner by the government leaders, even including the president. It can be considered that the citizen engagement is the key component to the success of this project since the main challenge was to persuade the squatters to relocate to the legal new subsidized housing. Some

non-governmental organizations also join voluntarily or at the request of the government in convincing squatters, so that there won't be any violations to human rights during the process of resident relocating.

3. Government invest in low-rent housing building and rent out to the reservoir immigrants at a low cost

Pluit Reservoir is originally used for flood storage, but the inhabitation of a large number of immigrants along

the bank of reservoir greatly reduces the reservoir's capacity in flood storage. The main purpose of this reservoir revitalization project is to advise these illegal dwellers to leave. In order to carry out the project in a smooth way, the government does not simply drive these people away. Instead, it tries to invest and build a number of affordable housing to provide shelters for these immigrants in reservoir. After these immigrants move into the affordable housing, the first three months are free. After that, they only need to pay USD one per month as rent.



□ the Favorable Green Environment after the completion of Pluit Reservoir



□ Jakarta Residents in the Newly-built Pluit Reservoir

Besides, the government tries to relocate them in the places not far from where they used to stay, so as to provide convenience for their working. Of course, affordable housing is not allowed to be sold and can only be leased for an indefinite period. Necessary facilities are available in these new communities, such as schools, markets, health care facilities, and thus the squatters' overall life quality can be improved and more jobs can be created in the meantime. Also, the provincial government has promised that 50,000 affordable housing will be provided by the year 2017. And 80% of the cost comes from the government and the 20% is from social financing.

4. There are frequent contacts between government leaders and squatters, so as to increase social support for the project

A strong leadership is the crucial point for the project to be proceeded. Over the past 20 years, it has been a difficult project to relocate the squatters without harassing their human rights. Reservoir dwellers are mainly fishermen or fishing workers, who belong to low-income groups. They live on the bank of the reservoir and are unwilling to move away not only because they can use the land for free (in fact illegal), but also because they can make money by renting out the house they built.

Besides, because the public do not trust the government, it is no easy to persuade them to accept the project led by the government. In fact, the local residents resist forcefully to cooperate with the government in the initial phase and ask for unreasonable compensation fees. The crucial steps to overcome this barrier lie in the frequent contact between the government leaders and the dwellers to improve the public recognition for the project. The governor himself directly came and consoled the people, listened to their problems and aspirations as well as communicated frequently. At the same time, he called on the private sectors to donate furniture for the new housing to attract the residents. In terms of explaining the importance of maintaining the reservoir area, he spared no efforts to do various work. Through communication, the government managed to persuade reservoir dwellers finally and eliminate their resistance, thus setting a good example for other similar projects.

5. Overall Strategy Layout for Water Control

Pluit Reservoir Revitalization Project constitutes only a part of the overall strategy layout for water control in Jakarta. Whether the project can be truly effective or not depends on the coordination of other projects. The first

one is canal-digging project. The severe accumulation of dirt has reduced the water resources management capacity of many rivers and canals. In cooperation with the central government as well as with the help of the World Bank and the government of Netherlands, Jakarta is carrying out a major canal-digging project, involving 13 river channels and 5 reservoirs.

The project is committed to reducing the coverage of flood danger in the region from 203 square kilometers down to 144 square kilometers. Besides, the government of Jakarta Special District provided about USD 6.2 million for the construction of water wells, embankments and other flood control infrastructure. Specifically, there are six major measures: First, accelerating the recovery of three long rivers (Ciliwung River, Pesanggarahan River and Sunter River), which currently only have a width of 15 meters, but will be expanded to 50-60 meters in the future. Second, building a new drainage system in the city. Third, building large reservoirs, such as Ciawi and Cimanggis. Fourth, building soakaways. It plans to build 20,000 wells with a width of over one meter. These soakaways will quickly absorb water within 4 hours. Fifth, building a multifunctional tunnel, which can be used as a water storage facility in rainy season and as the road or highway

in dry season. Sixth, water pump, shall be used as much as possible.

Specially, it needs to be stressed on the project of Ciliwung River, also known as Ciliwung River Revitalization Project (CRP for short). Its main purpose is to restore the river and remove all houses on the shore. In particular, the purification project of Ciliwung River consists of the following three major steps:

First, the polluted river water should be guided into the filter area by using the pipeline. In this section, trash will be cleaned out of the river, with the organic wastes used as fertilizer for soil on both sides of the river. Then, the river water with no trash will go into the second step or back into the river. The second step is to purify pollutants and increase the beneficial mineral elements in the river. In this way, it will be safe for surrounding squatters to use the water. Dwellers on both sides of Ciliwung River will be accommodated in CRP building. Relocating people in the slums alongside the river helps to beautify Ciliwung River. After slums being removed, more green areas on both sides of the river will be added to Jakarta and it will be better for preventing Ciliwung River from flooding. Finally, river water after processing will be led into the bank of Ciliwung River in two ways. One is through underground “capillaries”, which can not only bring

water, but also nutrients for the soil, thus creating an improved agricultural environment; the other way is to spray processed river water on buildings, which can increase the humidity of lower-floor buildings, facilitate the growth of plant and create a new ecological system.

In the meantime, Jakarta also encourages the construction of green belt, especially mangrove forests along the coast. Mangrove forests can fight against a large-scale tidal flooding and provide necessary vegetation for the city. It must be pointed out that the vegetation coverage in Jakarta has decreased from 28.8% in 1984 to 10% in 2012, which is also one of the important causes for frequent flooding in Jakarta.

Land gained through river or reservoir dredging will be used for a large coastal reclamation/development project, known as “coastal development project of national integrated capital”. This project will be carried out in three phases, covering more than 32 kilometers of coastline. First stage is a short-term coastal protection (until 2020); the second stage is the integrated sea dike construction and reclamation of new land (until 2030); the third stage is a multi-objective dike construction for Jakarta Bay (until 2030). This coastal development concept provides a groundbreaking solution. Acting as a natural

reservoir, it not only prevents the North Jakarta from floods, but also provides investment opportunities like tolls in terms of roads, railways, sea ports, land reclamation, and urban redevelopment there.

Effect and Challenge

1. Effect of the Initiative

After several years' efforts, Pluit Reservoir Revitalization Project and other related water projects have achieved obvious results, greatly improving eco-environment and residents' living quality.

(1) Greatly Improved Water Conditions
Pluit Reservoir Revitalization Project

is Jakarta's integrated water resources management strategy. As a part of blue green infrastructure development plan, it reflects Jakarta's vision for 2030, that is to build a safe, comfortable and sustainable city. The project has improved people's living environment. The application of sewage treatment equipment in the suburb has bettered the water quality. Reservoir dredging project has elevated its capacity in water storage and drainage. Pluit Reservoir has regained 7 million cubic meters of water storage capacity. Better water conditions has greatly perfected Jakarta's capacity to fight floods.

(2) Restored Eco-system

Pluit Reservoir Revitalization Project contributes to water ecosystems (such



□ Jakarta's Pluit Reservoir

as lakes, rivers, canals, estuaries and mangrove forests) that have been damaged or lost. These ecosystems are restored to a large extent with water content increased by 5% and this is also the target of the city. With the renovation of reservoir and relocation of surrounding dwellers, beautiful parks and vacant space have been built beside the river bank for the residents' convenience of entertainment and relaxing. The park covers an area of 20 hectares. There are over 10,000 trees, which can absorb a large amount of carbon dioxide and greatly improve people's living environment. In summary, the project has become the model for restoration of other reservoirs and rivers whose water resource ecosystem has been

severely damaged.

(3) Properly Relocated Reservoir Dwellers

The core work of Pluit Reservoir Revitalization Project is to move the residents living along the reservoir to new resettlements free from flood threat and ensure that their standard of living can be raised, so that social, economic and ecological benefits will be gained at the same time. With the help of the government, more than 2,500 residents were eventually relocated in the newly-built affordable housing. New housing has provided them with a better living environment with less threat of floods and other diseases. Municipal government has offered employment opportunities



□ The People in charge of the Jakarta's Pluit Reservoir program introduced the reservoir's conditions

for them in the settlement area as well. Besides, government leaders frequently communicate with local squatters and listen to their wishes.

2. Challenge of the Initiative

(1) Increase of Living Cost for Reservoir Immigrants

Although moving to low-rent housing will enable squatters to have access to better living environment and be free from flooding and the threat of other diseases, many squatters argued that their living cost will be largely increased after moving. Although the rent for every month is only USD one, they used to live on the river bank for free with no cost of property management and they could even make money by renting out extra houses. In addition, affordable housing is not allowed to be sold and squatters no longer have property rights. They believe that at least the houses on the river bank are owned by them. Therefore, many squatters were actually unwilling to relocate, and they once organized themselves to go to the provincial government for protest.

(2) Difficulties for the Government to Find Settlement Area for Immigrants

Although more than 2,500 people have been properly relocated, there are still at least more than 10,000 people needing to be resettled. However,

the government fails to complete the construction of all low-rent housing. The main difficulty is that it is hard for the government to find new land to build affordable housing for immigrants, because in Jakarta, the land is privately owned and very expensive. Besides, overexploitation in the urban area has almost occupied all of the city's idle lands. For the Government, whether enough lands can be found for the building of affordable housing is the key condition for the sustainability of the project.

Practice and Innovation

1. Revolutionary Innovation

The project is revolutionary. A strong leadership is the crucial point. Over the past 20 years, the main challenge is to relocate the squatters without harassing their human rights so that the physical improvements should be done. The solution lies in the governor himself directly consoling the people, listening to their problems and aspirations, and communicating with them frequently. At the same time, he also called on the private sectors to donate furniture for the new housing and explained the importance of maintaining the reservoir area to the residents.

2. Characteristics

It is expected that social and economic benefits are also gained through the development of this project. In the new subsidized apartments, inhabitants have better living environment as they are less vulnerable to flood risks and related health problems. The city is also seeking opportunities to satisfy the employment needs of these relocated inhabitants. The city officials keep close contact with squatters, considering their aspirations and relocating them to new housing located nearby so that squatters can maintain their current jobs. Facilities (schools, markets, health care facilities) are also provided in

the new living complex for realizing an overall improved quality of life as well as new job creation.

Highlight

The project is innovative due to a strong leadership centering around the governor of special district and the involvement of relative stakeholders. During the past 20 years, the main challenge is to relocate the squatters without harassing their human rights so that the physical improvements could be done. The key to overcome this barrier is



□ Leaders of this initiative take photo with the residents in Jakarta

that the governor himself directly came and consoled the people, listened to their problems and aspirations. He also calls on the private sectors to donate furniture for the new housing, so the people would be willing to move there. In the end, the significant resistance disappeared and this project became an model for other projects in the city.

The private-public partnership (PPP) scheme has been implemented at project in which the private companies that hold property development permits are obliged to participate in the project under the cross-subsidy scheme. The city is preparing several funding schemes, of which the main concept is to minimize the government spending and optimize public investment. The return, instead of cash, are reflected in humanity, technical or managerial resources.

There are several environmental goals that can be obtained by this project, such as climate adaptation to make Jakarta more conscientious of and friendly towards the environment, in effect allowing policy maker and city planner to take steps to reduce vulnerability; reduced annual urban flooding; enhanced city resilience against climate change, where the goals can be achieved.

The model of the project is not limited only to urban flood control or water management, but wider than that, it

can be applied in other sectors. It is also possible to expand the implementation of this concept not only within Jakarta area but also to the wider surrounding region (Greater Jakarta).

▾ Experience and Inspiration

1. A comprehensive strategy for water environment treatment should be put forward and it can also promote the city's ability to tackle climate change

Many cities are facing the threat of floods and the following diseases. To overcome these problems, policy makers and urban planners need a comprehensive strategy for water environment treatment, which helps improve urban water infrastructure construction, thereby reducing urban vulnerability and improving resistance to combat climate change.

2. Effective indicator system to assess the effectiveness of water environment treatment should be set up

The following indicators have been adopted to assess the result of water management in the Pluit Reservoir Revitalization Project: the duration of flood period, flood depth and affected

area, the number of people threatened by the flood, the number of homeless, casualties number, number of people living in places vulnerable to floods, death toll and number of damaged houses, social and economic loss caused by floods (including damages caused to city's basic facilities, interruption to daily life, disease outbreak, reduction of visitor number). The project uses the concept of “vulnerability” to test the applicability of the policy system as a whole, and at the same time develops scenarios/path by using various scientific methods, in order to integrate current into long-term vision. Indicators of monitoring and detecting the effectiveness of projects have been ensured. Fiscal policy has been improved to support the project. Close contact has been maintained between project performer and squatters involved. In this sense, the project is not only a ecological project, but also a social one. The test and relevant indicators are jointly made by the project parties, Jakarta environmental management authority, and Jakarta planning administration after researches. Thus, it will shed lights on water environment treatment for other cities.

3. The projects with public-private partnerships should be implemented

In Jakarta, under cross-subsidy

program, private companies with real estate development licenses have an obligation to participate in the project of water environment treatment. Jakarta currently has several self-service schemes, of which the main concept is to reduce government spending and optimize public investment. During the process of urban governance process, government alone is not enough. All parties, especially enterprises and other social capital must be fully mobilized.

4. Synergic cooperation between the cities should be reinforced to jointly combat the threat of climate change

In the past, in face of floods, authorities of Jakarta used to blame each other and shirk responsibility. However, with the overall water management strategy and Pluit Reservoir Revitalization Project, the government has realized that in order to solve the urban floods completely, local governments in the surrounding area must be united together to create synergies. Forest conservation needs to be promoted upstream, and river dredging outlets should be added downstream. Water conservancy is a systematic problem. Cities shall form alliance in dealing with regional governance so as to work together to



□ Pluit Reservoir

improve the ability to combat climate change.

5. The government should strengthen its interaction with the public and increase the project's social supports

One prominent feature of Pluit Reservoir Revitalization Project is the strong leadership of the Governor and the involvement of multi stakeholders. Over the past 20 years, the main challenge is to relocate the squatters without harassing

their human rights so that the physical improvements could be done. The key to overcoming this barrier is that the Governor himself directly came and listened to inhabitants' aspirations and communicated frequently, and at the same time gathered participation from the private sectors to donate attractive furniture for the new housing, so the people would be willing to move there. In the end, the significant resistance disappeared and this project became an inspiration for other projects in the city.



Senegal

□ Dakar is the biggest seaport in the West Africa

/ Dakar / Municipal Finance Program

With rapid growth in its urban population, a large portion of Dakar's population works in the informal sector. There was a pressing need for a central marketplace to accommodate its street vendors so as to improve their social and economic situation and to provide

more convenient and hygienic conditions for consumers. To finance the project, Dakar decided to access capital markets. Not only is it the first city to do so in sub-Saharan Africa (outside South Africa), it is also one of the few cities in a developing country to do so without

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-  **Name of City:** City of Dakar
 -  **Name of Country/Region:** Senegal
 -  **Geographic Region:** Africa (Sub-Saharan)
 -  **Population:** 1,256,000 (2013)
 -  **Surface Area:** 82.83 km²
 -  **Population Density:** 15,246 people / km²
 -  **GDP Per Capita:** USD 1,900
 -  **Title or Slogan of the Initiative:** Dakar Municipal Finance Program: Accessing the Power of Capital Markets to Improve the Quality of Life for the Urban Disadvantaged Groups
 -  **Start Date of the Initiative:** October, 2011
 -  **End Date of the Initiative:** December, 2016
 -  **Thematic Areas:** Society Economy Governance / Management
-

the benefit of full guarantees from the central government. It enlisted financial and technical supports from a wide range of organizations including the Bill and Melinda Gates Foundation, the World Bank, the United States Agency for International Development and Cities Alliance. A total of USD 4 million was raised for the project. Equally importantly, the city now has access to a new financing mechanism to achieve its development

goals. With this breakthrough, there is now a precedent for other cities across Africa to benefit from lower transaction costs and lower credit terms as well as less skepticism from investors as they seek mainstream sources of finance for their respective capital projects.

Background of the Initiative

Facing rapidly increasing urbanization (more than 3% per year), a growing deficit in infrastructure and urban facilities, and a limited annual budget (of approximately USD 75 million annually), the City of Dakar's leadership was seeking an alternative financing tool to meet its long-term development goals. Under the leadership of the Municipal Council of Dakar, the Dakar Municipal Finance Program (DMFP) has been developed to enable the City of Dakar to gain access to capital markets for its investment needs. Through the launch of a bond to build a strategically-located marketplace for relocated street vendors, Dakar Municipal Finance Program's central project has a direct impact on the lives of 6,000 households (around 35,000 people). With the engagement of other private and public parties, especially the financial assistance of the Bill and Melinda Gates Foundation (USD 5.5 million over four

years) and the United States Agency for International Development (USD 1 million), the DMFP plans to mobilize USD 40 million on the financial markets to fund this project with substantial benefits for informal sector vendors and the citizens of Dakar.

▾ Implementation of the Initiative

Although there is a global tradition of bond issuance to fund capital-intensive projects, this initiative represents the first usage of bonds for a city in sub-Saharan Africa (outside of South Africa) that is executed without the full guarantee of the central government. The DMFP involved innovations on several fronts, namely,



□ Facing the Dakar, Goree Island is the earliest colony exploited by the Europeans in the West Africa



□ Independence Square in Dakar



complying with the strict accountability and transparency demands of the bond market; experimenting with a new fund-raising tool; planning and building a new central market with guaranteed access by poor street vendors in a strategic location; building the capacity within city hall to become creditworthy through good governance, sound financial management and public participation.

The bulk of Dakar City's financial

resources come from appropriated funds of the central government, but such resources are sufficient enough only for sustaining the daily operation of the Municipal Government and there is hardly any funding left for supporting innovative activities and programs. Financial resources for innovative programs mainly come about in forms of bank loans or lending by foreign foundations. It is therefore a novel and creative attempt to access the capital markets to acquire funding for the DMFP.

Because of the novelty of the bond insurance process, the DMFP has enabled the leadership of City of Dakar to enhance its strengths in the following ways: (1) amplifying the voice of the urban poor through the institutionalization of the public participation process; (2) developing a long term strategic plan; (3) developing a comprehensive communication campaign to disseminate the city's strategic plan and to encourage investment in the future of the city through the purchases, on a retail basis, of bonds at primary issuance; (4) building capacity through intensive training in financial management, transparency and good governance; (5) purchasing technology for enhanced financial tracking and budget forecasting.

↘ Effect and Challenge

1. Effect of the Initiative

As a result of the DMFP, the City of Dakar now has access to a new financing mechanism that can be instrumental in helping the city to achieve its social and financial goals for capital-intensive investments. Additionally, in terms of this issuance, the DMFP plans to track the impact of the construction of the marketplace on a cross-section of vendors through a variety of social indicators. Ultimately, although the direct benefit is to the City of Dakar and its population, this program can be easily replicated across sub-Saharan Africa and dramatically

change the power of municipalities in an increasingly-decentralized world.

2. Challenge of the Initiative

A challenge that the management team faced was in selecting an appropriate investment project that met the twin goals of social development (which means the needs of the urban poor) and economic profitability (the expectations of investors). After months of consideration and focus group sessions bringing together members of civil society and elected politicians, the team proposed the long-considered marketplace as an appropriate project for the municipality's deliberation and approval.



□ Senegal President Official Mansion

Practice and Innovation

1. Revolutionary Innovation

Although there is a global tradition of bond issuance to fund capital-intensive projects, this initiative represents the first usage of bonds for a city in sub-Saharan Africa (outside of South Africa) that is executed without the full guarantee of the central government. Amongst its many risks, the DMFP faced initial risks (including the selection of an appropriate project balancing investor and developmental expectations and the attraction of a sufficient number of investors through demonstrating creditworthiness) and ongoing operational risks (including the fulfillment of its debt service obligations to avoid default).

2. Characteristics

The DMFP involved innovations on several fronts, such as in financing (testing a new fund-raising tool), social aspects (constructing a new marketplace for street vendors in a strategic location in accordance with the city's long-term development strategy), planning (it is part of a long-term strategic plan named 2025 Vision) and governmental and administrative aspects (building capacity in city staff to enhance creditworthiness through good governance, financial management and public participatory processes).

Highlight

The Dakar Municipal Finance Program is a remarkable innovation for sub-Saharan Africa; It signifies one of the first instances that a city has seized control of its financial destiny and directly approached private investors, through the capital markets, to source funds for investment projects. The program itself was fraught with a number of risks as identified above, and many skeptics in the international development community had doubts as to its likelihood of success. These skeptical views are predominantly linked to the pioneering nature of the program and the fact that it had not been attempted by any other city without the full faith and credit of the central government as an explicit guarantee of payment to investors.

Because of the success of the DMFP, other cities across the continent will face lower barriers to entry (including lower transaction costs, less skepticism from investors and central governments, etc.) and will be able to pursue bond finance as a means for funding capital-intensive projects. This program has created untold opportunities for other cities, and has changed the face of development finance in the global South.

▾ Experience and Inspiration

First, urban construction projects should be designed for improving people's wellbeing. The Dakar Municipal Finance Project represents a wellbeing-enhancing project oriented towards people from the low strata of society. Under the realization that people from the low strata of society make up a large portion of Dakar's population and in adherence to the ideal of "putting people first", the government of City of Dakar has incorporated wellbeing improvement into the overall framework of urban construction, considering it to be a vital tool for boosting city development. Thanks to the DMFP, which is incepted

to finance the buildup of a central marketplace to accommodate street vendors, the transportation and hygienic conditions of City of Dakar have been significantly improved.

Second, democracy does not necessarily translate into wellbeing enhancement. The DMFP has received extensive acclaims from all quarters of society, mainly because partisan politics was set aside to make the launch of the initiative a reality. As is clearly shown in the success of the DMFP, democracy does not necessarily translate into an improvement of people's quality of life. Excessive and unchecked democracy might even generate negative impacts on people's wellbeing. Open elections



□ Evening in the Senegal

and democracy can be seriously considered as a viable pathway to improve people’s livelihood, but in many cases, this pathway often leads nowhere. This has been the path taken by a number of countries in Asia, Africa and Latin America after their declaration of independence. The elites in these countries have attempted to follow the model of Western-style democracy, aspiring to boost people’s quality of life through the democratization processes, but most of such endeavors ended up failing to catapult their countries onto the track of economic prosperity.

Third, cooperation leads to a win-win outcome. The City of Dakar, as the lead agency and umbrella for the DMFP, has engaged other parties, both private and public, to assist at various points. These parties include the Bill & Melinda Gates Foundation (the primary

underwriter of the DMFP, providing USD \$5.5 million over 4 years), United States Agency for International Development (to act as the bond’s guarantor and as a donor, subsidizing the transaction costs associated with the bond issuance by USD 1 million), Moody’s Ratings and Bloomfield Ratings (the city’s external ratings agencies), and CGF Bourse (the financial intermediaries to the local market regulators). Institutional parties include the Cities Alliance (to provide key technical expertise and knowledge and the task manager for the Bill & Melinda Gates Foundation), the World Bank / PPIAF (to assist in scoping of the city’s financial strengths and weaknesses as well as the optimization of the city’s taxes), the French Development Agency (to analyze the city’s financial abilities and act as the city’s first lender) and the CREPMF (the local market regulatory body).





**Australian-
New Zealand
Line**

Australia



□ Overlook of Melbourne

/ **Melbourne** / 4°C Cooler: Using Green Infrastructure to Build a Climate Resilient and Prosperous Melbourne

Facing extreme climate challenges, Melbourne were not initially aware of the importance of ecological systems, thereby eliminating water supply for

urban landscape irrigation, which has led to significant reduction of green areas. As climate change becomes increasingly fierce, Melbourne's Government began

to realize the need to develop a long-term strategy. In 2010, it launched the initiative of “4°C Cooler: Using green infrastructure to build a climate resilient and prosperous Melbourne”. It formulated two strategies for urban development: Urban Forest Strategy; Open Space Strategy. In 2014, the initiative of “4°C Cooler: Using green infrastructure to build a climate resilient and prosperous Melbourne” stood out from 259 global candidate items for Guangzhou International Award for

Urban Innovation and became one of the 10 nominated cities for the second Guangzhou Award.

Background of the Initiative

Melbourne, located in the south-east of Australia, is a port city. As the capital of the state of Victoria, the second largest city of Australia Commonwealth, with per capita GDP of USD167660, it is the fastest developing city in Australia, covering a large area of 8831 square kilometers. In a narrow sense, Melbourne means the downtown district of Melbourne, with an area of 37.7 square kilometers. The space area mentioned below refers to Melbourne central urban area in a narrow sense.

From 1995 to 2009, Melbourne witnessed extreme hot weather, leading to severe drought, lack of water and heat, leaving 374 people dead. Relevant climate change study showed that Melbourne will more frequently suffer droughts, hot weather and floods in the future. During the drought, the city proposed to reduce the demand for water supply by 90% in the center of the city, thereby removing the irrigation of urban green landscape, and making substantial reduction in urban green areas. 40% of trees for urban landscaping are planned to be transplanted

 Name of City: Melbourne

 Name of Province/State: Victoria

 Name of Country/Region: Australia

 Geographic Region: Asia and Pacific

 Population: 4,529,500 (2015)

 Surface Area: 9,990.5 km²

 Population Density: 453 people / km²

 GDP per capita: USD 167,660

 Title or Slogan of the Initiative: 4 ° C

Cooler: Using green infrastructure to build a climate resilient and prosperous Melbourne

 Start Date of the Initiative: 2010

 End Date of the Initiative: in the Process

 Thematic Area: Society Environment Governance/Management

in the next 15-18 years. In addition, as the process of urbanization accelerates, ecological land is gradually eroded. Faced with the growing issue of extreme weather, the current mainstream view of water resources management believes that Melbourne has underestimated the value of green spaces and failed to realize the importance of ecosystem services. The old development ideas and methods of reducing water supply for urban landscape irrigation seem more extensive, which cannot effectively solve the problem. Melbourne needs to formulate a strategic plan so as to combat a series of climate problems and maintain economic prosperity and development at the same time.

In 2010, Melbourne made a shift in thinking. The City Council appointed a new team of urban green landscape, responsible for solving the above problems. The team developed two strategies and proposed urban development plans: Urban Forest Strategy; Open Space Strategy. In order to fulfill the targets, the team of urban green landscape implemented green infrastructure project, mainly for the building of downtown area in Melbourne. Green facilities include providing facilities of ecological services as well as those that will help improve urban adaptability

directly or indirectly. Specifically, there are facilities of two major types: one is green facilities, such as urban forest system made by trees, and flora and fauna, waterways and wetland; the other is artificial green facilities, including green open spaces, such as park, garden, natural reserve, and greenway, as well as green buildings, such as green roof and green wall, and green technology, for example, rain collection devices, and permeable road.

▾ Implementation of the Initiative

Launched in 2010, the project is a significant shift on Melbourne's journey to respond to extreme climate change and rapid urbanization. The launch of the project shows that Melbourne Government has broken away from the old way of thinking. The urban development goal has not only been targeted at economic growth, but also at sustainable development. Through the full implementation of urban green infrastructure projects, Melbourne plans to build itself into a model of new livable eco-green city in the future, so as to realize the great vision of a city in the forest.

1. On the Level of Implementation

(1) Effectively meeting the requirements of urban development strategy to build urban forest ecological structure

Published in 2002, 2030 Sustainability Plan for Melbourne has provided a long-term plan for the development of Melbourne and its surrounding places. According to the plan, in the next 30 years, Melbourne will be built into a livable city, a prosperous city for enterprises to thrive as well as a charming city for tourists to visit. The strategic plan emphasizes the overall direction of Melbourne, outlining 12 “green-wedge” areas, which belong to 17 local governments respectively. Their area is more than half of the total area of Melbourne. Strict control and development has been implemented in

“green-wedge” districts during urban construction and development.

Melbourne urban center, as an important controlling “green-wedge” district, has linked and implemented relevant requirements of urban strategic plan during its construction and development. With the implementation of two public policies, “Urban Forest Strategy”, and “Open Space Strategy”, replying on Yarra River natural water system, green belts alongside the river have been built to link cultural facilities, such as exhibition center (Federal Square), gambling city, as well as concert hall. Large green areas as well as urban open space, such as Royal Botanical Garden, Carlton Park, Olin Olympic Park, and Fitzroy Park, have surrounded and divided the urban center. By perfect planning and arranging open space



□ Wind Turbine

and green belts, such as large space of waterfront green land as well as urban ventilation corridors, good urban forest ecological structure with clear ecological texture has been formed, which plays a significant role in regulating urban micro-climate and reduce urban heat island effect.

(2) Combining theoretical research with expertise, and formulating practical program based on strategic objectives

Melbourne innovation project pays much attention to theoretical research and practical application concerning climate change as well as urban green space construction. On the scientific and solid foundation of academic research, in accordance with strategic goals of the project, it has made reasonable implementation plans for relevant programs so as to put high-tech professional science and technology into

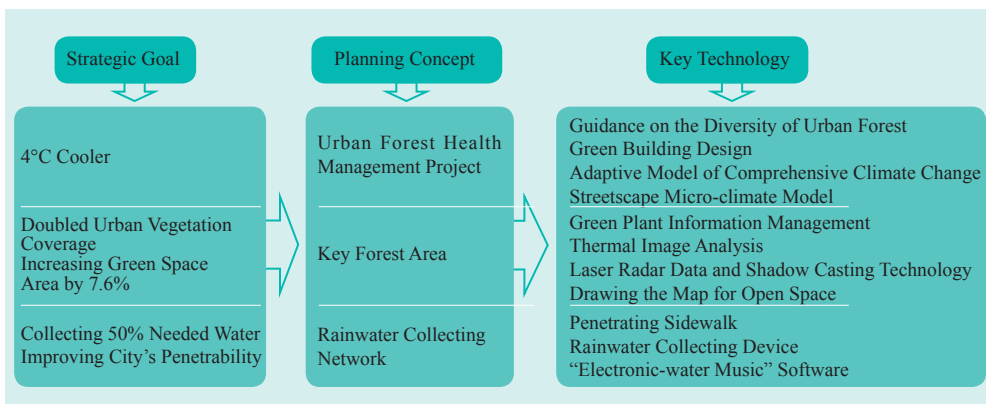
practice in a targeted way.

In order to achieve the strategic objective of reducing temperature by 4°C, an urban forest area that is diversified and highly adaptable needs to be built so as to maximize the function of ecosystem. To this end, a series of urban forest management project has been implemented.

To realize the strategic goal of increasing vegetation coverage and expanding the green space network by 7.6%, the city needs to make a plan of tree-planting project each year. In order to plant trees in a strategic way, 7 key forest areas in the city have been delimited to be planted in the next 10 years.

In order to achieve the strategic goals of collecting 50% of required water and increasing the permeability of the city, the municipal government needs to plan and implement the construction of a rainwater

Key Content of Melbourne Innovation Plan and Implementation Program





□ Citizens participate in the jointly designed Urban Forest District Plan Project

collection network. By collecting rain water, 25% of green irrigation water demand can met each year. Even during the drought season, the network can still work at a low cost and in an efficient way to ensure municipal water supply.

(3) Emphasizing the application of green technology, with a focus on building green demonstration project

Melbourne city construction, with going green and harmony as the theme, has innovatively integrated new concept, materials, and technology into the

construction of project to build a series of major model projects. For example, with the design concept of wetland of rain processing type in Melbourne Royal Park, an artificial wetland and rain recycling system project has been proceeded. Also, on Collins Street, sewage filter processing device, water for spray, rain recycling device, as well as underground sewage pipeline have been perfectly combined to water trees along the street. Among them, the most impressive one is a six-star green building of the No. 2

city government office building (Council House 2, CH2). There are innovative applications in CH2 in terms of lighting, ventilation, environmental protection, energy saving, as well as waste water recycling.

2. On the Level of Management and Guarantee

(1) Enhancing public support for urban forest through creative operation of public projects

Melbourne innovation project needs to get support from general community and the public. Therefore, the municipal government has launched a citizen participation project lasting for up to 4 years to invite all communities to participate in the design of “city forest

regional planning”. Mainly, in the way of professional team work division and encouraging public participation, a series of integrated innovation measures have been taken and multiple pilots have been established. According to geographic and climate conditions, 38 species have been chosen to build urban forest with species diversity and high adaptability, so as to create a pleasant living space for animal species.

These activities and projects have witnessed strong Melbourne media coverage and promotion, in which the exposure of urban forest planning has been increased significantly. It has received wide acclaim and support. When actively participating in the construction of urban green infrastructure-



□ Roof Garden in the Burnley Campus of Melbourne University

related projects and activities, citizens have improved their awareness of environmental responsibility.

(2) Making full use and combining expertise of various types, so as to effectively promote the process of urban green infrastructure

Melbourne government has worked together with various professional power to jointly carry out related research and close cooperation, mainly in the respects of developing monitoring device for green environment data, build economic framework for green basic facilities, wisdom city as well as city elasticity. For example, a joint research has been carried out with Melbourne University, which aims to understand the effect of climate changes on trees in Melbourne technology in an in-depth way through the technology of dendroarcheology, the first case in the country; a study of “economic assessment on green basic facilities” has been jointly conducted by Victoria University, the state of Victoria and the other local governments. The study will establish innovation framework, so as to assess the economic benefits of green infrastructure, including service value of ecosystem service and effect on health, etc. In summary, in the process of urban green infrastructure, Melbourne has fully taken advantage of professional expertise of various types to form and improve

5-year phased and long-term development strategy of “4°C cooler”, to provide strong support for the city to achieve the cooling goal and sustainable development.

(3) Actively seeking financial support from governments and all sectors of the society to guarantee the sustainable operation of innovation project

The successful implementation of Melbourne's innovation projects will not do without substantial financial support, in particular the continued long-term financial assistance. In order to guarantee the normal operation of the project, since 2010, this project has gained \$40 million in financial support from the City Council, State Government and the Federal Government. Except for continued funding support from the City Council, the project has also developed an amendment for planning scheme, established the “framework of open space” to attract private-sector investment in green infrastructure. In order to ensure private-sector investment in an effective and orderly fashion, scientific evidence needs to be cited to promote public and political agenda to attract long-term investments in green infrastructure. In this sense, the municipal government of Melbourne advocated to cooperate with the University of Victoria for the establishment of economic framework to evaluate the economic and social value

brought about by green infrastructure and ecological system. In addition, a 4-year project of public participation has educated and mobilized the citizens, thus receiving great support from the general public and community organizations.

▮ Effect and Challenge

1. Effect of the Initiative

(1) Renewing the traditional thinking of combating extreme urban climate, highlighting the importance of green infrastructure in urban construction

So far, Melbourne is the first city to propose the goal of reducing urban temperature by 4°C. Through the two established strategies and specific development objectives, “Urban Forest” and “Open Space”, as well as the design of a series of implementation plans, the city has guaranteed the smooth operation of urban green infrastructure project. Currently, \$40 million has been invested in Melbourne’s green infrastructure project based on the entire eco-system, which is the first in Australia. The construction of green infrastructure in Melbourne, different from that of carbon-intensive infrastructure in the city’s green area, has taken full advantage of functions of nature through a series of projects, used relevant high-tech professional



□ Prince Park in Melbourne

technology, and fully displayed the role of urban green infrastructure, so as to build Melbourne into an efficient, smart, and eco-international metropolis. At the moment, Melbourne is now promoting green infrastructure plan at national and global levels and providing reference and inspiration to relevant cities with its successful experience of urban construction and development.

(2) Promoting pilot demonstration projects in a comprehensive and orderly way, bringing achievements in the practice of building urban forest

In order to reach the city’s goal of reducing urban temperature by 4°C and decrease energy use in this regard, Melbourne has invested a large sum of money in two aspects, including technology for planning and practical

operation.

First, in terms of technology for planning, the municipal government of Melbourne has established 7 regional plans for urban forest, and complied “A Guidance for Urban Forest Biodiversity”.

Secondly, at the practical level, relevant pilot projects have been set up, including the construction of urban forest and shrubs, protection waterways and wetlands, as well as green space, rainwater irrigation, infiltration sidewalks, green buildings and green spaces and so on.

(3) Creating a livable ecology green city of new model to enhance the city’s brand image and influence

Thanks to local and national media coverage, the innovative project has not only attracted native scholars in Australia, researchers in South America and United States to come for study, but also inspired many cities in Australia, including cities such as Brisbane, Darwin and Perth. In the forms of government meetings, field trips and other activities, it has shared its knowledge and experiences with local governments in other cities. Meanwhile, it has also brought inspiration to 12 parliaments in Victoria. In this sense, the innovated project has increased its reputation all over the world, with its model effect continuously expanded. Currently, Melbourne has actively set

a city image of boldness, vision, and sustainable development, featured by livability, green, and ecology. Thus, it has won the prize of “Best Specific Environmental Initiative” in 2013 given by Australia United Nations Association, Banksia Foundation Australia Climate Adaptation Award 2013, and become one of the finalists for the 2014 C40 Cities International Cities Award Category for Climate Change Adaptation. Melbourne’s influence and competitiveness in the global cities have increased dramatically.

2. Challenge of the Initiative

(1) Cash-strapped problem threatening project sustainability

The construction of green infrastructure includes not only natural green infrastructure, but also artificial green infrastructure. Projects and technologies involved in the initiative are very diverse and complex. Since this project is the very first in Australia, its early fund mainly relies on the fiscal revenue of Federal Government and the State Government. However, relying solely on the government cannot maintain the subsequent long-term operation, which requires a lot of community, private-sector investment. Yet, compared with other facilities, green infrastructure is difficult to bring direct economic income for developers; the market prospects on

green infrastructure investment are not clear. The economic value and benefits have yet to be proved. It can be known that private-sector investment under market economy is still at its early stage. Long-term funding has not been completed, which will bring the follow-up operation of the innovative project into a certain cash-strapped predicament.

(2) Development ideas of urban green infrastructure needs to be promoted

In the traditional city development concept, urban green infrastructure would pay more attention to aesthetic value, to the neglect of the ecosystem services value and other socio-economic value. Actually, reasonable planning and construction of green infrastructure can effectively reduce the city's dependency on grey infrastructure, save input in national public resources, reduce people's sensitivity towards natural disasters. It has a very close relationship with city ecological system health and the human health, and it is a necessary "basic facility" in maintaining natural life process. In this sense, green infrastructure has played a key role in city transformation development. In the future, it is necessary to strengthen awareness and support of citizens, communities, as well as all social sectors for green infrastructure, based on the strategic goal of "4°C cooler", through multiple forms, including media, and

workers workshop, and forums.

Practice and Innovation

1. Revolutionary Innovation

Traditionally, cities are designed to function in a way that excludes nature. Green Infrastructure (GI) planning in many cities has been negatively affected by institutional failures to acknowledge the benefits that ecosystem services provide. As a result, green infrastructure is often treated one-dimensionally — that it is something nice to have instead of providing critical ecological and social functions. This type of thinking led to the withdrawal of water for Melbourne's urban forest during the drought and it triggered the unprecedented decline of the tree population.

Our new perspective is to consider green infrastructure as the city's most important and vital infrastructure. This is revolutionary for following reasons:

Our holistic, ecosystem based approach accompanied by a demonstrated multi-million dollar investment beyond business as usual investment in green infrastructure is the first of its kind for a city in Australia. As opposed to implementing carbon intensive infrastructure interventions in the landscape, we focused on harnessing the

benefits of nature and demonstrated the capacity of urban landscapes as green infrastructure using a broad range of projects.

No other city or municipality has a goal to cool the city by 4°C.

We are leading and driving a policy shift, nationally and internationally, towards recognizing green infrastructure as a crucial asset that provides multiple

benefits for society and the city.

2. Characteristics

This innovation is being applied in policy, strategy, research planning and implementation.

(1) Policy and Strategy

- ◆ Urban Forest Strategy—doubling the municipal canopy cover from 20% to 40% and expanding the stormwater harvesting network to capture 50% of required water

- ◆ Open Space Strategy—increasing the permeability of the city and expanding the green space network by 7.6%

(2) Planning

- ◆ We have developed 7 Urban forest Precinct Plans to guide tree planting for the next 10 years.

- ◆ Our “Growing Green Guidelines” is Australia’s first comprehensive technical reference guide for constructing green roofs, walls, and facades in a city context

(3) Implementation

- ◆ We have planted 15,000 new trees since 2010 and we are planting 3000 new trees each year

- ◆ Investing \$250,000 for passive irrigation systems in parks

- ◆ Investing \$5 million for streetscape adaptation to retrofit 40 streets to increase permeability and introduce water sensitive urban design



□ Ecological Livable City—Melbourne



□ Melbourne—City in the Forest

- ◆ Delivering the world’s first in-road stormwater harvesting system at Darling Street

- ◆ Investing \$20 million to build a stormwater harvesting network from 2011–2014 contributing to securing 25% of the water required for landscape irrigation annually

- ◆ A four year citizen engagement program to develop public awareness about the impacts of drought on the urban forest

- ◆ Delivering the 200m² green roof—“The Venny”

- ◆ Investing \$5 million for Errol Street Park which involved expanding

green space by converting a street into a park

(4) Research and partnership

- ◆ Our joint research with the University of Melbourne, using dendrochronology techniques to understand the impacts of climate change on Melbourne’s trees, is the first of its kind for a city

- ◆ Our “Integrated Climate Change Adaptation Model” will, as Australia’s first city climate decision making tool, enable us to use local data and make strategic decisions about the locations of green infrastructure interventions for the municipality

◆ Our “Assessing the economic value of green infrastructure” research in partnership with Victoria University, State and other local governments will enable us to develop an innovative framework to assess the true economic value of green infrastructure, including the value of ecosystem service and health benefits that have been traditionally neglected.

◆ Our Elm Genetic Diversity Program was the first in Australian cities to engage citizen foresters in collecting local scientific data for our future landscape management.

▾ Highlight

Our innovative aspect is that we are using an ecosystem based climate adaptation approach using green infrastructure to cool our city by 4°C degrees by 2040.

Despite the fact that no other city in the world has ever set up such ambitious target, we are confident this can be achieved by doubling tree canopy from 20% to 40% and maintaining the health and resilience of our urban forest.

We take a holistic approach to ensure successful delivery of this target is worth sharing with fellow cities and regions. In addition, a series of measures have been taken to improve citizens’ awareness of

urban forest.

We understand the success of the target delivery also requires long term financial commitment which usually is challenging. Since 2010, we have secured investment of \$40 million from the Council and in partnerships with the State and the Federal government.

Besides the on-going dedicated budget from the Council, we have also progressed in a planning scheme amendment introducing the “open space contribution framework” ensuring private sector developments financially contribute to green infrastructure provision.

We understand the need for scientific proof to drive the public and political agenda towards long term investment on green infrastructure. Hence, we are currently working with the Victoria University on developing an economic framework to assess the economic value of our green infrastructure and its ecosystem and social benefits.

▾ Experience and Inspiration

1. Using scientific, rational top-level design and integrating green infrastructure into urban construction

The success of Melbourne’s innovation is closely related to its

scientific, rational top-level design. To put it simple, two strategic plans have been worked out from the development goal of the project, and specific targets have been developed based on strategic plans. And then, based on specific target, a comprehensive and systematic implementation plan has been designed from two aspects, including theoretical research and professional technology. The operation of the project has been guaranteed through funds, labor, and policy, thus forming a complete system of urban green infrastructure that combines theory and practice, and providing a vivid demonstration sample for urban development and construction.

The construction model of Melbourne's urban green infrastructure, with the establishment of a "green infrastructure" system of comprehensiveness and connectivity as the core, integrates urban greening, rainwater collection network, irrigation and drainage system, green open space, green buildings, as well as penetrated sidewalk.

2. Creating green infrastructure with multiple technology to support the building of an eco-livable city

In the basic design of a modern city, the building of ecological infrastructure is the necessary direction



Artificial Green Infrastructures in Melbourne

of city development. It has reflected the concept of practicing circular economy, low-carbon economy and sustainable development. Specifically, ecological infrastructure construction must be emphasized, including woodland, and

open space, grassland, park, as well as river corridor. Through the imitation of natural system, the function of regulating air quality, water, micro-climate and management energy resources has been given to the full play. In addition, we need to emphasize the application of green technology in all aspects, especially in energy, water supply and drainage facilities and environmental protection facilities, new energy, pollution control, environmental monitoring, and the use of green technology, so as to support the building of eco-cities, livable cities, as well as environmental protection model cities.

The experience of Melbourne's urban innovation project can be drawn upon by relevant cities. For example, in the design of a sponge city, green stormwater infrastructure can be built. Effort has been made to make full use of natural conditions and, applying simulation of nature through a series of technical measures, to control urban stormwater runoff pollution, reduce flood, use water resources in a scientific way, protect water environment, and promote urban healthy water cycle. In addition, green building design has become a trend in architectural design. To strengthen the application of green technology in modern buildings, measures can be taken through the application of green building materials

and by taking advantage of natural light and ventilation, energy technologies, building walls, green roof, and increasing the overall green area of buildings, so as to achieve green development in the city.

3. Emphasis on community participation and cooperation, leveraging the national power in promoting urban green infrastructure

Urban green infrastructure involves different stakeholders, usually involving all levels of government regulatory agencies, research and educational institutions, landowners, environmental groups, communities and other stakeholders, who have different backgrounds and needs. In order to guarantee the smooth development of urban green infrastructure planning and implementation, it is necessary to emphasize the participation of official and non-governmental organizations, as well as popular participation, to think highly of its assets so as to evaluate on public support and social capital needed to achieve the features of green asset and benefits needed. And this shall be included in the entire planning and implementation process, thus becoming an important basis for determining the direction, goal, as well as program implementation.

A white hexagonal marker with a black border containing the text 'New Zealand'.
New
Zealand

/ **Christchurch** / **Our Ever Evolving City: Public Participation in Post-Disaster Construction**

From 2010, a series of earthquakes and aftershocks devastated large parts of Christchurch city, causing great casualties and massive damage to properties.

Following the Canterbury earthquakes, Christchurch City Council launched the Share an Idea community engagement process, in which the public submitted



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- 🏠 Name of City: Christchurch
 - 📍 Name of Province/State: Canterbury
 - 📍 Name of Country/Region: New Zealand
 - 🌐 Geographic Region: Asia and Pacific
 - 👤 Population: 375,000 (2016)
 - ⚙️ Surface Area: 1,426 km²
 - 👤 Population Density: 260 people / km²
 - 📊 GDP per capita: NZD 49,447
 - 🗣️ Title or Slogan of the Initiative: Christchurch:
Our Ever Evolving City
 - 🕒 Start Date of the Initiative: April 2011
 - 🕒 End Date of the Initiative: in the Process
 - ⚙️ Thematic Area: Society Economy
Environment Governance / Management
-

📍 Sea View of Christchurch

ideas for the Christchurch rebuild. The public feedback formed the basis of the Christchurch Central Recovery Plan, which included A Transitional City. In 2014, the Transitional City program stood out among the 259 entries vying for the 2nd Guangzhou International Award for Urban Innovation (Guangzhou Award) and was selected as one of the five winning initiatives.

📄 Background of the Initiative

1. A series of earthquakes left trails of destruction and desolation across Christchurch

The Christchurch urban area lies on the east coast of the South Island in New Zealand, well-renowned as the “Garden City”. Home to a population of 375,000 people, Christchurch is the third most

populous urban area in New Zealand, second only to Auckland and Wellington. It is also the largest city in the South Island. Located along the Pacific Ocean's Ring of Fire and sandwiched between Pacific Plate and Indo-Australian Plate, Christchurch is frequently struck by low-intensity earthquakes.

The Canterbury Earthquake (also known as the Darfield Earthquake) struck the South Island of New Zealand (about 40 kilometers to the west of Christchurch) with a moment magnitude of 7.4 at 4:35 a.m. local time on September 4th, 2010. Despite the fact that the earthquake caused no casualties, it did wreak havoc on Darfield Town and its surrounding areas. After the Canterbury Earthquake erupted, Christchurch was struck successively by over 10,000 earthquakes and aftershocks, including several ones with massive magnitudes. The most severe one erupted on February 22nd, 2011, recorded with a magnitude of 6.3, which claimed 185 lives and injured thousands of people.

As a result of frequent occurrences of earthquakes, land, infrastructure and buildings were critically damaged. 80% of the buildings in the city center were demolished; certain sections of Christchurch Cathedral were devastated; electric wires in certain areas of the eastern suburbs fell to the ground, resulting in a blackout that affected

some 15,000 households; the seismic shock waves caused the ground of some suburban parking lots to liquefy and turn into mudflats; the central city was closed; communities, schools and enterprises were forced to relocate somewhere. With the city in tatters and with trails of destruction seen everywhere, the urgency of rebuilding Christchurch City could not be overstated.

2. The Christchurch Central Recovery Plan based on public involvement

Confronted with a series of earthquake-induced problems, Christchurch City Council launched the "Share An Idea" community engagement process, a program designed to galvanize Christchurch citizens' enthusiasm and wisdom for the post-earthquake rebuild. As a result, the public submitted over 100,000 ideas and suggestions concerning the Christchurch rebuild. The community's vision was for a livable, vibrant, green and prosperous city.

The public feedback formed the basis for the Christchurch Central Recovery Plan, which included the Transitional City Program, to be led by Christchurch City Council. Envisioned to be fulfilled within 20 years' time, the Christchurch Central Recovery Plan drew strengths from successful practices from around



□ Post-earthquake Site of Christchurch

the world and was fully considered in the Life in Vacant Spaces report. Through the successful implementation of the Christchurch Central Recovery Plan, a new city is now rising from the earthquake-left ashes, phoenix-like. The earthquake-torn Christchurch is being reinvigorated under a well-devised blueprint for rebuild, which will surely lay the foundation for a bright future of this time-honoured city.

3. Strengthening public involvement in the Christchurch rebuild to re-establish community-based emotional bonds

While rebuild plans were made, Christchurch City was confronted by large desolate areas of vacant land

and low amenity, which created a so-called “Island Effect” as businesses re-established. Worse still, the road network and other facilities were torn apart by the earthquakes, resulting in the disconnection of communities to the heart of the city and in the severing of emotional connections among people.

With local community residents suffering great losses in both lives and properties, they found their daily life and work constantly disrupted by the lingering memories of the earthquakes. Some local residents of Christchurch found themselves afflicted with “post-earthquake disorder”, a form of disorder that falls into the category of “post-traumatic disorders” (PSTD). Symptoms

of “post-earthquake disorder” include: feeling distressed & frustrated throughout the day, feeling unwilling to speak out, being obsessed with religious teachings, staying outside the house for long, being afraid to fall asleep at nights and suffering from hyperaesthesia. When conditions get worse, the person afflicted with “post-earthquake disorder” may even lose his or her mind, or may even attempt to commit suicide.

Healing and hope were needed while people faced large-scale loss and on-going disruption to daily life. The Christchurch City Council needed to galvanize initiatives that brought people together. Specifically, the council needed to involve people into the cause of Christchurch rebuild, support business recovery, infuse people’s ideas and suggestions into the rebuilding process, reshape the memories of the city, reconnect people to their city and restore a sense of safety, belonging, pride and identity.

▾ Implementation of the Initiative

1. Setting up reasonable goals in key areas and taking responsive & effective approaches

The Christchurch Central Recovery Plan was implemented to launch the



□ People in Christchurch have great passion for the activities held by the government

Transitional City Program, which included support for recovery in three areas – community rehabilitation, sense of place restoration and business revival. The overarching objectives of the initiative were to reshape a stable social fabric, restore people’s sense of place and rejuvenate the city’s business.

(1) Supporting community healing and rehabilitation by reshaping a stable social fabric

The earthquakes not only caused



untold losses to local residents' properties and wealth, but also left indelible wounds on their hearts. In response, Christchurch City Council encouraged the public to involve in the rebuild process, taking into full consideration local residents' ideas and suggestions concerning city rebuild. At the center of the rebuild program was the effort to restore historical memories and build new positive memories, so that the emotional bonds between communities could be reconnected.

Strenuous efforts were also exerted to provide psychological therapies to community residents suffering from post-earthquake disorder, so that they could have their sense of pride and identity restored. Voluntary activities were properly organized in local communities to foster volunteering. Local residents were brought closer together through such volunteering activities as helping and caring for people most affected by the earthquakes. These volunteering activities served as a catalyst for the healing and rehabilitation process of communities, both physically and psychologically. Moreover, public ideas and suggestions concerning community rebuild were solicited from all sides. Residents with novel and foresighted ideas were offered support and favorable conditions regarding land, venues and funding, so that the public could test the feasibility of these new ideas and find out whether they could be adopted for the long term.

(2) Supporting recovery of sense of place and developing a sustainable city

Faced with trails of destruction, Christchurch launched a well-devised urban design plan to create a city environment that helped restore people's sense of place. The objective in this regard was to build a safe, livable, vibrant, green and prosperous city for local communities and to explore, test and create new sense

of place and identity.

The post-earthquake rebuild process for Christchurch was advanced under the guiding principle of functional zoning. The central business district of Christchurch was rebuilt and expanded southeastward along the Avon River. Efforts and resources were concentrated on rebuilding major infrastructural facilities, including the convention center and the central library. Large sections of vacant land were put to proper use in the rebuild process, while citizens, social and non-governmental organizations were encouraged to involve in the creative reconstruction process. As a result, a variety of transitional city projects with distinctive features sprang up, which helped to restore people's sense of place and regenerate the city's vitality.

(3) Supporting business recovery to reinvigorate the city's vitality

A series of earthquakes and aftershocks devastated Christchurch's business and disrupted people's daily life and work. Business constitutes a city's lifeline. As a number of commercial buildings were damaged to varying degrees by the earthquakes, there was an urgent need to restore these buildings for the recovery of business.

Given the urgency of the situation, the Transitional City Program was infused with a variety of pilot projects, each with

its distinct function and all for the purpose of providing the services that people greatly needed. These projects included: weekend marketplaces, commercial plazas, ice cream vehicles, bicycle renting and repair, exchange of home potted plants, 3D model printing and mini-sized golf courses, coupled with large-sized community-based activities that were held on an irregular basis.

In general, in the rebuild process, great importance was attached to the following respects: using recyclable and anti-seismic construction materials; improving traffic conditions for pedestrians by opening up new pavements and increasing transportation



□ Temporary Music House in the Christchurch after the earthquake

The Relative Organizations after the Christchurch's Earthquake

Organizations	Missions
Christchurch Central Development Unit (CCDU)	Founded on the “Share An Idea” campaign, CCDU is committed to bringing about the reinvigoration of Central Christchurch.
Earthquake Commission (EQC)	EQC provides disaster insurance covering home properties, manages natural disaster fund and offers financial assistance to educational and research institutes dedicated to mitigating the impacts of natural disasters.
Stronger Christchurch Infrastructure Rebuild Team (SCIRT)	SCIRT is founded to rebuild infrastructural facilities in Christchurch in the post-earthquake period.
Canterbury Earthquake Recovery Agency (CERA)	CERA is a government-led agency committed to coordinating efforts from all sides for the rebuild process.
Christchurch Transport Network	Christchurch Transport Network is responsible for developing special networks that help users find the speediest and safest roads.
Greater Christchurch Urban Development Strategy	Responsible for formulating steps and actions plans for the future development of Christchurch.
Future Christchurch	Responsible for releasing the latest reports and information.

accessibility; encouraging young people to start their own businesses, creating jobs for young people and increasing creative sectors; shaping a safe, livable and green city image; promoting the development of local tourism by attracting more domestic and international tourists to Christchurch. In a nutshell, a variety of approaches and measures were taken to rejuvenate the city’s vitality and to reinvigorate its modern appeal.

2. A government-led initiative that involves extensive public participation and multi-actor collaboration with non-profit organizations as the key actors

The innovation of the initiative lies in multi-partner collaboration for post-crisis rebuild, involving local governmental organizations (Christchurch City Council), government agencies (including Canterbury Earthquake Recovery



□ Temporary Green Buildings and Artworks in the Christchurch' s Cathedral Square

Authority) and non-governmental organizations (including community-based organizations like Gap Filler Trust). The key functions of the local government, government agencies and private sector are as follows:

(1) Local Government

As the central authority for Christchurch post-earthquake rebuild, Christchurch City Council is responsible for implementing and supporting the Transitional City Program on behalf of the general public; providing funds for the advancement of transitional city construction projects and the installation of permanent infrastructural facilities;

taking effective measures to reduce safety risks affecting arts facilities and public activities and providing speedy project approval services; promoting the prosperity and development of local creative industries (by means of setting up Creative Industry Support Fund); acting as an intermediary between project managers; gaining support from the central government, Maori residents, tourism-related and commercial organizations. Other governmental organizations also played a crucial role in the rebuild process, including Christchurch Central Development Unit (CCDU) and Earthquake Commission

(EQC).

(2) Government Agencies

Government agencies included Canterbury Earthquake Recovery Authority, a special organization led by Christchurch City Council and charged with the responsibility for advancing and coordinating efforts from all sides for the post-earthquake rebuild process. Another key government agency was the Stronger Christchurch Infrastructure Rebuild Team (SCIRT), which was responsible for advancing post-earthquake infrastructural recovery.

(3) Private Sector

The private sector in this regard mainly included non-governmental organizations, which were key coordinators for the implementation of the Transitional City Program in Christchurch. These non-profit non-governmental organizations included: Gap Filler Trust, responsible for delivering

and enabling temporary social activation projects; Greening the Rubble Trust, responsible for delivering and enabling temporary landscape projects; Life in Vacant Spaces Trust, responsible for matching temporary projects with suitable vacant sites by legal agreement, lowering risks and barriers to participation, and connecting other support.

Other non-governmental organizations included: Christchurch Transport Network, Greater Christchurch Urban Development Strategy and Future Christchurch. In general, this initiative, ever since its very inception, has been infused with the concept of public involvement. A variety of approaches were adopted to galvanize public enthusiasm for involving in the rebuild process, like launching the “Share An Idea” Project, setting up relevant trusts and non-profit organizations and organizing a series of activities (including

Estimated Cost Source of Post Earthquake

Costs in Various Fields	Billion USD	Proportion (%)	Indicative Funds	Proportion (%)
Housing	12–18	60	Private Insurance Company	30
Infrastructure	2–3	10	Earthquake Commission	40
Commerce	2–3	10	Company	20
Government	2–3	10	Local government and others	10
Community Property	2–3	10		
Total	20–30 billion USD			

Art Box and Beat Box, the Festival of Transitional Architecture, Rekindle, Audacious Festival of Sonic Arts, etc.)

The Established Organizations after the Earthquake in Christchurch

3. Establishing an innovative, coordinated and comprehensive prevention mechanism to crack the conundrum of sustainability facing Christchurch in the post-earthquake period

The Christchurch Central Recovery Plan should be considered revolutionary in nature. Christchurch City Council is implementing the “Transitional City”

Program on an unprecedented scale. The essence of the Christchurch Central Recovery Plan lies in establishing a socially coordinated comprehensive prevention mechanism based on strong public involvement. Under this mechanism, holistic and long-term approaches are being taken to facilitate the process of city rebuild, city renewal and sense of identity restoration. This mechanism is the key to effectively cracking the conundrum of sustainable development facing Christchurch in the post-disaster period. In general, the social coordinated comprehensive prevention mechanism demonstrates innovation in



□ Business District in the Christchurch



Community Innovational Life after the Earthquake in Christchurch

the following areas:

(1) Organizational Structure

All partners are brought closely together to jointly advance the post-earthquake Christchurch rebuild efforts and to build a safe, livable, green, creative and prosperous new city. Collaborative approaches are used to align partners around a new concept for the city, including local Maori, property owners, businesses, tourists, event organisers, the arts community and local universities.

(2) Governance

New non-profit trusts are established (with broad community representation),

which with broad community representation and support, are able to reflect the wishes and will of the majority of community residents. Through these non-profit trusts, residents are able to bring their new ideas to life and to activate vacant sites for landscaping and social activities.

(3) Strategy

Under the leadership of Christchurch City Council and community organizations, urban regeneration and recovery planning is advanced in a way that allocates transitional architectures for holding various temporary activities and volunteering events.

(4) Administration

Broker organizations (such as Life in Vacant Spaces) are set up to de-risk the use of public and private spaces for temporary activation, cut bureaucracy and red tapes and relax planning regulations for approvals. This ensures that community residents are able to bring their ideas and suggestions into real practice and that their sense of happiness, belonging and identity can be greatly enhanced.

(5) Financing

A co-funding approach is adopted for community grants (Transitional City Projects Fund for example) and for boosting local creative industries (Creative

Industries Support Fund) at a very challenging time for Christchurch City.

(6) Public Involvement

Extraordinary innovation in this regard is demonstrated by the number and range of projects and events delivered by the community. In terms of projects, public opinions from all sides are solicited. For instance, as a consensus fails to be reached on how to use a commercial land plot in the city center, the land plot is temporarily defined as public spaces not for immediate development. In addition, in 2014, Christchurch held International Congress on Adaptive Urbanism, an event that further promoted community-wide sharing and exchanges of ideas and



□ Business Innovation District in the Post-earthquake Christchurch



Business Innovation District in the Post-earthquake Christchurch

strengthened public involvement in the Christchurch rebuild efforts.

(7) Business

Extraordinary innovation in this regard is demonstrated by local entrepreneurs testing new goods or services in a low cost, low risk environment, embracing new transitional business opportunities and partnerships.

Effect and Challenge

1. Effect of the Initiative

In the wake of the earthquake in September 2010, under the leadership of Christchurch City Council and with vibrant support from all parts of the society, efforts were exerted to

promote Christchurch's post-disaster reconstruction, which eventually resulted in the achievement of strategic outcomes in the three dimensions of the Transitional City Program: community recovery, recovery of "sense of place" and business recovery.

(1) Community recovery

Since 2010, led by the government and operated by non-profit organizations, at least 325 community events have been organized; Over 10,000 volunteer hours have been given by the community; The community continues to test new ideas for the future; Numerous positive media articles and supportive responses have been received. These series of events and efforts have greatly mobilized the general public and soothed local residents' psychological wounds inflicted by earthquakes.

(2) Recovery of sense of place

During the post-disaster reconstruction process, nearly 100 vacant sites have been activated 450 times with over 150 creative projects; Transitional city projects are now recognized by the community and visitors as symbols of hope and recovery; Our Ever-evolving City Program connects people to spaces and businesses throughout the city; Numerous activities reflect the past, present and future of Christchurch, thus strengthening citizens' sense of identity and belonging for the

city under post-disaster construction.

(3) Business recovery

Effective means and measures have been taken to promote the timely recovery and construction of urban business functions. High levels of corporate sponsorship and in-kind support have been received, with reconstruction focus placed on boosting business clusters and community hot-spots. In addition, a number of artists and entrepreneurs have been chosen to move to Christchurch for the opportunity to participate in the creative spirit.

2. Challenge of the Initiative

(1) High cost of post-disaster urban recovery and reconstruction

Insurance losses caused by Christchurch Earthquake are considered to be the third-largest in New Zealand's history (Swiss Re., 2012). The losses caused by the earthquake account for 19% of New Zealand's GDP. The table shows that the total capital cost of Christchurch's reconstruction in 2012 is estimated to reach approximately USD 20-30 billion. And in the mix of indicative funds in all fields, the Earthquake Commission formed by the local government after the earthquake accounts for 40%, while private insurance accounts for 30%. As more accurate information becomes available, according to the data newly

released by the government, due to a high degree of uncertainty, reconstruction costs with decoration included could reach USD 40 billion.

Estimated Cost Source of Post-earthquake Recovery in Christchurch

(2) The advancement of urban construction projects hindered under risk perception.

In an uncertain environment, the perception of risk and inconvenience to landowners has been an obstacle to unlocking vacant land in private as well as local and central government ownership. Some of the related city recovery and reconstruction work has been delayed for a long time for no proper place can be found to carry out those programs.

Practice and Innovation

1. Revolutionary Innovation

The Transitional City Program should be considered revolutionary. Christchurch is undertaking this program on an unprecedented scale and is taking a revolutionary holistic and longer-term view of its potential for recovery, urban regeneration and city identity.

2. Characteristics

The Transitional City Program demonstrates innovation in the following



□ Post-earthquake Christchurch Government provides Recreational Activities for Citizens

areas:

(1) Governance

Collaborative approaches have been used to align partners around a new concept for the city including local Maori, property owners, businesses, tourists, event organizers, the arts community and local universities. Support has been rendered for the establishment of new not-for-profit trusts (with broad community representation) to activate vacant sites with landscaping and social activities.

(2) Implementation Strategy

Urban regeneration and recovery

planning includes Council and community-led transitional architecture and temporary activities for the city.

(3) Administration

Initiatives have been taken to de-risk the use of public and private spaces for temporary activation through the creation of a broker organization (Life in Vacant Spaces) and by cutting red tape and relaxing planning regulations for approvals.

(4) Financing

A co-funding approach has been adopted for community grants

(Transitional City Projects Fund) and for boosting local creative industries (Creative Industries Support Fund) at a very challenging time for the city.

(5) Community Involvement

Extraordinary innovation has been demonstrated by the number and range of projects and events delivered by the community.

(6) Business

Extraordinary innovation has been demonstrated by local entrepreneurs testing new goods or services in a low cost, low risk environment, embracing new transitional business opportunities and partnerships.

Highlight

The multi-layered and integrated framework adopted by Christchurch is replicable to other cities. The approaches below are of particular importance.

1. Local Government Innovation

(1) Council leadership and creative use of public spaces

Supportive leadership is critical to adopting new ways of working, to test new ideas and to take risks. The Council employs a Transitional Projects Advisor to build internal capacity for this program and to build relationships with delivery

partners.

(2) Transitional City Projects Fund

This fund encourages and enables temporary projects in vacant spaces which support recovery. To lower barriers, the fund runs short cycles, enabling projects to develop quickly. Normal funding requirements were relaxed, enabling individuals and businesses to apply.

The Transitional City Projects Fund supports up to 50% of project value, which encourages partnership. To recognize volunteering, pro-bono and in-kind contributions, a budget tool was developed which values non-cash contributions in monetary equivalents.

(3) Creative Industries Support Fund

This fund aims to retain and strengthen our creative talent as the city recovers. The fund supports entrepreneurship, social enterprise models, increased collaboration and financially viable partnerships across the creative industry. This approach has been recognized as an innovative arts recovery and urban regeneration tool. Creative NZ recently adopted this model to deliver the new Community Arts Development Fund across New Zealand.

2. Community Innovation

(1) Life in Vacant Spaces (LiVS established and co-funded by the Council)

A not-for-profit trust delivers vacant



□ Streetscape of Colombo in Christchurch

space brokerage services that provides a single point of contact for anyone wanting to lead a temporary project, test an enterprise idea, or offer space rent-free while it's not needed. LiVS lowers risks, matching projects to suitable spaces. LiVS can umbrella others in its public liability insurance policy, and offers simple legal access agreements. Purpose-built for Christchurch, LiVS is supported by local government, utility and pro bono partners, and a cross-sector advisory group. LiVS aims to become a permanent part of the urban fabric of the new city.

(2) Gap Filler (co-funded by the Council)

A not-for-profit trust delivers temporary community-initiated installations, art and creative/social

activity on vacant spaces. Gap Filler aims to encourage a wide range of positive community interactions, making the city more vibrant and fun.

(3) Greening the Rubble (co-funded by the Council)

A not-for-profit trust delivers temporary community-initiated landscaping and ecology projects in vacant sites, with native plants, pocket parks, green roofs, and food-producing community gardens. Greening the Rubble aims to increase biodiversity and voluntary participation in local initiatives.

3. Business Innovation

(1) Restart Mall

The Restart temporary container mall was established by the Central City Property and Building Owners to breathe new life into Christchurch's central city. Re:START now hosts 50 businesses and includes regular market stalls, street performers and buskers.

(2) EPIC

EPIC (Enterprise Precinct and Innovation Campus) is a two-stage development to create a world class innovation campus and hub for local technology companies. Stage 1, called Sanctuary, is a temporary building housing 20 companies and 300 staff which opened in September 2012.

▾ Experience and Inspiration

A review of “Christchurch Central City Recovery and Reconstruction Plan” and the “Transitional City Program” (advanced by Christchurch City Council) reveals that the success of an innovative project depends on the following key factors. The first factor constitutes the importance of stressing public participation and coordination, which in Christchurch’s case means promoting extensive public participation in post-disaster city reconstruction by launching the movement of “Share an Idea”.



□ Community Innovational Life after the Earthquake in Christchurch

Besides, it is also critically important to put great emphasis on collaboration and coordination between organizations and partners, and among various reconstruction projects. The second factor is co-financing, which means tailoring financial support projects for project applicants in light of actual financial demands encouraging the acts of seeking resources from local communities. The third factor is de-risking the use of public land and eliminating bureaucracy and red tapes involved in the application and approval of public land use, so that public land resources are placed under the direct management of local communities. The fourth factor is incentivizing land owners, which means providing tax cuts or exemption on the land used for the “Transitional City Program”. This innovative project offers lessons and experience and for urban development and construction in the following three dimensions:

1. Devising reasonable action plans and aligning them with city visions

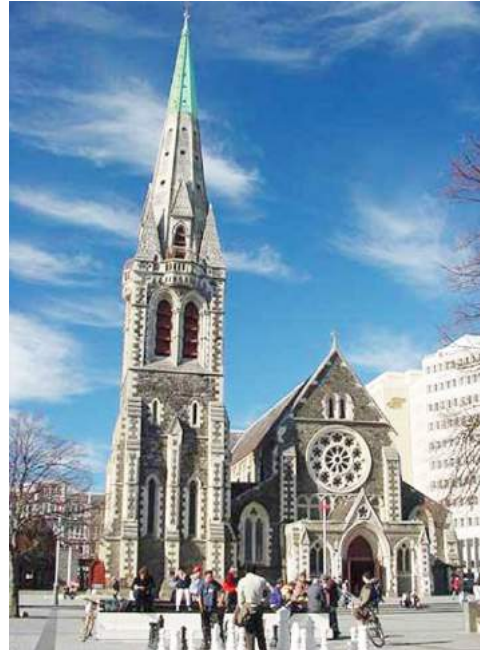
Christchurch’s success story shows that a local government must have a clear vision for its city. Specifically, a local government shall avoid the shortsightedness of lopsidedly emphasizing short-term and partial



□ Sea View of Christchurch

interests while devising a long-term action plan for city development based on detailed, comprehensive and scientific surveys and studies. Piecemeal measures that address the symptoms instead of the root causes will only lead to inefficient use of financial resources and a waste of taxpayers' money. In terms of the relationship among local government, central government, stakeholders, and community residents, in any large country, it is featured by both conflict and cooperation. How to reduce conflict

and enhance cooperation is a question that must be considered by every local government. Local governments should have a clear positioning of their roles. More energy should be channeled into promoting public participation in local governance, and local public resources should be used for public services. This will also help to increase public confidence in local government and promote fairness and justice, thereby increasing the legitimacy of local government, maintaining social harmony,



□ The Contrast Picture of Church Before and After the Earthquake

and catapulting local government onto the track of sound governance.

2. Actively Promoting Citizen Participation in Urban Macro Management and Control

First of all, local government should change their notions. Government must recognize the significance of citizen participation and be clear that good relationships between government and citizens are the result of active citizen participation. Government must fully respect the legitimate rights of citizens, acknowledge the subject status of citizens in local governance, and recognize that the key to effective local governance is

citizen participation. Secondly, correct guidance and regulation of citizen participation. If there is no unified leadership, strict rules and regulations, civil action may also be out of control. For that matter, government must work out effective preventive measures to ensure citizen participation carry out within the framework of the law in an orderly manner. Finally, an institutional guarantee must be provided for citizen participation. Government should improve and implement existing participation system so as to provide institutional approaches for local citizen participation in local governance. In addition, local institutional innovation and new model of management

(governance) should be encouraged in order to facilitate citizen participation. In a sense, only when citizens can be better involved in local affairs, can social prosperity be constantly promoted, eventually creating a livable, harmonious, and vibrant city.

3.Emphasize a Comprehensive Collaboration Mechanism among Institutions

The innovation project of Christchurch emphasizes that citizens are the main body of the city. It also points out that communities, associations and non-governmental organizations play an important role in post-disaster reconstruction and transitional city planning projects. Firstly, communities, community organizations and non-governmental organizations have actively engaged in post-disaster reconstruction and help local government save resources. Secondly, local governments and communities, associations and non-governmental organizations have established a good relation of interaction and cooperation, thus achieving win-win

results. Local government understand people's needs and receive public opinions through communities, associations and non-governmental organizations. Communities, associations, and non-governmental organizations obtain more supports from the government by encouraging more residents to participate.

Overall, through collaboration among various institutions, local government can not only improve public service, but also reduce the cost of investment, gain more human resources and science and technology support, thereby expanding the coverage of the service. City's public sector can take the lead in conducting inter-institution collaboration on major issues concerning city's future development. When conditions permit, non-governmental organization, and non-profit community organizations and private sectors should be introduced to participate in the practice of public decision and public services, as a way of reducing the coordination costs of public sector in private field, increasing service content, and enhancing service efficiency.





**The North
American Line**

A white hexagonal badge with a black border containing the text "The United States of America".

The
United States
of America















□ River Bank of Boston

/ **Boston** / Youth Lead the Change: Participatory Budgeting Boston

Boston's mayor sought a way to empower the youth at the age of 12 to 25 to become active participants in civic affairs. To this end, the City created the "Youth Lead the Change" program as part of the process for allocating

the city's capital budget. Through this participatory budgeting program, youth had the opportunity to collect ideas for capital projects, distill those ideas into concrete proposals, hold a city-wide vote to determine which projects get funded,

-
-  Name of City: Boston
 -  Name of Province/State: Massachusetts
 -  Name of Country/Region: United States of America
 -  Geographic Region: North America
 -  Population: 667,137 (2015)
 -  Surface Area: 125.41 km²
 -  Population Density: 13,841 people / km²
 -  GDP per capital: USD 858,000
 -  Title or Slogan of the Initiative: Youth Lead the Change: Participatory Budgeting Boston
 -  Start Date of the Initiative: December, 2013
 -  End Date of the Initiative: July, 2014
 -  Thematic Area: Society, Economy, Environment, Governance / Management, Technology
-

and ultimately determine how USD 1 million was spent to improve Boston for everyone. The goal was to teach the youth about city building and budgeting process, to gain leadership and professional skills. Boston thus became the first American city in which the youth have been empowered to decide on a portion of their city's capital budget. Over 450 ideas were generated, over 1,500 young people cast a vote, 14 projects made it to the

ballot and 7 were selected by the youth as winners for implementation. In 2014, this initiative of Boston stood out among 259 initiatives vying for the 2nd Guangzhou International Award for Urban Innovation and was shortlisted as one of the 10 nominated initiatives for the Award.

Background of the Initiative

“Young people are our future leaders.” To achieve this objective, the City initiated Youth Lead the Change and included this program in the city's capital budget. Through this participatory budgeting program, the youth had the opportunity to collect ideas for capital projects, distill those ideas into concrete proposals, hold a city-wide vote to determine which projects get funded, and ultimately, directly determine how USD 1 million is spent to improve Boston for its people.

Boston is committed to providing young people with a platform to express themselves and welcoming them to participate in government decisions. Youth Lead the Change creates a pathway for lifelong civic engagement and participation. Best practice in Boston about youth programming and policy is to include young people in the decision making and planning so as to ensure that

programming can accurately reflect the target population's needs. This initiative inspires young people to engage in the public decision-making in real sense and display their true creativity. Moreover, the initiative allows young people to contribute to the urban infrastructural planning and construction in the City of Boston, thus providing the youth with a strong sense of ownership in the community.

▾ Implementation of the Initiative

The initiative received tremendous supports from both governmental and non-governmental sectors. Boston Mayor's Office approved and sanctioned the Youth Lead the Change Initiative while Department of Youth Engagement and Employment provided day-to-day supports and oversight. It is also responsible for the project management and promotion agendas for the initiative. Office of Budget Management offered professional opinions about the project eligibility and coordinated city department supports. Office of New Urban Mechanics provided technical supports. In terms of project management, supports were provided by one of the participatory budgeting projects, a non-

profit consultant organization. The content and training materials and promotion supports are also supplied by it. Co-chaired meeting of the steering committee was established by the Mayor's Youth Council, and Urban College of Boston (non-profit) became its Co-Chair. Harvard



□ Martin J. Walsh(left), the Boston Mayor, supports actively the participatory budgeting program



□ Youth Working Assembly in Boston

Kennedy School, a private university, guided the data collection, effect assessment and categories estimation. Northeastern University, a private university sponsored, community events and meetings. The Citizeninvestor.org (private) built this website responsible for the online idea collection and mechanisms commencement. Boston Centers for Youth and Families (government) hosted community meetings and voting activities. Through collaboration with Mobile Commons, interested parties at any phase of the project could connect with the initiative by sending text messages to the designated numbers and would be able to voice opinions, learn about upcoming events and receive updates on the process.

In designing Youth Lead the Change, full consideration had been taken into—all materials had to be adapted to social media, web interfaces, and mediums that young people use. The goal was to enable the participants to have the frequent communications. Voting locations and promotion strategies covered local schools, public transit stations, community centers, and youth programs across the city. The project steering committee was comprised of diverse youth-serving organizations which ensured that decision makers who were writing the rules of engagement

were young people themselves and thus the youth can enjoy a strong sense of trust and ownership.

↘ Effect and Challenge

1. Effect of the Initiative

①It improves the civic engagement and openness of the government. Over 1,500 young people cast votes. For many, it was their first time to engage in a voting process.

②Idea Collection Assembly helps the youth have a better understanding of the civic budgeting and capital planning. Throughout the process, over 450 ideas have been submitted to improve Boston's development. Unfeasible ideas for execution through this process were forwarded to various city departments for future projects and planning.

③It inspires the youth to pay more attention to the infrastructure's construction in the city. Youth Lead the Change encouraged residents to review their communities and consider projects based on the people's need, plan's feasibility and sustainability. Projects were designed to improve community conditions and better the safety of the public safety, outside environment and school environment.

④It can reduce barriers for the

participation to participate the public determination. Materials were translated into different languages as often as possible and idea collection assemblies were held in accessible venues. Target included people who are traditionally underserved.

⑤ Many participants reported gaining specific skills including leadership, teamwork, social contact, communication and other professional fields. Many participants also expressed feelings of power of control ,that is their voices had truly been heard.

Youth Lead the Change has been proven conducive to encouraging youth engagement in public policy making processes and to bringing young people’s creativity into full play.

2. Challenge of the Initiative

One obstacle was how to improve the community’s trust in the government. As the project began, some community members questioned whether they would truly have an opportunity to decide how funds would be spent. A steering committee of youth serving organizations provided liaisons between communities and created an avenue of trust between community members and local government. As the project progressed, members of the community became more active as they participated



□ Guangzhou Award delegation visit Boston Department of Youth Engagement & Employment

in idea collection assemblies, project development and eventually voting.

Practice and Innovation

1. Revolutionary Innovation

The innovation of this initiative is revolutionary, which has been applied through policy, design and implementation. Never before have young people at the age of 12 to 25 been empowered to directly decide how a portion of an entire city’s capital budget would be spent.

2. Characteristics

In designing Youth Lead the Change, all materials had to be adapted for the population with special consideration

around the use of social media, web interfaces, and mediums that young people use. The goal was utilize the participants' familiar medium tools to have a better communication. Voting locations and promotion strategies covered local schools, public transit stations, community centers, and youth programs across the city, including the agencies for homeless and disconnected youth.

Through collaboration with Mobile Commons, interested parties at any phase of the project could connect with the initiative by sending text messages to the designated number and would be able to voice opinions, learn about upcoming events and receive updates on the process.

The design of the steering committee

was focussed on diverse youth serving organizations. This ensured that decision makers who were writing the rules for this process were young people and allowed them to take ownership of various aspects of the design of the process.

Highlight

1. Youth Lead the Change has created an innovative pathway for young people to get involved with City Government here in Boston

From the launch of the project to the end of the year, young people were not only the driving force behind the project's success, but also the generators of the



□ Renovation programs of the parks in the Paris Street include the newly built square facilities and the accessible fountain and battery charging equipments for the youngsters



□ The young people take part in voting

movement. Through surveys and focus groups with the Mayor's Youth Council, city leadership was able to understand the desire for young people to contribute to the decisions that are being made around them and also understand the benefit and strength of having young people participate in real decision making.

2. An assembly of the steering committee was convened, marking the official inception of the initiative

Members of the steering committee established the close communication with youth serving organizations. It was important to make sure that young people on the steering committee were supported



□ Harvard University, the world-renowned school, lies in Boston



□ These young people take part in the Youth Lead the Change: Participatory program

by the adults who allow the youth to have development space and establish the intentional relationship with the adults. This cohort of young people and supporting adults created the rules that would govern the process with a focus on the voices of young people.

3. Once the rules were written, the steering committee members began the promotion affairs and facilitated idea collection through the assembly

Locations for idea collection assemblies had a focus on traditionally underserved neighborhoods. As ideas were collected in person and through an online platform, young people and residents had the opportunity to interact with local government in a positive and

empowering way that promotes real change and ownership in communities.

4. Change agents applied to serve to transform ideas into capital projects based on community need, project feasibility and project impact in the community

Change agents worked with city departments to examine the ideas and approve proposals. Throughout this process, the young change agents had an opportunity to collaborate and learn with adults in city leadership.

5. Once projects proceeded to the ballot process, only young people could decide how funds would be spent

14 projects made it to be the ballot project in the first year and 7 projects were selected by young people as winners. Those projects would be implemented. This sort of real and tangible process empowered youth to get engaged in their communities, indicating that they can affect real change in their communities. The goal is that this initiative promotes civic engagement, changes social behaviors, increases trust and communication between youth and local government and promotes education about budgetary and democratic processes.

▾ Experience and Inspiration

1. A Transition from Urban Administration to Urban Governance

The acceleration of urbanization has caused great discrepancies among different social groups and has intensified the diversification of interests. The top-down model of government being the sole administrative actor becomes outmoded and anachronistic against this backdrop, as governments are finding it increasingly difficult to single-handedly address

challenges that arise from the complex urban public affairs system. Under such circumstances, the urban governance theory is gaining traction from the general public. In comparison to the urban “management” theory in the old days, the urban governance theory lays great stress on promoting dialogues, consultation and cooperation among a diversity of actors, suggesting that all actors bring what they can offer to the table and make the most of all social resources available for delivering public goods.

Urban management and urban



□ Boston in the Evening

governance differ only by one word, but such a difference implies a shift in roles and accentuates the responsibilities to be borne by the government, by citizens and by the society. Urban governance based on mass participation is able to pool the wisdom and resources of people from all walks of life for resolving issues arising amidst urban development, and therefore is conducive to creating a vibrant and harmonious society and boosting the competitiveness of cities.

2. Strengthening Top-level Design for Encouraging Public Participation

Boston's Youth Lead the Change offers great reference on how to incentivize public engagement in urban governance. The most eye-catching aspect of the initiative is its meticulous and well-arranged top-level design, which puts non-governmental organizations in charge

of project implementation, a process that covers the selection of members of the steering committee and the finalization of evaluation plans. In such a framework where the government formulates the rules and social organizations advance project implementation, the sense of public engagement is incentivized, which is a prerequisite to ensure that the project produces desired outcomes.

3. Boosting Public Enthusiasm for Participation

When Youth Lead the Change was still in its infancy, some community members questioned whether they would truly have an opportunity to decide how funds would be spent. As the project progressed, members of the community became more invested as they participated in idea collection assemblies, project development and eventual voting.





**The South
American Line**



Columbia

□ Educational Thematic Park in the Antioquia

/ Antioquia / Educational Parks for Youth

A network of 80 educational parks has been built around Antioquia. Aspects of this program are based on a widely-acclaimed experimental project in Medellin, the capital of Antioquia,

which is designed to make up for what Medellin's traditional education system has failed to achieve and to enable young people to tap into their innate potential and talent. The Medellin Project, which

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-  **Name of City:** Antioquia
 -  **Name of Country/Region:** Colombia
 -  **Geographic Region:** Latin America & Caribbean
 -  **Population:** 6,299,886 (2013)
 -  **Surface Area:** 63,612 km²
 -  **Population Density:** 99 people / km²
 -  **GDP per capita:** USD 6,740
 -  **Title or Slogan of the Initiative:** Educational Parks—A Space for Citizens in the 21st Century and a New-Style Education through Creative space and Programs so as to Develop Local Harmonious Cultural Environment
 -  **Start Date of the Initiative:** June, 2012
 -  **End Date of the Initiative:** Undecided (estimated by the government to have it completed in December, 2014, but a political, social and economic framework is being built to ensure it a part of urban public policies)
 -  **Thematic Area:** Society Governance / Management Technology Education
-

has resulted in the building of urban infrastructure like Park Libraries in areas hardest hit by poverty, is a vivid expression of the great importance that the local government attaches to improving the skill sets of residents in poverty-stricken communities. The 80 educational

parks are designed not to replace the formal educational institutions, but to complement public and private formal and informal educational programs as well as to attract talented and highly-skilled young people and to advance ideals of peace and civic duties along the way. In 2014, the Educational Parks for Youth Project stood out among 259 initiatives vying for the 2nd Guangzhou International Award for Urban Innovation and was eventually selected as one of the 5 winning initiatives.

Background of the Initiative

Antioquia is the second largest contributor to Colombia's GDP; However, the gap in terms of human development and economic growth between Medellin, the capital of Antioquia and the rest of the department is still obviously wide. The quality of education is one of the fundamental reasons for this inequality. Tests results in the nine sub-regions of Antioquia are well below the national average in math, science and literacy. Approximately half number of the children in the nine sub-regions drop out of schools, and only one tenth of them are able to receive a higher education. Consequently, territorial development is hindered, and migration from sub-regions

to the city is seen as the only alternative.

The governor, Sergio Fajardo, has always believed in education being the engine of social transformation. It is founded on the belief that education plays a key role in generating city's power and opportunities for a more equitable and sustainable development. Public education is understood in a broad sense, from early childhood till entrepreneurship, integrating culture, science and innovation. The 80 Educational Parks that are being built are the embodiment of this idea.

What started out as a competition for each municipality to “win” their Educational Park, turned into a large social mobilization around education in 109 different territories where local mayors were brought together with educators, youth groups and several other representatives of the local population, to think about strategies to improve the quality of education in their municipality. An independent panel of renowned academics, educators and businesspeople, selected the 80 winning municipalities.

The Parks do not replace formal educational institutions, but seek to articulate and complement public and private formal and informal educational programs, catalyzing innovation, creativity and change in the educational system. They aim not only at improving



□ Façade of Educational Thematic Park in the Antioquia

the quality of formal education, but also offer alternative educational opportunities to the wider community and become centers for developing community relations and citizenship, much needed in areas affected by violence and social ruptures.

Although it is part of a four-year development plan, it is a long-term project that will be part of a new policy



Implementation of the Initiative

These educational parks do not replace formal educational institutions, but seek to attract local talented and highly-skilled young people and to promote the concept of learning peaceful coexistence and civic values. Park libraries are being set up even in some of the poorest neighborhoods of Antioquia. The local government has been advancing the educational parks program under the belief that residents in poor communities are entitled to opportunities to improve their skills through education and training.

Antioquia has created a necessary standardized degree in a wide range of areas, including in the educational programs, the operating and financing mechanisms, and the decision-making processes. Given the great economic, social, ethnic and geographical differences among different municipalities, each park is built in a way that reflects the unique characteristics of each municipality, with some parks designed as a place to enhance social cohesion and others as a place centered on economic development like the quality coffees and ecotourism, etc.

With the cooperation with the public and private universities, a proposal is being developed to design and implement

framework and be implemented in collaboration between the public, private and social/community sectors. The private sector has financed some of the construction and educational contents. Local authorities co-finance the project in cash and human resources. The majority of funding comes from the government and is guaranteed through the policy framework.



□ Construction of an Educational Thematic Park in the Antioquia

a full monitoring and evaluation system that will evaluate results on a short (1 year), medium (3 years) and long-term (5—10 years) basis. Given the multiple elements included in this innovation, several quantitative and qualitative aspects will be measured: the institutional framework, the governance, operational and financial models, the educational outcomes of the programs that take place in the parks, the levels of social mobilization and appropriation of the Parks (Park Culture) and the Parks as models for building a citizenship culture and a culture for peace. The evaluation work is undertaken by local and central

parks teams, and evaluation strategies are subjected to adjustment in response to changing circumstances. As the Network is developing to its full-fledged shape, evaluation efforts are being stepped up. A round of evaluation actions is carried out by local park committees on a monthly basis.

➤ Effect and Challenge

1. Effect of the Initiative

The first Educational Park that began operation is in Vigia del Fuerte, a historically alienated area of Antioquia, in

a conflict-ridden zone, where institutional capacities are weak. The fact is that this is the first Park to operate is highly symbolic. Although most Parks are still in construction (30) and design (49) phases, the program has already showed the results in terms of promoting community participatory processes, raising interests for educational issues, and creating local institutional capacities around education.

There are 80 local Educational Parks committees where around 2,000 representatives of different communities meet on a monthly basis to discuss, socialize and plan their Parks. In each municipality, around 40 social mobilization activities have taken place,

centered on promoting a “Park Culture”, understood as civic values and caring for the Park as a “public good”. Basic indicators are reported weekly, such as the number of people attending the Parks and its daily program, early results of these programs for teachers, students and the wider population and qualitative indicators regarding people’s perception and satisfaction.

2. Challenge of the Initiative

Some political groups resisted this initiative, claiming that it was better to invest money in the traditional system. This has been overcome by the local government and community’s supports



□ Citizens in the Antioquia have a better understanding of Park Culture through community activities

and the investment in the formal schooling system has continued. In addition, concern for sustainability has been expressed and managed by building a public-private institutional framework to guarantee public funds and co-financing, to establish long-term alliances and to insist on the continual social mobilization and appropriation of each Park.

Practice and Innovation

1. Revolutionary Innovation

More than just buildings, the Educational Parks are conceived as public places for citizens of the 21st Century, a model for building capacities and opportunities through education. The formal and alternative educational programs that will be developed within these spaces will promote science, technology, research, innovation, connectivity, and entrepreneurship, as well as develop cultural and artistic practices as a means for enhancing citizenship, diversity and identity. Each Park, between 500-600 square meters in size, has been designed by national architects of all ages who competed to be part of the process, and thus gives each municipality a unique identity. Each design was considered with various community who “dreamt their park”, building on notions of local

identity and diversity.

The Educational Parks program should be considered revolutionary. Aspects of the program are based on experiences in Medellin (when Fajardo was mayor), where building urban infrastructure like Park Libraries in marginal areas of the city catalyzed a number of social processes. However, the



□ Citizens in the Antioquia have a better understanding of Park Culture through community activities

Parks model contains new elements that were not identified in other experiences. The wide social mobilization process can be considered as an innovation in and of itself. Now, several cities in Colombia and a few in Latin America are interested in learning about the experience.

2.Characteristics

The operational model is also an innovation. The 80 Parks will function as a Network and operate through a public, private and community partnership. Despite the social, economic, ethnic and geographical differences in each municipality, the Network creates a necessary degree of standardization in the educational programs, operating and financing mechanisms, and decision-making processes. However, a balance is realized between these unifying standards and developing the unique “character” of each Park, as a reflection of each particular context. In some areas, the Parks will be a place to build social cohesion, in others, a place centered on economic development like quality coffees, ecotourism, etc.



Highlight

The educational parks are public, comprehensive and fun urban space of symbolic significance, where citizens are able to enrich and enhance themselves in terms of innovation, education, culture, corporate management, science, technology and civic rights and duties. An educational park might be an ordinary functional facility for many other cities, but it constitutes one of the

most important forms of infrastructure in Antioquia (second only to churches and central squares) as well as the newest landmark facility.

The educational parks are designed mainly to improve the quality of education, facilitate the implementation of local educational and cultural programs, boost local socio-economic development, attract talents and create a place for harmony and for civic values. Seven Lines are developed by a number of organizations and universities, which are:

- ◆ Teacher training to improve pedagogy and knowledge in math, science and literacy
- ◆ Complementing primary and secondary schooling in basic areas and improving technical and vocational training
- ◆ Opportunities to access higher education
- ◆ Access to ICTs (information and communications technologies) as educational tools and a means to connect to the world
- ◆ Creating a culture for entrepreneurship
- ◆ Environment culture, art and sports for education and citizenship building
- ◆ Learning foreign languages in the fun and applicable ways

Each component has been



□ Students have access to various kinds of knowledge in the educational Parks

developed into strategies and projects. The detailed program of each park is developed with each local committee, with full consideration given to their priorities. Community participation and empowering and creating local capacities have been an essential part of the process and a guiding principle. This is an innovation in the public sector, which often works under top-down processes between regional and local governments and communities.

Using local communication networks and social media to promote the educational parks project has been an important tool, generating social appropriation in the municipalities and placing the regions of Antioquia on the public agenda. The gap between the metropolitan area and the rest of the region

is so wide that a majority of people in Medellin do not discuss regional projects or see them as a source of innovation. The nine regions are usually associated with being backward, remote and a source of migration. This project is offering a new vision of the regions as potential poles for development. The educational parks, even under construction, are starting to become tourist attractions because of their innovative architecture and social driving force.

Experience and Inspiration

1. Close Collaboration between the Public and Private Sectors

The whole process of building the educational parks, from their conception and design to construction, operation and management, has never been undertaken by the government alone, but has involved a great number of non-governmental organizations and citizens, which is the reason why the project has



□ Students have access to various kinds of knowledge in the educational Parks



□ The Learning Situation of Educational Park

produced desired outcomes. What started out as a competition for each municipality to win their educational park, turned into a large social mobilization campaign around education in 109 different territories, where local mayors were brought together with educators, youth groups and representatives of the local population to jointly devise strategies to improve the quality of education in their respective municipality through the parks. An independent panel of renowned academics, educators and business people selected the 80 winning municipalities. These educational parks are designed not only to improve formal education, but also to offer alternative educational

opportunities to the wider community and become centers for developing community relations and citizenship. An alliance with NGOs is formed to advance the project, which can serve as a model for cooperation between governments and NGOs in other areas.

Although it is part of a long-term development plan, the educational park project has been incorporated into a new policy framework and implemented in collaboration between the public, private and social / community sectors. The private sector has financed some of the construction and educational contents. Local authorities co-finance the project in cash and human resources. The majority

of funding comes from the department and is guaranteed through the policy framework.

2. Extensive Promotion and Communication

When the project was still in its infancy, some political groups resisted it, claiming that it was better to invest money in the traditional system. This has been overcome by the local government and community's supports for the project and the investment funds into the formal schooling system would continue. Eventually, political groups originally in objection to this project were convinced by the fact that the educational parks did not replace formal educational institutions. Moreover, there was public concern for the sustainability of the project. To ease such concern, a public-private institutional framework has been built to guarantee public funds and co-financing, establish long-term alliances

and advance extensive promotion of the project. Extensive promotion has become an essential part of this innovative educational park project in Antioquia. Now, several cities in Colombia and a few in Latin America are interested in learning about the experience.

3. Integrating Educational Parks into Urban Construction Strategies

As a supplement to the overall youth educational undertaking of Antioquia, the Educational Parks for Youth Project has been proven conducive to boosting the all-round development of young people. The project looks like China's youth palace program, but with certain distinctive characteristics in the sense that these educational parks are woven into the urban tapestry and are developed into public facilities as well as tourist attractions. Some of them have become a place for leisure and fun.

Brazil



□ The Scenery of Rio de Janeiro

/ **Rio de Janeiro** / **Rio Operation Center: Integrating Data and Monitoring Public Utilities in a Truly Intelligent System**

Rio de Janeiro has been hit hard by repeated Atlantic storms imperiling the city. This especially affects the mostly low income settlements that are located on the high slopes surrounding the

metropolis and are prone to devastating landslides. Following a vicious storm in 2010, Rio de Janeiro decided to create a center that operates 24 hours a day, staffed by officials from 30 city

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-  Name of City: Rio de Janeiro
 -  Name of Province/ State: Rio de Janeiro State
 -  Name of Country/Region: Brazil
 -  Geographical Area: Latin America/ Caribbean region
 -  Population: 6,320,446 (2015)
 -  Surface Area: 1,224 km²
 -  Population Density: 13,841 people / km²
 -  GDP per capita: USD 14,823
 -  Title or Slogan of the Initiative: Rio de Janeiro operating center—real smart system integrating data and monitoring instruments
 -  Start Date of the Initiative: December, 2010
 -  End Date of the Initiative: in the Process
 -  Thematic Area: Governance/ Management Science and Technology
-

departments. This center has become a global model showing the benefits that can be derived from collaboration, alignment and data sharing across city divisions. Since the facility went on-line, employing some of the latest information communication technology and weather forecasting systems, there have been no deaths caused by landslides. The model has had many other benefits for

the day-to-day management of the city. Traffic emergency response time has been reduced significantly as citizens are alerted about traffic snarl ups and accidents and redirect to the best routes. Data gathered for the center also enables the identification of neighborhoods with higher dengue fever infection rates. In planning the facility, Rio officials visited alert centers in Madrid, Seoul and New York, and have since forged cooperation with Johannesburg as it plans a similar system.

This project stands out from 259 initiatives vying for the 2nd Guangzhou International Award for Urban Innovation, and was shortlisted as one of the 10 nominated initiatives for the Award.

Background of the Initiative

For a very long time, the Atlantic storms have threatened Rio de Janeiro and it has been a very precarious situation, and the city has been badly battered by the storms. Particularly, the low-income communities are severely hit and the majority of the community is located at the high slope around the city, and easily encounter destructive landslide. In April, 2010, Rio suffered an attack of rainstorm (the precipitation exceeds 304 millimeters in 24 hours), which cost the life of 68



□ Christ the Redeemer of Rio de Janeiro

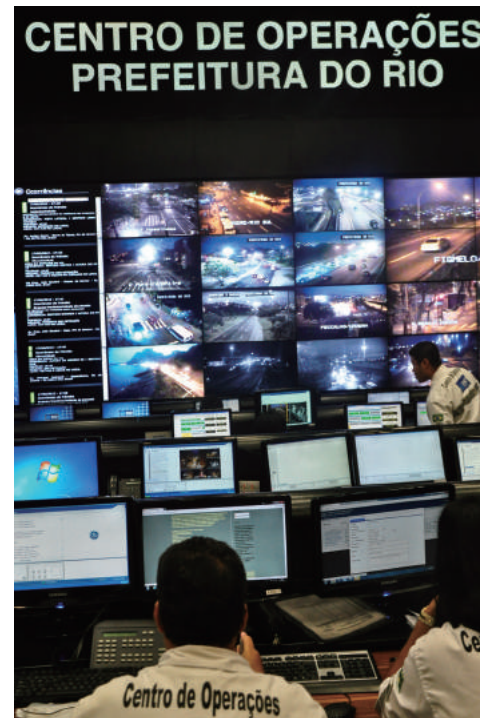
people. Emergencies do not only cause huge casualties and economic loss, but also reflect the underlying problems in the operation of social systems. Moreover, it changes the value of the society members to a certain degree. Faced with various emergencies which still keep popping up, the government should act as the core, either in prevention and early warning or the response to the emergency as well as the afterward restoration and reconstruction. But in dealing with the emergency, the government might not be able to do all things on its own such as removing hazards, controlling the signs of danger, monitoring the situation and conducting reconversion. Most resources the government needs come from other governments or departments, enterprises and social forces. Whether or not these different forces can aggregate to form a resultant force against emergencies mostly relies on whether the government can effectively coordinate these subjects and their related resources. In a word, this depends on the coordination capability of the government. It is a pressing problem for the municipal government to adopt emergency measures and coordinate with all parties when facing with unexpected disasters.

Implementation of the Initiative

After the disaster of debris flow in 2010, Rio decided to set up Center of Operation Rio (COR). COR assumes the following three functions: prevention and management of risks, city operation and large scale events. This is a successful exploration involving trans-department cooperation in city governance.

1. Smart Management: In-depth Cooperation with the Technology Company

The development and application



□ COR manages city's traffic

of information technology and the information system in government organizations have provided strong impetus and technological support for “recreation of government” movement which increasingly rises throughout the world and ignites people’s infinite imagination of the future “virtual government”. People believe that the broad application of information technology will exert deep influence on the idea of governance, function of government, structure of powers, organization structuring, management model, operation mechanism and

workflow, and soon will drive significant reforms of government management and operation models, thus improving the government efficiency and then further facilitates social and economic development widely.

In the practical operation of COR, the strong information technology supports from the technology company plays an extremely important role. Cooperators such as IBM, Billfinger, Cisco, Samsung and Google provide their expertise and technology to help COR obtain, share and deliver information in a faster way. In particular, the establishment of geographical coordinate data system which is related to the needed properties in Rio’s daily operation, better helps Rio government to deal with emergencies in the city. In the operation of the geographic coordinate system data, Oi and TIM (telecom companies), which are responsible for implementing the links of data transmission, play a crucial role. In addition, in order to improve the traffic of Rio de Janeiro, the City Hall installed a large number of new surveillance cameras, intelligent traffic lights, electronic and transport meters within the city. In information technology, the Rio government targets to build a new data center and implement structural systems in 2016.

COR is also very advanced with



□ Façade of COR



□ COR establishes the coordinated and operated mechanism

regards to office facilities. The municipal government has spent a total of approximately USD 8.9 million to build a three-story building (including equipment). The control room, which serves as the heart of the project, has 200 controllers with three classes and monitors the city in real-time 24 hours around the clock. The city control room receives daily image data from more than 900 cameras transmitted through 30km optic cable. The 60-square-meter (24 meter x2.50 meters) video wall, which is located in the control room, consists of 80 46-inch monitors provided by the Billfinger and Samsung. In addition, Cisco also offers telepresence systems,

and Itaotec provides a computer network for staff in the operation center.

These advanced technologies and equipments greatly enhance the ability of the Rio in dealing with crisis. For instance, in terms of the efficiency of urban management, the emergency response time is reduced by 30 percent. When a traffic accident is confirmed, incident management team will immediately rush to the accident site for processing. City map with more than 80 digital images can display all the information such as the city image including all vehicles and equipment of real-time location. For example, in summer when preventing dengue, geographical analysis of medical



□ 1746 HotLine of COR

records makes it possible to position the highest rate of infection residential area. Municipal government uses this information to implement appropriate preventive measures. The first morning when we visited, a community was caught a fire. The mayor immediately obtained all the information and dealt with it in a timely manner.

2. Collaboration among Multiple Departments: a Large Platform Integrating Multiple Many Sectors

Before COR was founded, the professional departments are seriously lagging behind in both the external

and internal communication and dissemination of information because of the lack of cooperation. In front of natural disasters such as a landslide, early warning prevention, disaster response, there is the insufficient response and the city government is unresponsive and stagnated. In addition to bad performance in disaster response, the government also shows lower efficiency in traffic accidents and urban management; The emergency response time is too long, and urban traffic congestion problem is serious.

Therefore, the innovatively established COR gathers nearly 30 municipal departments, public agencies, public utility companies as well as

government representatives. Efficient communication of information helps all departments work well. COR is an innovative one. Although there are some urban management centers in the world which have similar effects, such as the CISEM in Madrid, Spain, which coordinates the police, fire service and fire engines, COR is unique in its coordination of public services and the number and scale concessionaire.

COR is not a vertical organization system, and in a parallel architecture, the interaction of these departments and representatives of the parties grows deeper. COR integrates aspirations and interests of all parties, with each

department obtaining information while keeping in touch with other departments. Such cooperation is a continuous process in which people can have a try to learn every day.

In June 2013, the municipal government of Rio established a big data department called “PENSA-Ideas Room”, which is used to process all data generated by COR. The new department is designed to improve the level of service provided to the public through searching, analyzing and comparing the evaluation of different databases so as to determine the relevance and influence of the events. “PENSA” has the channel to enter all sector-wide databases. Big data management can



□ There are 400 people accepting the stimulated training

achieve model and analysis which can not be completed by a single sector. Therefore, it also enhances the scientific nature of the policy planning. Now, the data generated from traffic operation and management can be used as references to enact public transport planning and transport policies.

3. Two-way Communication: Fast and Convenient Political-Social Information Interaction

The original intention of establishing COR is for risk management and crisis response, so it is natural that COR will release information to the public. Communication with the media is a two-way exchange of information. In terms of information dissemination to the outside, thanks to its capacity of collecting information and efficient operation, COR can always manage to release real and effective information in the first time to the public through the mass media. A media room in COR facilities is the place where it serves as a media representative to release continuous warning to the public in real time. For traffic information, for example, information about traffic problems or traffic recommendations is firstly being noticed to COR. Since all sectors and transport concessions have their representatives in COR, and field representatives also can automatically

receive corresponding information from the same departments, COR can disseminate information through mass media, radio and television, so the public will be able to have access to information in a faster and more accurate way.

In risk prevention, COR has a scientific system which includes four meteorologists and seven technicians to monitor weather conditions around the clock. The entire meteorological technology system is connected with the National Institute for Space Studies. The weather radar owned by the municipal government outputs the updated images every two minutes, and these images identify humidity, rainfall areas, thus providing references for displacement and intensity. Rainfall monitoring network is composed of more than 100 measuring instruments, covering a radius of 250-square-kilometer movement. It not only predicts precipitation (updates every 15 minutes), information of lightning and wind speed, but also determines more specifically the area that might suffer from the greatest impact.

When COR identifies landslide risk areas, the local residents will receive notice immediately through SMS, Twitter, Facebook. And an alarm will be triggered for the most dangerous areas, so the local residents can be transferred in advance to an alternative accommodation.



Video Wall of COR

Shelter residents with disabilities will be determined with the reference of geographical coordinates, so that social workers will be able to arrive in time to help them evacuate.

On the other hand, if the public report atypical events, the media can also be kept informed of the COR. In addition, COR sets up a special hotline 1746 for connecting municipal channels of communication and urban services reported by the public, through which the public can request, make complaints and obtain information related to debt, fines, license, and even information about tourism. In practice of information strategy, the government also pays attention to the transparency of government information and fosters the awareness of public participation.

The official of COR said: “Slums are not forgotten and ignored. The poorest areas of Rio de Janeiro are also installed alarms, so it can guide people in time of crisis and tell people where to take refuge when the flood is coming.”

Effect and Challenge

1. Effect of the Initiative

Emergency response time is reduced by 30%. Once the accident is confirmed, incident management team will immediately rush to the accident site for processing. City maps with more than 80 digital images display the real-time location information of cars such as all vehicles and equipment.

On road maintenance, the center is responsible for coordinating with municipal and concession groups to repair traffic management control.

Another example is embodied in the high incidence of dengue which is spread by mosquitoes in summer. Geographical analysis of the medical records makes it possible to target the residential areas of the highest infection rate. Municipal government uses this information to implement appropriate preventive measures.

The Centre also contributes to improving the management efficiency of

the city in many other ways, among which public transport is one example. Traffic is one major challenge to megacities like Rio de Janeiro. The efficiency and high utilization of public transport is essential for sustainable urban development. Bus rapid transit, ferries corporations all have their representatives in the COR.

Communication strategies are essential as for providing the public with alerts regarding these events and the timely and proper placement of the public. Waze (a socialized map application) is one of the tools applied to this project.

Others include the daily bulletin of the main events on three COR websites. These announcements are released 24 hours a day by COR via SMS, Twitter, Facebook, radio and television.

2. Challenge of the Initiative

COR faces several challenges, including challenges from human resources. Among its employees, 400 people receive ongoing training and simulation training, resulting in program inefficiency, while increasing training costs over time.



□ Convenient Traffic of the Rio de Janeiro' Center

At the same time, another challenge involves the background information of every sector and the concession acquirers. Over the years, each party has developed its own standard procedures. In decision-making process, there are cases that the parties have different views. In most cases, the exchange is mutual. Problems about differences between departments and information retention must be resolved. By integrating the interests of all parties into one single position, different departments can get information at the same time and stay in touch with other departments. Such cooperation is a continuous process of trying to learn every day. COR is not a vertical structure, therefore, these interactions are constantly improved and upgraded. A protocol rule of coordinating more than 150 kinds of events has been established.

Practice and Innovation

1. Revolutionary Innovation

Rio Operation Center is of revolutionary innovation. Other similar centers in the world, such as Madrid, Spain CISEM, serve for the coordination of police, fire and fire trucks. The COR is unique in its coordination of public services and the number of concession acquirers.

2. Characteristics

Large scale of data collected by COR and 1746 hotline are also used in other practice.

1746 hotline is a communication channel connecting the municipal government, through which the public can report about the problem of urban services, make their requests and complaints and obtain information about debt, fines, licenses and travel. In the practice of information strategy, it also enhances the transparency and the digital participation of the public.

The municipal government sets up a big data department called “PENSA-Ideas Room” in June 2013, which is used to process all data generated by COR. This new department aims to search, analyze and assess the relevance, and through comparing different databases to determine the impact of the event; It can enhance the level of service to the public.

“PENSA” has the channel of entering all databases. Big data management can do the research of mode and analysis that other channels fail to complete. Therefore, it becomes possible to make policy planning based on correct information. Now, data generated from operation and management of daily traffic can be used as references for enacting public transport policy and transport planning.

Highlight

COR runs in three areas: risk prevention and management, city operations and large-scale public events.

Risk prevention and management is committed to saving lives. This aspect includes weather forecasts, rainfall monitoring and general defensive measures. The integration of data and human resources has made the COR at the core of the city which has been subjected to heavy rains and floods in the history.

In daily operations, the operation center gets to know all events affecting the daily operation of the city through intelligent monitoring tools and direct contact with field operation staff, then to make necessary response and give

guidance to the public regarding how to avoid potential problems. Departments and concessionaires provide public services in COR for offering information of events that take place in Rio and respond to unforeseen events.

Communication with the media is a two-way exchange of information, which also strengthens the exchange of information with municipal authorities, thereby increasing its effectiveness of micro-governance and recommendation on residents. If there are people reporting an atypical event, the media itself can also be kept informed of the COR.

COR facilities include a control room, where operators in the control room work on a video wall. Crisis chamber is used to open an emergency meeting with various departments, which



□ Surfing and Kite-flying in Rio de Janeiro

is also connected to two other crisis rooms. One of them is in the mayor's office and the other is at the Civil Defense Service. The media room is where media representatives release real-time continuous warning to the local people.

The establishment of communication channels helps to improve the quality of public policy, and also guarantee the transparency, accountability and credibility. As part of the innovation in high efficiency management of the municipal government, these projects are necessary tools for Rio de Janeiro to be a smart city in the future.

In an urbanizing world, for a city like Rio de Janeiro which faces many challenges, such as the traffic which constraints more and more people, the consequences of climate change and the extreme weather conditions caused by a series of events, an operating center can serve as a major strategic tool for Rio to become a smart.

▾ Experience and Inspiration

1. Materialization of cross-sectoral cooperation

Cross-sector governance aims at integrating the decentralized power within the government which is separated due to specialization, optimizing the

allocation of resources within government departments. Different departments within the government should follow the continuity and integrity of the business process, and achieve collaboration and consultation within cross-sectoral, cross-functional boundaries. From the point of the actors, there are vertical cooperation between the higher and lower levels of government, and horizontal cooperation between governments at the same level, or the different departments of the same government hierarchy, as well as cooperation between inter-regional and inter-governmental in concentrated form.

As Rio established COR, it aims at solving defensive risk management, urban operation, large-scale events, gathering nearly 30 municipal departments, public institutions, utility companies and government representatives. Buenos Aires has set up an innovation and creativity cooperation committee, which is a lateral mechanism that is jointly participated by a plurality of cross-cutting areas of the government. Departments that conduct cooperation in public policy innovation projects are departments of innovative economy, department of entrepreneurship guidance, department of science and technology guidance, department of foreign trade guidance, secretariat of residential sectors and inclusive department, department of information

and open government guidance, smart city project steering department, department of e-government guidance, department of science and technology education guidance, department of international relations and cooperation guidance, Deputy Minister of resident services, Deputy Minister of transport, department of planning and management control guidance, department of strategic planning guidance. It is a very comprehensive flagship program about sectoral cooperation.

2. In-depth participation of the Public

Cooperative governance is not limited to the coordination and reconstruction of functions within and between the governments, but also should be realized in a greater field in the government, the market, and the Field of Social realization. Social organizations, enterprises and the public by virtue of their respective advantages participate in the supply of public services and social management process and build healthy partnerships between government and market, government and society and jointly cope with complex social problems.

In terms of cooperation between government and market, Rio makes a good attempt. During the operation of

COR, strong IT support from technology companies plays a very important role. In terms of cooperation between government and society, Buenos Aires is a good example. On one hand, it builds a platform like “the round-



□ Jardim in Brazil

table negotiations” to convey public opinions, and on the other hand, it sends government agencies into the community to guide and foster social organizations, and leads the public to participate effectively in public affairs which is connected with their own interests.

3.Enhancement of management quality of smart city

Information sharing among government departments is needed to further develop e-government. It is also the best way to increase the value of information, avoid the waste of resources, and improve the efficiency of information resources. Before COR was established, due to the lack of factors such as equipment and technology, information of various departments of the Rio can not achieve quick and easy communication and sharing, so the relevant partments are not able to share the accurate information on climate or the occurrences of emergencies. This may cause huge losses to Rio. Therefore, in the face of disasters, the establishment of the COR is in line with the need of intergovernmental information sharing,

and the establishment of communication channels has improved the enactment of public policies, and also has enhanced the efficiency of government in emergencies.

COR constitutes an operation mechanism which coordinates more than 30 government departments through the use of sensors, satellites, video systems and GPS systems to collect real-time traffic information, weather, lighting, power, and other parameters. Then, this information will be used to manage traffic flow through the computerized traffic lights, to change the traffic flow in traffic accidents areas and surrounding areas of traffic congestion, and also this information can provide effective navigation services for ambulances. Apart from helping to solve the traffic problem, the city can take advantage of the sensor data to ensure that discarded garbage is picked up in a timely manner. The city can provide extreme weather warnings through face book (Facebook), Twitter (Twitter) and SMS, etc. These measures have strengthened the accuracy and forsights in terms of the urban management at large degree.

Argentina



□ Buenos Aires












/ **Buenos Aires** / Collaborative Roundtable for Innovation and Creativity

Like many local government administrations, Buenos Aires faced a wide range of bureaucratic barriers.

These included too many fruitless meetings, confusing lines of initiative and lack of accountability. Buenos

Aires decided to reform its governance system with a management initiative called “Collaborative Roundtables for Innovation and Creativity.” The central idea of these roundtables is to engage in frank dialogue between

the municipality and its citizens and to stimulate imaginative and innovative actions by senior officials. The varied initiatives which emerged include “Schools of the Future” focused on robotics and 3D printers; an “Enterprise Academy” to deepen entrepreneurial potential; a “WiFi for Inclusion” initiative to close the technology gap for less affluent citizens; and a platform to unlock the potentials of foreign market enterprises. This project stands out from 259 candidate items of Guangzhou International Award for Urban Innovation, and boasts as one of the 10 nominated cities of Guangzhou Award.

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-  Name of City: Buenos Aires
 -  Name of Country/Region: Argentina
 -  Geographical Region: Latin America/ Caribbean region
 -  Population: 2,890,151 (2010)
 -  Surface Area: 203.3 km²
 -  Population Density: 14,216 people / km²
 -  GDP per capital: USD 38,000
 -  Title or the Slogan of the Initiative: Buenos Aires City’ s Collaborative Roundtable for Innovation and Creativity
 -  Start Date of the Initiative: 2013
 -  End Date of the Initiative: in the Process
 -  Thematic Areas: Governance / Management

Background of the Initiative

Large-scale transformation of the city center and large-scale construction of infrastructure constitute the main trend of the urban development. While in this huge process of urban construction, major cities like Buenos Aires encounter such phenomena as street violence, fragmentation of communities and heavy pollution, which implies that in city planning, we have not managed to obtain and contain the idea and value of the



 Colorful Buenos Aires



□ Buenos Aires Investigation teams talk about the innovation issues

public.

As a result, it becomes a major topic to be discussed in urban management as to how to integrate the idea and value of the public into city planning, construction and relevant decisions. Nonetheless, symbolic public participation and non-participating public participation are always seen in practice. Cheryl Simrell King and many other scholars have pointed out that effective public participation not only means to find an appropriate instrument and technology with regards to expanding the scale of public participation in

public policy-making, but also take into consideration the basic roles of municipal government and the public. Buenos Aires has made successful exploration in this aspect through reconstruction of governance in order to facilitate public participation.

▾ Implementation of the Initiative

1. Innovation and Creativity Cooperation Committee

Firstly, Buenos Aires conducted an action named “Innovation and

Creativity Cooperation Committee”. The committee is jointly participated by multiple cross-cutting regional governments. They cooperate with each other in creative projects of public policy-making, and mainly deal with the shortage of coordination in carrying out creative policies. As a transverse organization, the committee does not respond to any department, aiming at breaking the logic of partitioning structure, no longer being subject to the government structural organization.

One of the major purposes of setting up “Innovation and Creativity Cooperation Committee” is to facilitate the frank dialogue between municipal government and citizens, so as to

stimulate senior officials to take imaginative and creative actions. The contribution of committee in terms of constructing public participation mechanism comes from two aspects: one is the construction of route in obtaining information from top to down; the other is the construction of platform sending information from down to top. As to obtain information from top to down, senior officials of the committee (mayor, cabinet minister and senior officers of the municipal government) and experts will conduct inspection in relevant places, and convene meetings at regular intervals. Often, they would be inspired by the situation of places being inspected, and then make corresponding policies. Apart from that, they always report local and international news to mayor, cabinet minister and senior officers of the municipal government, which serves as the basis of decision making. The committee members solicit public opinions through field research, and then discuss the information they obtained or further report the information to integrate public opinion into decision making process. In this way, a route of information transfer is formed from down to top.

On the other hand, the committee, through promoting or stepping in



Collaborative Roundtable of Buenos Aires members have a meeting with the president of Cabinet

projects regarding public participation, drives the objective effect of information transfer from down to top. For instance, in “City of Ideas”, the committee manages to let the public express their opinions freely through two activities: First of all, the committee collect citizens’ thoughts with respect to how to deal with the issue. They achieve the following answer after the preliminary trial. Regarding the question “From your perspective, how can we improve the traffic situation in Buenos Aires?”, more than 5000 taxi drivers are contacted directly, generating about 1000 ideas. (Among which, 90% is through feedback and 10% is through online feedback.) In considering the question “What will you do to make Buenos Aires more modern.” more than 300 answers are from university students and these students also take part in the workshop in their schools. 500 registered users contribute to making the city a more sustainable one through an eight-hour network platform. Secondly, the committee convenes public participated meetings to directly discuss common issues and seek solutions of improvement. At last, the public can also take part in “Night in Museum”, so that they can put their 800 answers regarding “What you can

do to make Buenos Aires a better place to live?”

Innovation and Creativity Cooperation Committee has achieved the two-way transmission of public opinion in vertical direction through its own operation and the projects involved. Based on public opinion, the government has introduced many a service item which is to the interest of the public. For example, the committee contributes the project “En Todo Estás Vos Card”, which is a comprehensive



□ Puerto Madero Port of Buenos Aires

instrument that can be used to new-type transaction, subsidy and the acquisition of cultural products and simplified procedure. 400,000 cards are issued in 2014, and it is projected to produce new benefit and will achieve the integration with subway system. Apart from the above, the project of “ecological bicycle” is also adopted. Namely, citizens can borrow and return the bicycle automatically at 200 stations through mobile application or En Todo Estás Vos Card.

2. Direct Guidance of Community Management by Villa 20 Community Management Office

In 2011, Buenos Aires SECHI designed and implemented an array of policies aimed at strengthening citizens’ cultural development, community identity and participation when confronted with fragile community environment. Specific steps are that the government sets up normal office in this community, and generates more sustainable and long-term relations with local citizens, NGO and enterprises through the office. This office plays a guidance role in the reconstruction of the community, mainly lying in following aspects: First, as a permanent representative of the government in this community, it creates conditions of direct and mutual dialogue between the government and the citizens. Second, it mobilizes community citizens to participate in normal “round table meetings”, and conducts brainstorm with respect to community safety and environment. Besides, it also subsidizes NGOs in the field of sports and culture, and organizes public sports and cultural activities. By doing that, they hope to encourage the citizens to adopt healthy pursuit of outdoor sports and enhance neighborhood relationship among citizens.





□ Avenida 9 de Julio of Buenos Aires

The representative organization in community, on one hand, serves as a bridge between government and society and also plays an important role in facilitating information transmission between two parties so as to help form a stable government-community relationship, which undoubtedly constitutes the foundation of a sustainable governance. On the other hand, the organization also

helps to foster the participation ability of the citizens. At the individual level, the office gathers together distributed citizens through “round table meetings” to discuss how to reuse deserted public space. In this process, government regulators help the public to take part in “debating communication”. Exchanges beginning with indecision and constant conflicts will always end with a decision-

making process which is better based on consensus of two parties, and deliver a stronger and more inclusive neighborhood relationship. Thus, on the organization level, government organization pays more attention to exploring and strengthening social organizations among the community, to entrusting the social organization to carry out sports and cultural activities and offer them financial assistance.

Up till now, Villa 20 is witnessing less pollution, less insecure problems and more sports and cultural activities in public areas. The improvement of hardware environment, diversity of spiritual life and promotion of safety help citizens to gain more sense of identity of the community. Apart from

the above, the process of discussing public affairs and wide participation of outdoor cultural and sports activities makes citizens care more about the community.

3.The public as the main body in daily decision-making process

Compared with election by voting, the participation of daily decision-making process stands as an important mark of the identity of the citizens. During the practice of Buenos Aires, fields that citizens participate in are not those big events related to politics, but those regarding the promotion of welfare. For instance, in the community of Barrio Parque Donado Holmberg, citizens negotiate on the legality of poor resident's house. Previously, unilateral settlement of the issue always all ended with failure. But in 2009, all relevant parties were called together, and residents and family organizations wielded their influence through public hearing. The administrative subjects of the city take proactive actions to contact representatives of the residents, to seek the best solution according to their own situation. House inhabitants, all residents who are affected by house acquisition (organized by NGOs), lawmakers from all departments,



□ Street Performance in Buenos Aires



□ Business District of Buenos Aires

municipal interest bodies of multiple parties, will affect the policy process and the decision result with a timely and equal chance. And the citizens are now at the center of decision making and are directly relevant to the issue. After the discussion by multiple parties and when two parties reach a consensus on the legal frame of housing, the proposal is passed with unanimous approval at later municipal congress and put into effect immediately.

Under the guidance of the government and with the cooperation of the social organizations and the participation of community residents, Barrio Parque Donado Holmberg community has achieved great success in improving infrastructure, reducing environment pollution and enhancing social security. Currently, the community is constructing a teacher training college for kindergartens, primary schools and higher special education schools.

Two new underground passages and a 1500-meter bikeway have been completed. 30% of greenbelt has been adopted into the community and the frequency of street patrol police has increased by 100%.

▮ Effect and Challenge

1. Effect of the Initiative

(1) Periodical meetings participated by referents and experts in this area. Experts visited benchmarking places and organizations. The periodical meetings are only designed for and managed by mayors, cabinet departments, and senior officers of Buenos Aires municipal government. These meetings are of great success, for they produced a great many of seniors officers with lots of creative projects. And these senior officers are inspired when visiting the creative places.

(2) Real-time communication submitted to mayors, cabinet departments, and senior officials of municipal government. Real-time communication is of great help for it not only includes news related to local and international innovation, but also it changes the language of officers receiving the communication.

(3) Monthly regular meetings participated by mayors, cabinet departments, and municipal government senior officials. Results of these meetings are of great benefits. As the cooperation committee is not institutionalized, monthly regular meetings replace the cooperation committee held by cabinet departments per month.

(4) The close contact with government exchange group shifts innovation into one of the basic instrument of government exchanges.

2. Challenge of the Initiative

(1) Regarding the space of convening these meetings, it becomes gradually crowded in terms of the intern meeting space held each week.

(2) It becomes increasingly difficult to organize work which focuses on result and output. Although the committee can deliver multiple comments and suggestions (brainstorm), it is hard to integrate all the opinions so as to select the right solution and then put into implementation and management. The committee should formulate reasonable criteria through discussion, which can be transferred into quantized index, so as to conduct future meetings in a more effective manner.

Practice and Innovation

1. Revolutionary Innovation

The innovation committee provides a platform to enrich ideas, accelerate development and cooperate in projects with regards to innovation in public policies.

The innovation committee by nature is a revolutionary measure, as it serves as a novel strategy in dealing with public policies. Different from other departments in the world which aims at propelling innovation, the innovation committee is a horizontal

organization with no corresponding management departments. As a result, both its working mode and output are innovative. The committee is changing the way in which Buenos Aires government conducts innovation.

What is more, officials offer suggestions by taking advantage of their qualification and experience. Obviously, people need to take an audacious and counter-intuitive attitude when considering innovation for development, and that is just where the main merits of the committee lie.



Business District of Buenos Aires

2. Characteristics

Despite the fact that the means adopted in work within the committee are innovative strategies, the measures proposed by the committee are also proved to be of great innovation.

(1) “Future School”: This measure helps to introduce educational innovation and new technology (robot and 3D printing) to public schools in the city.

(2) “Buenos Aires School of Entrepreneurs”: it provides training programs which aims at strengthening the potential of entrepreneurs and these programs are taught by training instructors from Kauffman Foundation.

(3) “NIDO”: It refers to a development area for manufacturing enterprises with great potentiality enjoyed by residents from Villa 1-11-14. In this area, there is a kindergarten, an activity center which welcomes social entrepreneurs as well as an auditorium which is built with the help of advanced technology. Functional buildings cover an area of 4,800 square kilometers, benefiting 80,000 people.

(4) “Wi-Fi Coverage”: This measure provides people with an access to the internet by using less resources, so as to narrow the digital gap.

(5) “Buenos Aires Exporters Platform”: This project helps people

get to know the major requirements and procedures with regards to doing business in foreign markets.

Highlight

The purpose of setting up a committee is that the municipal government of Buenos Aires is aimed to build it into an innovative, pioneering, creative, sustainable and inclusive oriented city. It realizes that risk might occur when carrying out innovation at this level. Therefore, in order to reduce the risk, it took the following measures targeted at strengthening cooperation and influence. Here are summaries of the measures:

1. Meaningful Learning

The projects which are used for entrepreneurship means to transfer the spirit of entrepreneurship into a compulsory course that would be taught in all public schools in Buenos Aires. During the preliminary test in 2014, 31 pilot schools were involved, with 800 trainers, 31 kinds of school utensils and one virtual classroom. In 2015, this measure is implemented to cover all the public schools within the city.

2. Planning your Future

This program has got the permission of “Code College” with the purpose of designing developer ecosystem. Students majored in information science can use this permission and ordinary students and all citizens also can use it freely. From February to December 2012, the Sixth group (200 students) students majored in information science accepted training. Online courses would open to 4,000 students, and 25 middle schools

would provide classroom courses. It is estimated that about 5,000 residents registered in online courses.

3. Accelerating Organization and Seeding Capital Fund Project

This project helps to set up certain organizations which will select targeted enterprises and provide them with fund and work space and give them guidance so as to accelerate their development. From January to September 2014, it is predicted that there would be five



□ Streetscape of Buenos Aires

accelerator organizations.

4. Creative Fields

In 2014, this project planned to utilize its current 4,000 square meters of solid space in order to facilitate cooperative work and provide the community with the instrument they need, with which they can develop their specialized items, molding machine, office location and internet for instance. Some of the alternatives fall to soft loans permission and financing from municipal banks, operational cost and national preferential policies. Besides, the government has always been encouraging to create new space. A total of 167 items had been carried out in 2013, which offers a usable land of 2,450 square meters. And these programs created 501 jobs.

5. Buenos Aires Identity Card

This project is a digital identification of each resident, constituting the digital property of the city. It plans to gain 1 million users in one year.

6. City of Ideas

At the tendering platform, residents can voluntarily express their ideas on how to deal with difficult issues. The preliminary test has achieved the following results: Regarding the question “How do you think we can improve the traffic in Buenos Aires?”, we directly

contacted more than 5,000 drivers who contributed about 1,000 ideas. When considering the question “What will you do in order to build Buenos Aires a more modern city?”, about 3,000 answers were from university students, who have also participated in the workshops in their school. Through an eight-hour online platform, 500 registered users contributed their ideas on how to make the city more sustainable. What is more, two meetings were convened during the buffet in community No.13 and No.2, during which about 150 residents in that area discussed the common issues so as to improve their living conditions. At last, the public can also take part in “Night in Museum”. The Museum provides one wall of the building to the residents, so they can post their 800 answers regarding “What you can do to make Buenos Aires a better place to live?”

7. En Todo Estás Vos Card

It is a comprehensive tool that can be used for new trade interests, subsidies, obtaining cultural products and simplified procedures. 400,000 cards were issued in 2014 and it was predicted that it would generate new benefits and the card would be integrated with the subway system.

8. Ecological Bicycle

Residents can automatically

borrow and return bicycles at 200 stations by taking advantage of mobile application and En Todo Estás Vos Card.

▾ Experience and Inspiration

1. Technological Decision-making with the Assistance of Elites

Elites play the important role of technology guide in the decision-making process of public affairs by taking advantage of their expertise. To what degree will the elites participate the decision-making process of public affairs depends on the level of expertise of the decision makers compared with experts. In the practice of Buenos Aires, the participation of elites can be seen both in high level decision-making and community discussion. In “Innovation and Creativity Commission”, senior officials of the committee (mayor, Cabinet minister and senior officers of the municipal government) hold meetings regularly with experts; in the building of community Villa 20, multi-disciplinary groups drive the decision-making process of community affairs. The project group consists of elites from many industries including architects,

urban planners and educators, who provide technological guidance on issues such as how to plan the community wasteland and how to set the layout. Apart from that, the elites also support and provide technological training for the public who also take part in the decision-making process, so as to guarantee that the public and community organizations can drive the negotiation of public affairs in a more effective manner.

2. Social Organizations as Partners

Social organizations can aggregate decentralized citizens through common interests and value. This agglomeration effect on one hand can help citizens with common interest act as a whole, so as to exert greater influence on the participation of public affairs. On the other hand, it is more convenient for the government to identify the common interests, and then bring more benefits to the community with the help of social organizations. With regards to concrete affairs, social organizations play important roles in the implementation and the supervision of public policies. In the management of Villa 20, SECHI subsidizes local sports and cultural NGOs to carry out the planning of



□ Streetscape of La Boca, Buenos Aires

regular sports and cultural activities in the newly cultivated space. Moreover, the evaluation of the renovation of community Barrio Parque Donado Holmber is conducted by the urban development departments, and it submits reports at the fixed period to urban legislative institution housing committee. And this committee also contains civil and social organizations so

as to guarantee the transparency in the process of the project. As to cultivateing people's capacity of autonomy, cultural and sports social organizations of community Villa 20 are recognized by the government as positive leaders. In that way, the government manages to empower the community and help to strengthen the building of community network.

— Annex —

List of 30 Deserving Recommended Initiatives of the 2nd Guangzhou International Award for Urban Innovation

(By Alphabetical Order)

City	Initiative
Bogota (Colombia)	Zero Waste Program: a focus in reuse with social inclusion
Bremen (Germany)	Livable Streets – Livable City! Sustainable Mobility and Car-Sharing – Key for reclaiming street space
Brussels (Belgium)	CLTs, an innovative and participative home ownership model
Budapest (Hungary)	Coming Soon! – Rögtön Jövök!
Büyükçekmece (Turkey)	Our disabilities don't have to stop us!
Changwon (South Korea)	Resident-led Urban Planning “Building the Best (Eutteum) Neighborhood” Project
Dubuque (USA)	Smarter Sustainable Dubuque
Galle (Sir Lanka)	“Make Green & Clean Bio Energy City in Galle”
Kisumu (Kenya)	Waste to Wealth
Kunming (China)	Free Bus Service by the Elderly in Kunming
Laiwu (China)	Respect the Low-Income Citizens' Right of House Selection
Lisbon (Portugal)	Lisbon Local Development Strategy for Neighborhoods or Areas of Priority Intervention(BIP/ZIP)

Lusaka (Zambia)	Know Your City—A 2030 City Without Slums
Malmö (Sweden)	Climate Smart Hyllie
Mexico City (Mexico)	“Calle Completa” Línea 5 de Metrobús
Ottawa (Canada)	Ottawa’s Innovative Spirit: Transforming an Economy through Diversification and Entrepreneurship
Petaling Jaya (Malaysia)	Greening the Grassroots—A journey for Sustainability Petaling Jaya
Phitsanulok (Thailand)	Phitsanulok: Low Carbon City with Integration of Stakeholders by Taking Activities on Reducing Green House Gas Emission and MRV System to Sustainability Environment City
Porto Alegre (Brazil)	Datapoa—The Open Data Project of the City of Porto Alegre
Recife (Brazil)	Recife Pact for Life—Urban Security and Violence Prevention City Plan
Rostov (Russia)	In Step with the Time: Socially-oriented Project for Adaptation of Elderly People to Information Technology
Sabadell (Spain)	Sabadell Smart City as a Catalyst for Building the

	City of the Future
São Paulo State (Brazil)	State Program for Prevention of Natural Disaster and Mitigation of Geohazards
Seoul (South Korea)	Anti-corruption Clean Construction System
Surabaya (Indonesia)	Community-based Independent Waste Management
Sylhet (Bangladesh)	Building a Water-logging Resilient Sylhet City
Tallinn (Estonia)	Free Public Transport for the Residents of Tallinn
Tel Aviv (Israel)	The Tel-Aviv-Yafo Municipality Citizens Club
Vancouver (Canada)	West End Community Plan
Vienna (Austria)	Wien Mags Wissen—Making Public Sector Knowledge Management Work: Creating Engagement with Value Based Management



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