ADB

Technical Assistance Report (Forum Proceeding)

Project Number: 9308-REG
RETA
May 2019

International Forum on Low Carbon Development for Central Asia Regional Economic Cooperation (CAREC) Program Cities

The Cities of Tomorrow: Sharing Low Carbon Experiences for Green, Competitive, Resilient and Inclusive Cities

Beijing 4-6, December 2018

Key Messages and Outcomes

Asian Development Bank

ABBREVIATIONS

ADB	–	Asian Development Bank
BAU	–	Business-as-usual
CAREC	–	Central Asia Regional Economic Cooperation
EV	–	Electric vehicle
GDP	–	Gross domestic product
GHG	–	Greenhouse gas
GPC	–	Global Protocol for Community-scale Greenhouse Gas Emission Inventories
GPS	–	Global positioning system
HVAC	–	Heating, ventilation, and air conditioning
MDB	–	Multilateral development bank
MRV	–	Monitoring, reporting, and verification
NDC	–	Nationally determined contributions
SDG	–	Sustainable development goal
ToD	–	Transit oriented development
UNFCCC	–	United Nations Framework Convention on Climate Change

CONTENTS

I. CONTEXT

1. The International Forum on Low Carbon Development for Central Asia Regional Economic Cooperation (CAREC) Program Cities was held on December 4-6, 2018, in Beijing, China. It was organized as part of the Asian Development Bank's technical assistance project on Promoting Low-Carbon Development in CAREC Program Cities (9308-REG). The forum was organized, and the agenda was designed based on the following contexts:

A. A Systems Approach Facilitates Low-Carbon Development in Cities

2. Climate change has raised awareness of the circular nature of the world we live in—a world in which economic value created also leads to the generation of wastes that harm the local, regional, or even the global environment. Adopting a systems approach makes possible a better appreciation of the intended, as well as unintended, consequences of any policy or investment decision. In the context of cities, adopting a systems approach will:

- Recognize the interrelated nature of urban infrastructural services, all of which require energy inputs;
- Improve diagnosis of causality and of both intended and unintended consequences of policy or investment initiatives;
- Apply information and communications technology advances to identify, analyze, and understand how underlying economic, environmental, and social structures drive the urbanization process; and
- Develop solutions for low-carbon development that are uniquely suited to each city and do so with full engagement of city-level stakeholders.

B. Learning Through Knowledge Sharing

3. Low-carbon development in CAREC cities can benefit from the various initiatives already being implemented in several cities in developed and developing countries. The advantages of learning about initiatives that worked well and those that didn't work well are several, and include:

- Appreciation of how the low-carbon development narrative was developed and communicated to secure full ownership of the idea among city-level stakeholders;
- Articulation of the co-benefits of low-carbon development for local communities (through better quality of life), for the regional ecosystem (by sustainable management of air, water, and land pollution), and for the global commons by mitigating the harmful impacts of greenhouse gas (GHG) emissions; and
- Ability to select from among urban, transport, electricity, and water planning tools, as well as tested GHG management tools, to customize solutions that are consistent with local realities.

C. Governance

4. Low-carbon development has an explicit focus on setting targets for GHG reductions and tracking how far these targets have been achieved. The monitoring, reporting, and verification (MRV) system is a key instrument of governance and an integral contributor to the larger goal of sustainable development.

- The focus on GHG outcomes enables continuous analysis and feedback to improve performance in various contributing urban, commercial, and industrial services;
- The feedback loops that are included from the planning stage to the implementation stage enable robust community participation;
- Objective metrics on performance in the low-carbon development plan and investment program are directly linked to targets agreed on by the key urban services sectors (such as transport, energy, buildings, water, and waste management). This process improves transparency and accountability among urban sector institutions;
- Validation of improved urban governance has significant potential for attracting financing from markets to expand city-wide low-carbon infrastructure investments.

D. Financing

5. For cities to transition effectively to low-carbon pathways, significant incremental investments are necessary. The financing gap in investments cannot be met from the very limited funding available from local resource mobilization, national governments, or even the various bilateral and multilateral organizations. Securing market-based financing requires potential investors to be able to track the risks and returns of investing in these cities independently.

- A key first step is to implement “green” procurement policies that are within the jurisdiction of city governments;
- Another step is to invest in open-access digital data platforms that fully disclose performance, both in terms of low-carbon targets achieved and in the transparent analysis of performance by contributing sectors; and
- Macro-fiscal policies that lower the costs of doing business also enhance investor interest in participating through subscription of green bonds, offers of venture capital financing, or even project financing.

II. KEY MESSAGES FROM THE FORUM

A. Climate Change, Urbanization, and Sustainable Development Goals

"Through this Forum, ADB reinforces our roles as trusted partner, reliable financier, knowledge provider, and a convener of strategic partners for your low-carbon city development efforts."—Ms. Teresa Kho, Deputy Director General, Asian Development Bank

6. The Beijing forum was held at the same time as the COP24[1] meeting in Katowice, Poland, during which 177 countries pledged to finalize the rules for achieving the Paris Agreement goals of reversing the trend lines for GHG emissions, and thereafter to accelerate decarbonization of economic activities until 2050. Cities play a critical role in achieving these targets because they are centers of economic dynamism. By 2050, Asian cities will hold about 66% of the continent's population. With hundreds of millions of new residents moving to these centers and rising standards of living, significant pressures are being placed on the energy supply and natural resources supporting urbanization. These generate economic, social, and environmental costs at the local level in the form of chronic traffic congestion, heat islands, and air, water, and land pollution. At the global level, many of these activities contribute to GHG emissions, and in the decades ahead, cities will be exposed to extreme weather events that are likely to be unpredictable because of climate change. A strategy that balances low-carbon development at the city level with continued economic growth, improving living standards, and sustainable use of natural resources is therefore required.

7. Combating climate change is a stand-alone sustainable development goal (SDG); it also has "knock-on" effects on 14 of the remaining 16 SDGs that 177 nations committed to achieve by 2030 (Box 1). For example, achievement of Goal 11 on sustainable urbanization is affected if adverse climate effects (such as increased typhoons, sea level rise, floods, droughts, etc.) expose communities and fixed assets to the risk of damage or destruction. However, cities can take the lead in utilizing a low-carbon development pathway through improved governance (consisting of policy, regulatory, and planning innovations) to become safe, resilient, inclusive, and sustainable.

8. Apart from the environmental and social justifications, there is a persuasive economic case for low-carbon investments in Asian cities that are ADB clients:

- Various technological breakthroughs that have occurred and continue to take place could reduce GHG emissions from the various urban services significantly, and at lower operating costs relative to business as usual (BAU);
- However, these measures can be expensive because they usually require financing for upfront capital investments (although the cost savings at the operational phase could pay for the measures that produced them and amortize any financing that is required);
- Further savings could arise from reduced expenditure on energy infrastructure and elimination of subsidies.

[1] COP24 is the informal name for the 24th Conference of the Parties to the United Nations Framework Convention on Climate Change.

Box 1: Sustainable Development Goals[2]

Goal 1. End poverty in all its forms everywhere.

Goal 2. End hunger achieve food security and improved nutrition and promote sustainable agriculture.

Goal 3. Ensure healthy lives and promote well-being for all at all ages Goal 4.Ensure inclusive and equitable quality education and promote lifelong learning+ opportunities for all.

Goal 5. Achieve gender equality and empower all women and girls.

Goal 6. Ensure availability and sustainable management of water and sanitation for all.

Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all.

Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

Goal 10. Reduce inequality within and among countries.

Goal 11. Make cities and human settlements inclusive, safe, resilient, and sustainable.

Goal 12. Ensure sustainable consumption and production patterns.

Goal 13. Take urgent action to combat climate change and its impacts.

Goal 14. Conserve and sustainably use the oceans, seas, and marine resources for sustainable development.

Goal15. Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss.

Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable and inclusive institutions at all levels.

Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development.

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[2] United Nations. *Transforming Our World: The Sustainable Development Agenda for 2030*. https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf

B. Low-Carbon Urbanization and Economic Benefits

"Low-carbon cities range from very simple models to much deeper collaboration between urban specialists and city governments."— Reinder Brolsma, Urban Water Management Specialist, Deltares

9. Urbanization generates unique carbon and other natural resource footprints, depending on how much energy, water, construction material, and other resources are consumed by urban households, industries, and services. These patterns of consumption in turn depend on the spatial structure, transportation characteristics, and the feedstocks of energy systems that supply electricity, heating and cooling, transportation, and so on. Since the first industrial revolution, cities have met their energy needs largely from coal, petroleum, and natural gas, most of which generate large GHG emissions that rapidly expand with more urbanization and economic growth. Low-carbon development advocates the adoption of an approach that promotes a lifestyle that is clean, green, and healthy for individuals while also sustainable for the ecosystem. This is possible by either replacing or enhancing the efficiency of the existing energy feedstock with less-polluting alternatives, such as renewable energy, ground-based heating and cooling, and so on. Such outcomes are beneficial to the community as well as to the global commons—and without sacrificing economic growth.

10. Moving out of the BAU comfort zone will require governance changes at the national, municipal, and community levels that track development outcomes in terms of a city's carbon emissions in addition to the well-established performance indicators of economic and social well-being. Such a transition requires leadership by municipal governments aimed at promoting urban forms that simultaneously lead to more efficient energy usage while also improving the quality of life for residents. Similarly, transport policies need to promote mobility solutions for urban commuters rather than encouraging more private cars with single users clogging city streets. An operational challenge lies in getting large sector agencies and national ministries to collaborate with each other for results at the city level. Mobilizing city-level leadership and communities to own the low-carbon development agenda is obviously critical to achieving reductions in carbon emissions and energizing local stakeholders to own the climate agenda.

11. The economics of decarbonization requires understanding of not only the costs, returns, and GHG savings of low-carbon measures, but also on how these measures stack up against BAU scenarios (in terms of energy use, direct and indirect energy costs, and the resultant carbon emissions). On the positive side, digitization of data and the availability of a large and growing suite of analytical and modeling tools offer rigorous but cost-effective methods for measuring carbon emissions, which need to be managed to achieve the low-carbon development goals a city adopts.

12. The operational question for each participating city is how quickly economic benefits can be appropriated by its stakeholders. Typical questions include how much the city stakeholders can reduce their energy and heating/cooling bills and what the economic benefits would be because of the environmental and health impacts of reduced pollution, less traffic congestion, and improved quality of life.

C. Long-term Decarbonization Strategy

“The overall objective is to align private investments with city low-carbon goals. Mongolia’s future lies in working in collaboration with ADB and local governments as the seed funders to attract private investors.” — Enkhtumen Tumenstog, Investment Fund Specialist, DBM Asset Management SC, LLC

13. Current BAU practices in cities are based on long-standing planning traditions that have not factored in the carbon implications for urban design and for key service sectors such as energy, transport, solid waste collection, waste treatment and disposal, and water and sanitation. The transition to low-carbon cities requires tracking how decarbonization of these sectors and practices can be accelerated without compromising on economic growth, social equity, and environmental sustainability. This process requires understanding the systemic ways these urban infrastructure service sectors operate and interface with each other. Decarbonization therefore requires “thinking integrated while acting disintegrated” by establishing GHG reduction targets at the city level and requiring sector agencies to achieve specific decarbonization targets for the services they are responsible to deliver.

14. Promoting a decarbonization strategy requires moving beyond sector master plans to a systems approach that triangulates economic, environmental, and social sustainability goals. A key requirement is the full incorporation of the social dimensions through full engagement of all city-level stakeholders in the planning and implementation process. Advances in digital data generation, notably through geospatial data, real-time information from the global positioning system (GPS), social media communications, and the ubiquitous sensors in urban infrastructure can leverage “big data” analytics and cloud computing. Such advances allow the discussion, debate, and prioritization of local development goals, which are usually fully consistent with low-carbon development objectives.

15. Low-carbon development therefore consists of establishing phased targets for decarbonization that are measurable and accepted by the relevant service providers as a part of their organizational mandates. For this process to be internalized by city governments, the accompanying storyline or narrative should be endorsed (as to the identified priority actions, why the targets have been established, and why achieving these targets is important) by city stakeholders. Each of these actions (such as identifying and establishing priorities and achieving desired outcomes) will benefit from adopting a systems approach that specifically analyzes the cross-sector effects, including identification of possible unintended consequences. Big data analytics will play an important role in providing inputs on learning and sharing the knowledge of what worked and what didn’t work.

16. A long-term decarbonization strategy that is sequenced according to a city’s priorities. Typically, the easiest goal to accomplish is promoting energy efficiency upgrades, because these interventions lead to direct economic benefits to the energy consumer. The next step in the sequence is promoting fuel switching, either by adopting renewable sources of energy or by replacing coal and petroleum with natural gas (as an intermediate measure). Fuel switching has upfront capital costs that must be financed. The more ambitious goals eventually result in fully decarbonized city systems.

17. The three stages can be facilitated by investing in digital data platforms that offer the basic electronic infrastructure needed to integrate the activities of diverse service providers. Analyzing these normalized data sets enables city stakeholders to identify trade-offs and unintended effects and to debate the costs and benefits of different options to achieve carbon reduction targets. For

example, many of the upgrades listed in the first column require close collaboration between the electricity, heating, and building sectors, all of which can benefit from energy-saving actions with very quick payoffs. The goals listed in the second column require a larger set of policy and regulatory measures that result in the city switching the fuel mix from coal and petroleum to renewable energy feedstock. The third column, which describes true decarbonization, would require a much more comprehensive set of policies and sector actions.

18. The process of transitioning from a BAU situation, to the carbon-peaking outcome, and then accelerating the transition to the low-carbon and zero-carbon outcomes has implications for the way people will live, commute, and work together during these changes.

D. Lessons Learned from Developed Country Cities

"The German word Eigenart or peculiarity captures the diversity of city systems in terms of space and well-being, social cohesion, creativity and innovation."— Manfred Fischedick, Vice President, Wuppertal Institute

19. Low-carbon development in cities is accelerated through local climate actions that reduce carbon intensity without compromising economic growth. Experience from several cities in Europe, the United States, and Japan validates that such a transition is possible by changing the narrative and value systems through dialogues and debates. Such actions include promoting green, climate-resilient urban development by applying integrated planning of housing, public spaces, mobility, energy use, and water and waste management while retaining a laser-sharp focus on achieving decarbonization goals. A fundamental requirement is the engagement of local stakeholders in identifying priorities that are important to the city in the long term because the underlying investment and policy actions will likely require several decades to implement fully.

20. Experiences in cities that successfully promoted low-carbon choices enable developing member country practitioners to prioritize low-carbon options that are economically attractive and institutionally implementable in a specific country and city context. Examples include ground-based heating, promotion of a circular economy through methane capture from liquid and solid wastes, adoption of green building standards and energy labeling, promotion of solar energy through solar panels on rooftops, and so on. Equally important is to learn about how these cities successfully leveraged incremental financing from markets to support their new investments.

21. Successful low-carbon planning and implementation experiences in cities in advanced countries have led to the availability of several analytical and modeling tools that could be adapted to meet the needs of the CAREC cities. The lessons from these experiences will be shared by ADB as training material, in e-learning or face-to-face courses, and through events such as this forum.

III. SUMMARY OF PRESENTATIONS AND DISCUSSIONS

22. The topics discussed reflected the opportunities and challenges faced in the CAREC cities to promote low-carbon development. Opportunities for promoting new streams of investment in low-carbon urban development arise because the narrative of urbanization today emphasizes the quality aspects in terms of citizen health and the availability of amenities that encompass not only infrastructure and social services, but also good-quality environmental services. Summaries of individual sessions are presented in Section IV, while key messages emerging from the forum are provided below.

A. Experiences of Old Industrial Cities and New Districts in Developing Low-Carbon Strategies

23. Old industrial cities that had already undergone structural transformation because many of the traditional employment-generating smokestack industries had closed. This crisis enabled city leaders to refurbish “brownfield” sites more effectively while also providing a suite of amenities to attract service-oriented businesses and knowledge institutions. (A brownfield site is one that was developed for industrial use and then abandoned without remediation.) Adopting a low-carbon approach to complement planned urban renewal projects is made possible by the presence of robust governance institutions at both the national and the city level and by active stakeholder engagement in identifying those priorities that are important to the entire community.

24. A second category consisted of old industrial cities that were responding to pressures from constituents who wanted infrastructure services that met their housing, mobility, and lifestyle needs. In these cities (which are primarily in Europe), for example, citizens have championed mobility solutions that rely on nonmotorized options such as bicycles and pedestrian-friendly shopping and recreational area development.

25. The third group consisted of either old industrial cities or new districts that were taking the lead in meeting the country’s nationally determined contributions (NDCs) by developing low-carbon or climate-friendly solutions. In China, for example, the central government has directed all large cities to bend the carbon emissions curve by 2030 at the latest, and thereby catalyzed low-carbon planning at the city level, often with the active engagement of local carbon-intensive industries. In the Netherlands, where sea level rise presents an existential threat to the whole country, water planners have developed “sponge city” ideas that capture excess water runoff for future use.

26. Overall, these initiatives have fostered social inclusivity using modern tools such as social media, blogs, and so on, and attempted to minimize the costs of adverse indirect rebound effects, if any.[3] However, the key selling point, as far as city-level stakeholders are concerned, consists of a convincing narrative of the economic, social, and environmental benefits that accrue at the local level. Such a narrative should highlight a compelling economic case by demonstrating benefits in terms of cost savings, risk mitigation, or both.

[3] A notable example is that when rooftop solar energy is promoted, the local electricity company loses some of its most valued customers—those who usually pay more through block tariff structures but can now buy less electricity from the grid. This well-intended initiative could generate a negative rebound effect by creating financial problems for the electric utility.

B. Applying the Lessons from Cities in Advanced Countries in the Context of Cities in Developing Countries

27. Successful low-carbon city plans have maintained a consistent focus on monitoring the extent to which policy or investment initiatives are leading to the desired overall reduction in carbon emissions from that city. For example, traffic congestion and air pollution problems that citizens complain about have high carbon emissions. If the goal is to reduce emissions, commuters use of ride-sharing services and investment in bus rapid transport systems lowers the emissions — instead of the city investing in more roadway flyovers and wider car lanes at the expense of footpaths. The unintended consequence of more flyovers and wider lanes is usually more congestion and air pollution; single-occupant cars increase pressures on the road system and, over time, increase the carbon emissions. On the positive side, energy storage systems that capture excess power from solar panels could be optimized if they also serve to recharge the batteries of electric vehicles. Another example described was the eco-mileage program in Seoul, South Korea, which offered matching grants from the Seoul Metropolitan Government to a homeowner who saved on electricity consumption. More than 1 million persons (about 10% of the Seoul metropolitan population) participated in the program because of the direct economic benefits they obtained.

28. Low-carbon development is also being catalyzed by the ongoing digital transformation of public life. Cities today have multiple sources of electronic data because sensors have become ubiquitous in monitoring water, electricity, and traffic flows; data are available through GPS and the use of geographic information system maps (derived from satellites) and mobile phones. For example, technology today allows the selling of excess renewable energy back to the grid, monitoring the movements of public transportation vehicles, and the tracking of air and water pollution levels in real time. Disruptions caused by big data analytics and the internet of things are very helpful in establishing city-level decarbonization goals, including the effectiveness of contributors from different sectors. These qualitative impacts on growth are measurable, making it that much easier for a value investor or a global pension fund to consider investing in the city.

C. Tools for Low-Carbon Planning

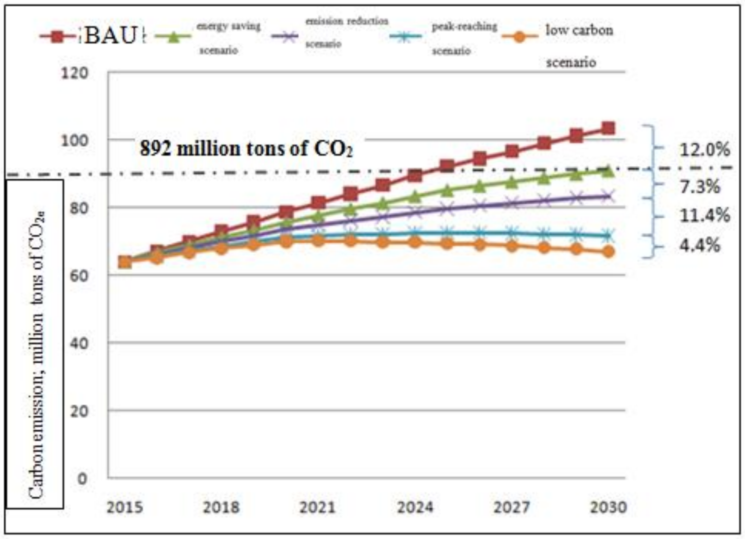
29. Low-carbon development is grounded in systems thinking. Quantifiable GHG emissions provide a common metric that can lead to sector-specific decarbonization targets. Such an approach encourages integrated city planning. Collaborative and coherent sector development is possible across the energy, transport, buildings, waste, and land use sectors, while also emphasizing preventive actions to build city resilience.

30. Measuring the low-carbon progress at the city level is made possible by a quantifiable indicator of GHG emissions reduction. Such an approach enables the digital overlay of several databases to develop an integrated city plan, along with complementary actions across energy, transport, buildings, waste, and land use. Analytical tools are also available to assess the GHG inventory at the city level, simulate alternative scenarios for decarbonization, and provide objective data on decarbonization progress.

31. An example of such a tool is shown in **Figure 1**, which describes the low-carbon development scenario for this RETA's pilot city, Changsha. The BAU scenario is shown in red while the other scenarios show more aggressive actions to bend the emissions curve for the years 2018 to 2030. The low-carbon scenarios identify energy and emissions trajectories that are alternative to the BAU scenario. They incorporate various measures that promote both the use, and the efficient use, of cleaner fuels. Results under this scenario show what changes are possible if all efforts are

deployed to reduce energy consumption and GHG emissions and provide the foundation for setting the city's goals and targets. This helps to quantify the potential for the associated energy and emissions savings.

Figure 2: Decarbonization Options for Changsha City



D. Financing for Low-Carbon Development

32. The low-carbon plan endorsed by the city also includes investment requirements by sector, the paybacks that correspond to the projected decreases in energy and carbon intensity. The carbon savings could include several nonstructural and structural interventions, such as:

- Net reductions through embodied energy usage in building materials, through green building standards, to adoption of energy efficiency measures and renewable energy substitution in the building, commercial, and industrial sectors;
- Replacement of diesel generators with rooftop solar systems;
- Replacement of coal-fired heat-only boilers with ground-based heating;
- Diffusion of low-carbon public and private transit through bicycle, two- and three-wheeled vehicles, car-sharing, bus rapid transit systems and so on; and
- Adoption of circular economy principles by capturing GHGs from liquid and solid wastes generated by cities.

33. Financing from the public sector could be accelerated because of NDC commitments. In addition, several presentations described how green procurement policies have required public agencies, including city agencies, to finance low-carbon solutions. In Europe, for example, cities such as Reykjavik (Iceland) and Barcelona (Spain) have taken the lead in promoting green procurement. Chinese cities have promoted electric buses through procurement policies. Securing green finance in CAREC cities from global markets is more challenging unless there is a credible track record that records how effectively green funds have been deployed to reduce the carbon footprint of a city.

IV. FORUM AGENDA AND SUMMARIES OF INDIVIDUAL SESSIONS

A. Forum Agenda

Day 1: 4 December 2018, Tuesday

8:30-9:00 *Registration of Participants*

9:00-9:40 **Opening Plenary**

High-level officials from the host country and supporting organizations will set the scene by painting a canvas depicting the relevance of LCC Policies to the Climate Change Agenda and recent developments in global low-carbon policies relevant to CAREC countries

Welcome Remarks

- Teresa Kho, Deputy Director General, East Asia Regional Department, Asian Development Bank
- Xu Huaqing, Director General, National Center for Climate Change Strategy and International Cooperation

Key Note Speeches

- Alex Perera, Deputy Director of Energy, World Resources Institute
- Dr. Manfred Fischedick, Vice-President, Wuppertal Institute

9:40-10:00 **Book Launching Ceremony**

"50 Climate Solutions from Cities in the People's Republic of China"

- Teresa Kho, Deputy Director General, East Asia Regional Department, ADB
- Pengfei Xie, China Chief Representative, C40 Climate Leadership Group
- Jack Robinson, Publication Editor, Sustainia
- Jisheng Zhang, Shidong Cheng, Zhi Cheng, Xianqiang Mao, Local Consultants for the Publication

10:00-10:15 **Call for the 2nd Climate Solutions from CAREC Program Cities**

- Jack Robinson, Publication Editor, Sustainia

10:15-10:30 *Coffee Break*

10:30-12:30 **Session 1: From Dirt to Smart, Transforming Cities through Low-Carbon Development**

This moderated panel discussion will investigate on-the-ground experiences on promoting low-carbon development in transforming cities

Moderator: Xuedu Lu, Lead Climate Change Specialist, East Asia Sustainable Infrastructure Division, East Asia Regional Development, ADB

- Manfred Fischedick, Vice-President of Wuppertal Institute: "Low-carbon urban transformation in the Ruhr region"
- Daizong Liu, Director China Sustainable Cities Program, WRI: "Community transformation cases including Bo01, Malmo, Sweden – Industrial Harbor to Modern Low-Carbon Smart District"
- Toru Hashimoto, Director, Development Cooperation Department, City of Yokohama: "Transformation from industrial port city to smart and green innovative city: case of Yokohama and its implication to cities in emerging economies"
- Yuanguo Li, Deputy Director General, Changde Climate-Adaptive City Construction Leading Group Office: Transforming a slum into culturally sensitive and climate adaptive community in Changde, Hunan Province

Discussion & Rapporteurs Summary

12:30-14:00 *Lunch Break*

14:00-15:30 **Session 2: Fast development/ New Districts**

Moderator: Ralf Schüle, Co-Director of Research Group of Energy, Transport and Climate Policy, Wuppertal Institute for Climate, Environment, Energy

- Jiangning Sun, Director of Technology Department, China Eco-city Academy: Sino-German Eco-Cities Program experience
- Mao Qin, Deputy Director of the Low Carbon Management and Development Center of *Changning* District, Shanghai
- Steven J. Goldfinch, Disaster Risk Management Specialist, ADB: Avoiding the Generation of New Risks in Cities
- Sven Beyersdorff & Brita Staal from Nordic Sustainability: Livable District and Low Carbon Lifestyle

15:30-15:45 *Coffee Break*

15:45-17:30	**Session 3: Panel Discussion on Low-Carbon Urbanization** Moderator: Vijay Jagannathan, Senior Fellow at WRI • Om Prakash Agarwal, CEO of WRI India: Re-designing City Transport for Low Carbon Development • Taedong Lee, Associate Professor, Yonsei University and Tony Jun, Project Advisor, Overseas Project Development, Seoul Urban Solutions Agency: Making Seoul Low-carbon and Green City • Dr. Gyeng Cheul Kim, Transport Planning and Policy Consultant, Department of Transport, Philippines and former President of Korea Transport Institute: Low-carbon transport experiences in the Philippines and Republic of Korea • Brent Habig, Vice-President, International Programs, Institute for Sustainable Communities: Low Carbon City Programs Discussion & Rapporteurs Summary
18:30-20:00	Cocktail/Reception Hosted by ADB Nawon Kim, Senior Environmental Specialist, East Asia Sustainable Infrastructure, ADB
Day 2: 5 December 2018, Wednesday	
9:00-10:15	**Plenary 2: Roundtable on Low-Carbon Cities - Mayors' and MDB Perspectives** Moderator: Toru Hashimoto, Director of Development Cooperation Department, City of Yokohama • Pengfei Xie, C40 Climate Leadership Group • Maia Bitadze, Deputy Mayor, Tbilisi, Georgia • Bi Lei, Director, Resources and Environmental Department (Climate Change Office), Shenyang DRC, PR China • High Level representative from Guilin City • Representative from Zhenjiang City Discussion & Rapporteurs Summary
10:15-10:30	*Coffee Break*

10:30-12:30	**Session 4: From data to action: innovative tools for climate smart development**
	Moderator: Nawon Kim, Senior Environmental Specialist, East Asia Sustainable Infrastructure, ADB • Wee Kean Fong, Deputy Chief Representative, WRI China: GHG tools • Michael Steinhoff, Program Director, ICLEI-Local Governments for Sustainability USA: ClearPath for online GHG platform • Tjitte Nauta, Regional Manager Asia / Strategic Advisor Integrated Water Management, Deltares: Circle Stakeholder Engagement Tool • Reinder Brolsma, Urban Water Management Specialist, Deltares: City Adaptation Support Tool (AST) • Bruce Taper, CEO and Founder, Kinesis: Low-Carbon Pilot City Mapping Tool • Lulu Xue, Research Associate of Sustainable Cities, WRI China: Smart Card application in Ulaanbaatar Discussion & Rapporteur Summary
12:30-14:00	*Lunch Break*
14:00-16:00	**Session 5: Engaging private Investors in Low-Carbon Approaches**
	Moderator: Alex Perera, Deputy Director of Energy, WRI • Mr. Philipp Tepper, Senior Expert, Global Sustainable Procurement Capacity Centre, ICLEI European Secretariat: Business Perspectives on Green Procurement • Haiping Yu, Program Officer, ICLEI East Asia, Secretariat, “Challenges of implementing Green Public Procurement in the PRC” • Enkhtumen Tumentsogt, Investment Fund Specialist, DBM Asset Management SC LLC: Green Finance Design in Ulaanbaatar Affordable Housing Project • Y.T. Tzeng, Director of China Office, Kefenrod Rainwater Management Training Center – Private sector perspective on low-carbon and climate adaptation technologies • Weiwei Kou, Director of Investment and Corporate Development, Ant Financial Services Group – Ali Cloud Computing for Low Carbon City Development Discussion and Rapporteur Summary
16:00-16:15	*Coffee Break*

16:15-17:30	**Concluding Session** Moderator: Nawon Kim, Senior Environment Specialist, ADB • Report on CZT pilot city activities: Steven Zeng, Country Director, Institute for Sustainable Communities & Xu Yong, Managing Director, Hunan Innovative Low Carbon Center (HILCC) • Report on Astana pilot city activities: Aigerim Akiltayeva • Report on UB pilot city activities: Zolzaya Enkhtur & Dorjgotov Otgonbaatar • Wrap-up by WRI • Closing Remarks by Hao Zhang, PRCM Deputy Country Director, ADB
Day 3: 6 December 2018, Thursday	
Morning	**Site visits** • Monitoring & Management Center of Beijing Commission of Transport • Goldwind Industrial Park of District Energy System

B. Summaries of Individual Sessions

Welcome Remarks by Teresa Kho, Asian Development Bank

34. **Ms. Teresa Kho**, Deputy Director General, East Asia Regional Department, Asian Development Bank, welcomed participants to the International Forum on Low-carbon Development for CAREC Cities. In her opening remarks, she highlighted the important role that cities in fast-urbanizing Asian countries will have to play if member developing countries are to achieve their NDCs under the Paris Agreement. By 2050, cities will hold 66% of Asia's total population, who will benefit from rapid economic growth and rising living standards. In addition, many of these cities are vulnerable to a growing number of extreme weather events that could reverse development gains. Overall, these trends will place enormous pressures on infrastructure, housing, energy, transportation, and natural resources. Local climate actions could provide solutions by transforming the urbanization pathways into low-carbon development that fulfill the NDCs while also advancing the achievement of sustainable development goals (SDGs). Low-carbon development is grounded in systems thinking that relies on integrated city planning of land use through collaborative engagement among agencies in various sectors, agencies that deal with energy, transport, buildings, and water and waste management. The forum provided participants an opportunity to learn about how some cities have already implemented such programs, the various tools available to accelerate the low-carbon development process, and how city-level policies could attract green finance to bridge investment funding gaps. As a trusted development partner and knowledge provider, ADB is committed to provide capacity building and investment finance support to all its member developing countries.

Opening Plenary Session

35. **Mr. Xu Huaqing**, Director General, National Center for Climate Change Strategy and International Cooperation, China, emphasized the Chinese government's commitment to sustain economic and ecological development, not only for Chinese cities but also to share these experiences and benefit from good practices from the rest of the world. Energy reforms meant to promote energy efficiency among major users and the substitution of renewable energy sources for fossil fuels have been complemented by technological advances through rapid advances in digital capabilities. About 70 Chinese cities are developing carbon emissions peaking plans through city-specific low-carbon development plans. These include technological and institutional innovations (such as adoption of market incentives and promoting good-quality lifestyles with clean, safe energy systems, industry, transportation, and lifestyle system changes) that are consistent with local priorities. The expectation is that by 2030 all Chinese cities will have seen peak carbon emissions through investments facilitated by appropriate planning regulations and industrial and taxation policies. Central government institutions provide support by financing demonstration projects, developing robust monitoring reporting and verification systems, establishing low-carbon development indices, and promoting opportunities to learn from international experiences. China is ready to join forces with other nations in promoting regional low-carbon development through South–South Cooperation, the Belt and Road Initiative, and other forms of international cooperation. Collaboration is also taking place with research institutes in Korea and Japan to compile best practice solutions in the respective countries.

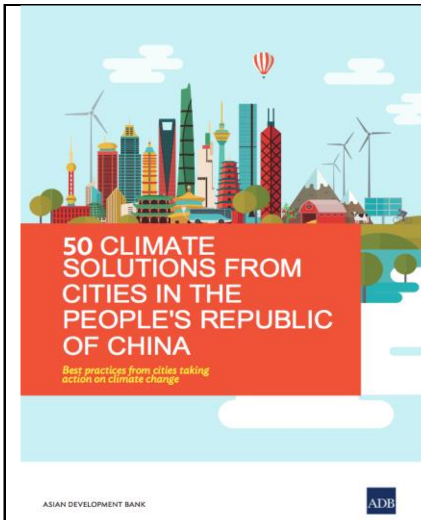
Keynote Speeches

36. **Mr. Alex Perera**, Deputy Director of the Energy Program, World Resources Institute, raised a concern that the past five years have been the warmest on record despite GHG emissions during this time having been flat globally. He suggested that policy interventions to promote low-carbon development could be in three areas: (1) reduce the carbon footprint of the buildings sector, (2) decarbonize electricity, and (3) shift transportation to more convenient and less-polluting solutions. Currently, buildings represent a third of global energy demand and produce a fourth of GHG emissions. As cities in member developing countries are growing rapidly, carbon emissions from buildings are projected to double by 2050 unless clear targets are set, such as mandating that new buildings be net zero by 2030 and all existing building net zero by 2050. Decarbonizing the electricity sector can be accelerated by promoting renewable energy from solar, wind, and geothermal sources and by generating energy from city wastes. Transportation solutions will face the need to persuade city commuters to walk, bicycle, or use public transport instead of continuing single-occupant car commutes. The good news is that the costs of various solutions, particularly solar energy, are dropping (and creating many local installation and servicing jobs). Many large private corporations are also becoming conscious of the strategic imperative to buy renewable energy and thereby add to the client base. A key pre-condition is establishing clear, measurable targets on how low-carbon development will be achieved (such as a target of net zero emissions from all buildings by 2050).

37. **Dr. Manfred Fischedick**, Vice President of the Wuppertal Institute, in his keynote address emphasized that there are no blueprint solutions for promoting low-carbon development in cities. A part of this process is to develop convincing narratives on the benefits of climate actions that are shared with citizens. The German word Eigenart (peculiarity) captures the diversity of city systems in terms of space and well-being, social cohesion, creativity, and innovation. There are many objectives that need to be reconciled, such as buildings' resilience to climate fluctuations and economic and social disruptions. A process of exchanging knowledge and co-creating solutions through intensive community engagement is necessary. Learning from each other must

be accompanied by creating social space for sharing innovations, testing, experimenting, and learning from failures. Through a process of dialogue and debates, city stakeholders need to discuss the pros and cons of various low-carbon options and identify innovations to start the city's adoption of into low-carbon pathways. On the positive side, many cities are creative centers capable of triggering a transformative process in terms of planning and investing for a better tomorrow, which includes incorporating metrics for low-carbon, resilient, and livable spaces by 2050.

Release of ADB Publication



Economic growth in the People's Republic of China has been accompanied by rapid urbanization and rising living standards. These trends have placed enormous pressures on the energy and natural resource bases of Chinese cities and resulted in the country becoming the largest global emitter of GHGs globally. In addition, at the city level, air, land, water pollution, traffic congestion, and other negative externalities have affected the well-being of residents as well as of the natural ecosystem. The government of the People's Republic of China has taken corrective action by articulating a vision to realize good city models of "ecological civilization" by encouraging city models to promote sustainable, inclusive, low-carbon, and resilient growth. The National Development and Reform Commission has designated 87 low-carbon pilot provinces, cities, and districts since 2005, with the objective of testing and validating city-level pilots that result in accelerated peaking of GHG emissions compared with a BAU scenario.

Several city-level initiatives have tested solutions to local problems that include a large portfolio of corrective measures. These include conservation of energy, reductions in GHG emissions, increased usage of mass transit, encouragement to use nonmotorized transport, introduction of electric vehicles, investments in green infrastructure, rehabilitation of wetlands, development of sponge cities, and strengthening of flood protection.

The experiences from 50 cities that effectively undertook GHG reduction and environmental improvements have been documented in the ADB publication, Climate Solutions from the People's Republic of China—Best Practices from Cities Taking Action on Climate Change. It was released at the Beijing forum.

Summaries of Individual Sessions

Session 1: From dirt to smart, transforming cities through low-carbon development

City case studies sharing experiences from Germany's Ruhr Valley, Sweden's Bo01 Malmo, Japan's Yokohama, and China's Changde in transforming problems into low-carbon solutions

38. **Mr. Manfred Fischedick** shared the experiences of the Ruhr Valley in reinventing itself after many of its traditional brownfield industries (such as iron and steel production and coal mining) disappeared, leaving behind a region with declining populations and heavily polluted brownfield sites. The 11 Ruhr cities (with a total population of 5 million) worked collaboratively with intense community engagement to convert many of the underutilized brownfield sites into "tech" clusters that led to investments in state-of-the-art science and service-based activities aimed at promoting technological transformation. These objectives fitted well with low-carbon, green objectives and led to building energy efficiency innovations, the replacement of coal-based electricity generation by renewable energy and synthetic fuels, and the interconnection of district heating systems in each city to realize economies of scale. Intensive engagements with local industry associations and residential communities also ensured widespread ownership of ideas. For example, when a competition was launched in the cities to suggest innovations, more than 300 ideas were identified and implemented as projects. Examples of low-carbon investment projects ranged from smart buildings to zero wastes, from cleaning up water bodies to promoting bicycling over driving cars. The city of Essen constructed more than 100 kilometers of dedicated bicycle paths.

39. **Mr. Daizong Liu** contrasted the low-carbon planning innovations undertaken in cities such as Malmo with the traditional urban planning in Chinese cities. For example, Chinese cities with a rich cultural heritage, such as Suzhou and Chengdu, had cleared dense, traditional urban settlements suitable for pedestrians and replaced them with super blocks of high-rise buildings. In the latter, typically, about 60% of the area is allocated for bridges, road space, and flyovers, resulting in horizontal expansion or urban sprawl, requiring more kilometers of roads, more use of cars, and greatly reduced pedestrian traffic. These high-rise buildings and car-oriented developments have contributed to the expanding carbon footprints of Chinese cities. There are currently 300 cars for every 1,000 citizens in Chinese cities, as opposed to 900 cars for every 1,000 residents in U.S. cities. BAU practices in urban planning need to be changed through the implementation of carbon-peaking targets. He gave an example of the alternative approach followed by Malmo, Sweden, in repurposing a brownfield industrial site. After intense community engagement, the city plans contained priorities for urban investments. The brownfield was repurposed into a pedestrian-friendly residential area, with redevelopment design contracted to as many as 13 developers who were encouraged to come up with creative solutions. Consequently, many innovative approaches were generated through pedestrian and bicycle traffic, and building owners had incentives to use renewable energy and to adopt energy efficiency measures.

40. **Mr. Toru Hashimoto** described the transformation of Yokohama city, which, like the German rust belt cities, faced significant challenges in responding to economic structural changes (such as the disappearance of traditional heavy industries and a decline in port traffic), along with growing air and water pollution caused by car traffic growth, congestion, and pollution. The city's response was to develop a long-term investment program that was anchored around six strategic interventions. Three of these interventions targeted expansion of residential housing to serve the growing requirements of advanced research facilities located in the city. Three other interventions focused on improving city-wide connectivity by the construction of the bay bridge, expansion of the city subway system (including a multimodal processing center to connect the bus, subway,

and inter-city railway systems), and renovating the city's road network. Today, the Minato Mirai area—the original brownfield site for Yokohama's heavy industries and shipyards—is recognized as a "best practice" low-carbon city development. Mr. Hashimoto, however, cautioned that the planning and implementation process has taken more than five decades, and that a reformulated urban vision requires long-term commitment of city leadership and other stakeholders.

41. **Mr. Yuanguo Li** of the Chengde Municipal Public Utility Administration Bureau (Hunan Province) explained how the city implemented the sponge city idea through German technical assistance. Chengde city is very vulnerable to flooding, and this problem has worsened in recent years. The city undertook a thorough risk evaluation of the hazards, including areas where populations were vulnerable. The risks of one-in-30-years flooding events were mitigated through flood protection measures. Water quality in rivers, lakes, and other water bodies have since been restored. In addition, investment proposals to protect 130,000 square kilometers of wetlands were developed and capital came from the market to supplement donor and government investment support.

Session 2: Fast development/new districts

Four cases showed successful implementation of greenfield low-carbon solutions: the Sino-German cooperative example of an eco-city, the Changning district low-carbon innovation example, Shanghai strategies to manage disaster risks in cities, and livable districts and low-carbon lifestyles in Nordic countries

42. **Mr. Ralf Schule** introduced the speakers and the session topic. This session's focus was on sharing decarbonization experiences of relevance to the CAREC city participants. Decarbonization required a change in mindset across several dimensions: one, in terms of changing the way infrastructure priorities were set by city leaders; two, by rethinking social or community involvement in the process of decarbonization; and three, by establishing the appropriate green goals. Key design inputs involved adoption of dynamic targets, building a convincing narrative that was acceptable to key stakeholders, and relating project indicators to low-carbon development outcomes.

43. The first presentation was by **Mr. Mao Qin**, who described the significance of the eco-city concept for Chinese urban policies. The idea of promoting urbanization while balancing economic and ecological sustainability goals has been enshrined in national policies. The Sino-German Eco-Cities project was an important platform for learning from the German experience in promoting eco-cities. Twenty-one cities from across China participated in this three-year program and local decision makers learned from the German experience. Twenty cities completed their low-carbon plans and shared their recommendations at a cooperation conference in which the German and Chinese sides participated. An excellent example was how Chinese cities learned about the technological and institutional innovations in waste management by German cities (such as how the "3 Rs"—reduction, recycling, and reuse—were institutionalized and how circular economy concepts were used to reduce a city's waste footprint). He described the Zhoujiaba Smart Wetland Platform, which was used in reversing ecological deterioration to water bodies caused by effluents discharged from a nearby sewage treatment plant. Analysis of the data generated by the platform led to implementing circular economy ideas (i.e., methane from the sewage treatment plant generated renewable energy and digested sludge was reused as fertilizer for increasing agricultural production).

44. The second presentation was by **Mr. Jiangnin Sun** of the Changning District of Shanghai city. This pilot project, financed by the World Bank, demonstrated the potential for achieving significant

energy savings and reductions in GHG emissions from public buildings (nonresidential buildings in the public and private sectors). The project's baseline analysis indicated that 64% of the large public buildings accounted for 90% of electricity consumption. After identifying the buildings that were suitable for participation, the project team worked closely with city authorities to engage the various bureaus and departments that had administrative and regulatory responsibilities for overseeing building energy efficiency. An online digital data platform was established to track energy consumption on a real-time basis, while utilizing state-of-the-art big data analytics to identify intervention areas. Thereafter, financial incentives were designed to attract energy-saving companies, which received limited project financing as a means of leveraging substantially larger flows of market finance (the project attracted market-based financing, as opposed to the project subsidies, in a ratio of 6:1). Overall, the project saved 21,000 tons of standard coal on 2.4 million square meters of buildings, and carbon intensity was reduced by 23% between 2010 and 2018. The lessons learned were:

- Accurate and credible assessment of electricity consumption by each building was possible by independent third-party verifications;
- Benchmarks for energy efficiency for each class of building made it possible to specify realistic performance targets; and
- Marginal abatement cost curve methodology enabled identification of the highest net benefits among energy efficiency intervention options based on cost or on the difficulty of calculating the potential savings of electricity and carbon equivalents. The project also successfully established a regional energy internet.

Since the completion of the project pilots, two buildings have demonstrated the possibility of achieving near-zero emissions; this has become a goal for other building owners.

45. The third presentation was by **Mr. Steven Goldfinch** of ADB. He described rising trends in disaster losses because much of Asian urbanization is taking place along vulnerable geographies (such as coastal areas, along river banks, etc.). These trends expose built assets and populations to significant economic losses that will be accentuated by extreme weather events expected with climate change. The bank estimates that as much as $26 trillion will be required to mitigate disaster risks in Asian cities between 2016 and 2030. Such large economic losses could be mitigated through risk-informed policy and planning interventions. To prepare for this eventuality, Asian cities need to invest in objective data collection and analysis, so that communities and city planners are fully aware of the risks faced because of climate and weather, infrastructure investment decisions are taken to build urban resilience, and cities plan to mobilize maximum financial resources from communities, markets, and governments.

46. The fourth presentation, by **Mr. Sven Beyersdorff** and **Ms. Brita Staal** of Nordic Sustainability, Copenhagen, Denmark, shared the experiences of European cities in promoting low-carbon development. In these cities, urban plans that promote healthy, sustainable lifestyles are widely endorsed by city-level stakeholders. For example, evidence indicates that worker productivity is enhanced by a healthy lifestyle, including access to more light, circulation of fresh air, and plants in the workplace. At a city planning level, communities need to be given access to affordable green housing, shared mobility, clean energy and water, and so on, while also affording maximum opportunities of interacting with nature. For example, Rotterdam passed regulations to promote rooftop gardens serving as recreational places and rooftop farms. Copenhagen invested in 750 kilometers of dedicated bicycling lanes that resulted in cyclists making about 60% of trips that were under 5 km in length. Such public investments promote healthy lifestyles for individuals while reducing car use. Although the Copenhagen bicycle lanes have been acclaimed

as a best practice, the planning process required rigorous upfront analysis, followed by legislating appropriate regulations, before the plan could be implemented. A notable illustration is the development of integrated solutions that involved cars, public transport systems, ride-sharing, and pedestrianization that accompanied the bicycle infrastructure investments. Another example cited was the construction of an incinerator plant in Copenhagen that also serves as a ski slope in the winter months. Stockholm, Sweden, has repurposed an old industrial district into the Stockholm Royal Seaport with 12,000 new homes with a target of carbon neutral development by 2030. Included in the plan is a 50% increase in biogas production from the area and a requirement of at least 20% usage of solar energy in the homes. Oslo, Norway, passed regulations to make the inner city car-free after developing comprehensive mobility solutions through policies, toll roads, and adequate public transportation systems, using digital data management to oversee, analyze, and regulate as needed.

Session 3: Panel discussion on low-carbon urbanization

Panelists shared their personal experiences in promoting low-carbon urbanization. These accounts helped participants transition to the second day of the forum, during which the focus shifted from the “what to do” to the “how to do” aspects of low-carbon urban development.

47. **Mr. Brent Habig** from the Institute of Sustainable Communities shared his experiences working with cities in the United States and in many Asian countries. Low-carbon urban development requires systematic planning within a country’s policy and regulatory framework, but without losing focus on developing solutions that are responsive to local priorities. For example, in China, the central government’s directives require cities to implement carbon emissions peaking before 2030. This has led cities to identify answers to three questions: When can carbon peaking be achieved, and how much ahead of 2030? How much will the city’s carbon emissions rise before carbon emissions peaking takes place? How rapidly will the carbon-peaking curve decline thereafter? Much more planning and analysis is required before these questions can be answered. The plan must articulate how the trajectory of carbon emissions will be objectively monitored and evaluated, identify the investments that will be required, and describe how financing will be obtained. The development of the low-carbon city plan is a process requiring engagement of key city stakeholders (the various departments and bureaus, community representatives, and the private sector). Mr. Habig gave some details of the Xiangtan peaking plan that his organization had helped the city government develop (shared in more detail in Session 5 on December 5, 2018).

48. **Mr. Mike Kim** highlighted his experiences as an urban transport planner in Seoul in terms of three mistakes that have often been made by city governments. The first mistake was city plans that substituted car lanes for pedestrian walkways and bicycle lanes in response to growing car ownership in the city. This expansion in roads and flyovers in Seoul only led to more single-occupancy vehicles, more traffic jams, and higher carbon emissions from tailpipes—all contributing to the city acquisition of a larger carbon footprint and reduced air quality. Dr. Kim contrasted the carbon footprint of 265 single-occupancy cars with the equivalent passenger load in seven buses to illustrate why transit-oriented development was so much superior in terms of carbon footprint. The second mistake was to permit free parking in many parts of the city—much of the city center was occupied by parked vehicles at the expense of circulation space for pedestrians and public vehicles. The third mistake was to build urban sprawl without designing adequate access through public transportation in the expanded areas, leaving commuters from these new areas with no option but to utilize single-occupancy cars.

49. **Mr. O. P. Agarwal** agreed with Dr. Kim's description of the three mistakes commonly made, because when either flyovers or car lanes are expanded, traffic typically picks up very quickly and soon the expanded roadways face traffic jams that are as bad as, if not worse than, before. The solutions require re-envisioning conventional ideas on the three levels of transport for different income groups in the city. The current paradigm assumes that affordable public transit is necessary for the urban poor, that the emerging middle class will use two-wheeled vehicles and low-value cars, and that high-income groups will use high-value cars. As incomes rise, there will inevitably be more and more single-occupancy vehicles in developing country cities, creating air pollution and traffic gridlock. To promote low-carbon urban development that supports healthy lifestyles, the challenge is on how to persuade commuters to shift from driving single-occupancy vehicles to patronizing public transport. Dr. Agarwal suggested that the definition of public transport should be expanded from crowded buses and metro rail systems to include shared mobility options that are now very effectively served through mobile apps. A common feature is that these mobility solutions (car, tuk, motor bike, jeepney, or minibus ride-sharing) do not require government subsidies while they reduce the stress levels of commuters in terms of navigating traffic or finding a parking space. However, suitable regulations must be enacted so that the options are safe, reliable, and environment friendly.

50. **Mr. Lee Taedong** gave an example from Seoul on how city leadership along with citizen engagement promotes low-carbon energy solutions. Seoul Metropolitan Government jurisdiction generates only 3% of its energy requirements. The remaining 97% is supplied by nuclear and coal power plants in other parts of the country, transmitted through high-voltage transmission towers and lines that often affect populations living close to these pathways. Seoul city decided to reduce this dependence on nuclear and fossil fuels by announcing a "one less power plant" policy. The city council committed to reduce its dependence on these outside energy sources by 2 million tons oil equivalent within two years. City leaders thereafter engaged with communities and businesses to secure widespread buy-in to the idea and to develop specific solutions through a suite of measures. The measures included promoting energy efficiency programs targeting residential, commercial, and industrial establishments; improving public transportation to discourage car usage; improving energy demand management; and promoting use of renewable energy sources through adoption of rooftop solar panels. A key part of this engagement process was explaining to a cross section of stakeholders why such actions were beneficial (lower energy bills, improved quality of public transportation, less air pollution, and so on). The target of 2 million tons oil equivalent was achieved within two years. This process succeeded because the goals were clearly defined, plans were developed after careful assessment of trade-offs, and citizens took full ownership of the ideas.

Roundtable on Low-carbon Cities — Mayors' and Multilateral Development Banks (MDB) perspective

51. **Mr. Xie Pengfei** of the C40 Cities Climate Leadership Group led off the discussion with three examples of how the group collaborated with city leaders and decision makers to build awareness and take actions aimed at reducing GHG emissions. The first example was a workshop on electric vehicles held in Nanjing, China, in October 2018. Participants from 10 cities learned about best practices for taxis and visited electric vehicle manufacturing units in the city. A second example, from Hangzhou city, showcased how digital platforms and data analytics were used through the Alibaba platform to provide low-carbon development training to participants from 66 countries. The third example, from Hong Kong, was presented at the Asia Environmental Protection Conference, enabled participants to network and learn about the city's low-carbon development program.

52. **Mr. Bi Lei** from Shenyang, Liaoning Province, explained that Shenyang faced challenges like those facing cities in the Ruhr Valley because of the significant presence of heavy industries and automobile production that depended on coal as the source of energy. Switching to low-carbon pathways was challenging because there was no prospect of switching to an alternative source such as hydropower or nuclear energy. However, the city was host to 49 universities and 109 national laboratories, along with expanded digital machinery and robotics manufacturing capabilities. Shenyang has developed plans to achieve carbon peaking by 2027 through actions in key sectors such as industries and transport. The framework for energy management included expanding solar PV systems, electricity storage, and geothermal energy, while welcoming collaboration from third-party energy-saving companies. Mr. Lei highlighted the positive impacts of good practices by giving an example of a hotel that achieved a one-third reduction in its energy consumption by adopting energy efficiency measures and promoting increased usage of renewable energy. The Shenyang city government is also exploring local carbon trade markets as another way to improve incentives to promote renewable energy adoption and further strengthen energy efficiency actions. The city has also emphasized the importance of ecological development to protect green mountains, blue rivers, and frozen landscapes.

53. **Ms. Fidume Huseynova**, Vice Mayor of Baku city, Azerbaijan, described her city, and how it was coping with frequent natural disasters and the influx of a very large displaced population from the countryside. The city is currently expanding affordable housing to the approximately 1 million refugees who have been affected by natural disasters. The city has taken steps to move industries from the city to the suburbs and to replace old brownfield sites with parks and gardens. One significant transformative achievement is a reduction in traffic congestion by investing in transport infrastructure, including the construction of flyovers.

54. **Mr. Musa Tanabayev**, head of the Division of Environmental Protection and Nature Management of Astana, described the three-year plan for environmental protection that Astana has adopted. Eight sectors for interventions were identified, keeping in focus the government's commitments to achieve SDGs by 2030. The relevant follow-up activities were emissions management, control of GHGs from stationary sources, reforms of public transportation, remediating brownfield site by cleaning the soil, and improved solid waste management. The road map for the Astana strategy is already available and a city-wide team has been mobilized for effective implementation. The city is developing the Astana green city concept and digitizing data collection systems. A pilot project to manage solid wastes in a sustainable manner envisages that 90% of solid wastes generated in the city will be recycled.

Session 4: From data to action: innovative tools for climate-smart development

55. **Mr. Wee Kean Fong** explained the steps necessary to promote climate-smart development. If the global targets of emissions peaking by 2020 and achieving net zero emissions by 2050 are to be achieved, city action plans must track progress through objective or science-based evidence rather than qualitative targets. This idea of "measuring what needs to be managed" requires several steps, starting with cataloging the GHG inventories using tools such as the GHG Protocol for Cities (GPC). Afterward, peaking targets can be set that are measurable, and traceable. A key requirement is to evaluate the emissions trajectory beyond the peaking year or to describe in detail how quickly the decline takes place or accelerates. For example, New York City has been compiling a GHG inventory every year and is able to identify the drivers of carbon emissions increases or decreases for each time period.

56. **Mr. Michael Steinhoff**, Program Director, ICLEI USA, spoke through a recorded video on the ClearPath web application, a tool developed by ICLEI in 2009 and now being widely used in cities across the world (currently, in more than 400 cities in the United States, Argentina, South Africa, and Brazil). ClearPath is a GHG inventory tool that provides inventories of GHGs and enables city leaders to simulate the impacts of any specific planning intervention on the city's carbon footprint. Users can revise assumptions based on economic and demographic factors and track impacts of planned actions on key emissions sectors at the city level, such as static energy, transportation, and wastes. The tool also supports city-level energy and emissions management, including alternative scenario analysis and projections through a simplified system of data entry. As more and more inventory data are captured by the tool the analysis can be further enriched, including possible comparisons of how communities have progressed in terms of achieving their goals, identifying the internal and external drivers for reducing their respective GHG emissions. The reporting format enables the city to report on the GPC format (both scope and GPC reference numbers), while also advising city leaders through easy-to-understand visuals, scenario-building exercises, and helping them become aware of the carbon intensity of grid electricity, role of transport planning, and so on.

57. **Mr. Tjitte Nauta** of Deltares described the CIrcle tool, an interactive, open-source web-based tool that is of immense value to a city planner by overlaying models of infrastructure, buildings, roads, energy networks, energy transitions, and water networks to enable climate-friendly design of critical infrastructure. More infrastructure needs to be built in the cities of the developing world over the next 30 years than has been built in the world since the industrial revolution. Awareness can lead to increased resilience. "Critical infrastructure" refers to assets that could have an impact on life and the environment, such as urban flooding and disaster risks from extreme climate events, or other chronic problems, such as traffic management, that affect the quality of life in cities. On September 28, 2003, for example, there was a blackout in Italy that severely disrupted the economy. Another example was the Queensland floods in Australia in 2011. These big events usually have multiple consequences because interrelations between different subsectors contribute to cascading effects that impact everyone. The Amsterdam inundation model, for example, tracks impacts on different sectors under different flooding scenarios—impacts on dikes, electricity, fire stations, roads, and so on. These scenario-building exercises can also assess the consequences of changes in assumptions. They can also help answer several questions, such as where to evacuate people after an event and how to avoid in future the problems that had been seen. Detailed models need good digital elevation data, and much is confidential. Interactive visualization tools can be used to develop "what if" scenarios that promote research and capacity building among all urban stakeholders.

58. **Mr. Reinder Brolsma** of Deltares explained how analytical tools help city leaders better understand the climate adaptation challenges of rainfall variability, greater flooding, land use changes, and population growth. Adaptation support tools help retrofit a city's built assets to better withstand bigger water flows and to minimize heat stress and effects of droughts. A key requirement is to engage all city-level stakeholders to participate in co-creating solutions. For example, New Orleans wanted to communicate and collaborate with citizens after Hurricane Katrina led to disastrous flooding in the city. Utrecht in the Netherlands planned for station area redevelopment that promoted a healthy lifestyle and green city development. The discussions focused on evaluating possible solutions and their implications for future investment and operations and maintenance costs.

59. **Mr. Bruce Tapir** of Kinesis presented the Kinesis low-carbon mapping platform, which is a web-based platform designed by urban specialists to use available public and private data sets (including utilities' and insurance companies' data) into one data platform. Web applications using

simple dashboards and rich visualization use these data sets and share the findings to improve urban planning and management. The starting hypothesis is that cities are a mosaic of characteristics. For example, data on canopy cover for Sydney, Australia, has 8-square-meter resolution; data on surface water has 15-square-kilometer resolution. Extreme heat has different effects in different parts of the city. A 10% increase in canopy creates a 1° reduction in heat in the areas that have been identified as hot spots. Data visualization by neighborhoods can help city planners and leaders to understand the nature of trade-offs between tree planting, water use, and heat islands in the different city neighborhoods. Another illustration supported Sydney's reform of parking regulations. Currently, there are 1.6 cars per person in the metropolitan area; however, among the city population under 35, one in four doesn't even have a driving license. For the latter demographic, access to car sharing is much more important than the availability of parking space. Setting aside more street parking for car share providers is therefore a better use of the infrastructure than locking in parking spots for single-passenger car users. The Kinesis platform has set benchmarks, run scenarios, set targets, and developed mechanisms to measure impacts.

60. **Ms. Lulu Xue**'s presentation illustrated how existing data sets available in the city of Ulaanbaatar, Mongolia, can be used in low-carbon, smart city planning. This has been made possible by the "smart card" system implemented by the city for its public transport system. Every time a commuter boards or alights from a bus, details are electronically registered, along with the movement of every bus in designated routes (through GPS). On an average day, about 850,000 trips are electronically captured by the smart card data platform. Analyzing one day's data set of commuter and bus movements, Ms. Xue gave some examples of how bus routing could be rationalized, particularly in terms of improving services to the underserved ger areas on the outskirts of the city. (Currently, the poor reside in the ger areas, and they are forced to take more expensive taxis and use informal car-sharing.) The data set also revealed that about a third of all commuters currently transfer at least once before completing their journeys. By using real-time smart card data for analysis, the city can establish a bus intelligent management system that is responsive to demand by city residents for more efficient and convenient bus services and to rationalize the bus routes to lower carbon emissions.

Session 5: Engaging private investors in low-carbon approaches

61. **Mr. Phillip Taper**, senior expert from ICLEI, presented ICLEI's experience with public procurement, and Ms. Ling Yu spoke about public procurement in Chinese cities. Since 1996, ICLEI has supported a program on public procurement for low-carbon development in collaboration with local governments and the United Nations system. A key challenge for green procurement is how to verify whether the products to be publicly procured fulfill sustainability goals. Mr. Taper gave the example of the Procura+ network in European cities, which enables cities to network, connect, and act together. Through this network, many cities (47 in Europe, five in China, and one in Korea) have undertaken green procurement practices to reduce GHGs. These actions have taken place in several sectors, such as construction, information and communications technology, transport, and food and catering. Public spending and finance are linked. The Procura+ app in Barcelona generated lessons from pioneering experiences that were widely shared. Reykjavik included in its tender for cleaning services award criteria that required all providers and suppliers to have ecolabels. Greater London procurement policies aim to reduce the life cycle costs of lighting systems by specifying award criteria that minimize maintenance costs of replacing light bulbs. Seoul set public procurement targets that were ambitious, with the idea of aiming high and achieving about 80% of the targets.

62. **Ms. Haiping YuIn** explained that about 11.5% of China's fiscal expenditures require the public procurement of goods and services. As a single consumer of products, services, and construction

projects, the city is a significant client for climate-friendly goods and services. Procurement in China is undertaken through the government procurement law; state-owned enterprises are required to follow tender law. Central government policies mention the importance of green procurement policies. In 2004, government procurement law made it mandatory to promote energy-saving products, and since then energy savings and water savings have been championed by the National Development and Reform Commission and the Central Ministry of Environment and Ecology. Today, many government departments and state-owned enterprises are voluntarily implementing green procurement policies. For example, the Tianjin municipal government was allocating only 2% to the bidding point system, but after working with ICLEI the points were increased to 15%. The key lessons learned were to undertake a thorough analysis of demand, to follow rather than lead market creation, and to focus on improving interdepartmental coordination.

63. **Mr. Enkhtumen Tumenstog** described how public–private partnerships are being promoted in Ulaanbaatar city through the ADB-financed Green Affordable Housing and Urban Renewal Project. The Eco-District and Affordable Housing Fund has been established as seed funding to promote green finance with engagements from global capital markets. Such a fund leverages concessional financing made available by ADB and the Green Climate Fund to finance and construct 10,000 affordable housing units for low-income communities living in the ger areas of the city. The development goals are to establish a sustainable green financing mechanism and develop standards and regulations for scaling up green projects in Mongolia. Ger dwellers in these localities will be able to move to better-quality housing with modern heating infrastructure. Such a move eliminates the need for the beneficiaries to burn raw coal for heat and will thereby lower carbon emissions. Repayments from these home owners also provide a corpus of the Affordable Housing Fund. Information on how the project works, rates of return on investments, and so on, will be shared with capital markets to seek out additional funding sources for more such projects, which may have lower rates of return but deliver beneficial impacts in terms of reductions in carbon emissions.

64. **Mr. Y. T. Tzang** made a business case for sponge cities for not only creatively solving urban flooding issues but also expanding urban forestry as a method of capturing carbon. He explained how city drainage infrastructure ends up collecting rainfall, rather than allowing the soil to enable rainfall infiltration to the aquifers. With climate change, many cities will experience more days of heavy rainfall; instead of being viewed as natural disasters, these could serve as opportunities through rainwater harvesting and smart management of rainwater sources. For example, China has 5 million kilometers of highways with borrow pits on either side of the road system. These pits, and large-diameter pipes, could potentially store huge volumes of rainwater. The sponge city idea advocates saving excessive rainfall for use later by the city for urban irrigation or supplementing the water supply. For example, the Taipei Memorial Hall has harvested 1,000 cubic meters of rainwater. Many German cities are replacing about 50% of city water supplies with rainwater collection systems. These innovations are cost effective and can be promoted through public–private partnerships.

65. **Ms. Weiwei** spoke on digital economy opportunities to engage information technology companies in promoting low-carbon cities. Such companies are well placed to support city governments in applying technology and big data and cloud computing to develop low-carbon city solutions. Digital technologies offer many opportunities to improve data gathering, analysis, and presentations. For example, many big cities don’t have good public transportation. Data from networks, signals, and GPS systems in buses enable urban transport planners to improve traffic circulation and offer mobility solutions while also tracking progress in terms of reduced carbon levels. Other applications include reducing the carbon footprint in the energy mix, establishing an

emissions trading system, or of evaluating the trade-offs of reducing energy intensity in local industries. The digital platform has the potential to become the "green brain" of a city by comprehensively collecting and analyzing various data overlays available at the city level. A new city being planned near Beijing is being supported by Ali cloud data analytics in identifying the drivers for low-carbon development.

Session 6: CAREC TA Pilot Cities: Progress and Follow-up

66. **Mr. Steven Zhang**, Country Director, Institute for Sustainable Cities, and Mr. Xu Yong, Managing Director of the Hunan Innovative Low-carbon Center, gave a report on the CAREC pilot cities in China. These include Changsha, Zhuzhou, and the Xiangtan (Chang-Zhu-Tan) cluster. The emission-peaking roadmap in Chang-Zhu-Tan aims to lay out actions to deliver the intended city-determined contributions and help cities achieve high-quality development with innovation, inclusion, and low emissions. The work is most advanced in Xiangtan, which has projected its carbon peaking in 2028; this was made possible by a GHG baseline assessment. This was followed by scenario analysis for peaking, which had to factor in the high carbon intensity of the iron and steel plant located in the city. Later, a roadmap identifying prioritized action areas was developed; the roadmap included energy efficiency, industrial transformation, low-carbon energy, and transport, each with key indicators. Policy recommendations were then developed, which suggested emphasizing market-driven actions and a more inclusive process of stakeholder engagement. The key lesson learned from this process was the importance of developing climate actions that were fully consistent with the municipal government's priorities and the required capacity building among the key bureaus of the municipal government. These lessons are relevant to Changsha and Zhuzhou as well. The demonstration effect of the Chang-Zhu-Tan cluster's low-carbon development and emission peaking will be significant, not only to the many cities in CAREC that share similar features, but also as an example of systematic city planning oriented by low-carbon targets and supported by international cooperation. The next steps include the following:

- The introduction and application of low-carbon technologies in key industries and city services through a combination of policy and planning actions, and
- Utilization of the ADB-financed Xiangtan low-carbon city loan to leverage climate development funds to scale up the low-carbon city development in the Chang-Zhu-Tan cluster.

67. **Mr. Wee Kean Fong** spoke on behalf of Astana city. Astana is a city large in territory and abundant in resources, but it suffers from severe air pollution in the winter months because of the widespread use of coal-fired boilers. The national government announced ambitious goals in its NDCs, and the Kazakhstan 2050 Strategy emphasizes a green economy, the adoption of cleaner sources of energy, greener agriculture, and green energy resources. Ongoing work is breaking down the long-term goals into shorter-term targets, such as:

- Translating the national vision to Astana (Astana 2050 Strategy);
- Planning with more specific roadmaps;
- Facilitating implementation by screening project list and developing pipelines;
- Designing financial schemes to manage different sources of funding; and
- Developing indicators for monitoring (there has already been good feedback on starting a data system/program).

68. **Ms. Zolzaya Enkhtur** and **Mr. Dorjgotov Otgonbaatar** reported on Ulaanbaatar city, the CAREC pilot city of Mongolia. Ulaanbaatar city is the coldest capital of the world and suffers from the worst air pollution because of the burning of raw coal by many of its households. The rapid expansion in the city's car population has further deteriorated air quality. The challenge for the city is how best to prioritize among many proposed projects, all of which are important. For the transport sector, the development of bus rapid transit) with ADB financing provides some of the answer, but equally important is to utilize the data platform provided by the smart card system to rationalize the bus routes and reduce the carbon footprint of the transit system. Support from ADB and the Green Climate Fund are playing a significant role in promoting the low-carbon development agenda. However, a very big remaining challenge is how best to build capacity among the municipal staff to plan and implement low-carbon development. The deliverables proposed from the project after consultation with government include a sustainable data management system for GHG data at the city level, recommended investment roadmaps, and a source book to advise city governments.

V. ACCELERATING THE COURSE OF CHANGE

A. The Role of ADB

69. The ADB’s Strategy 2030 publication identified several key operational priorities. These included:

- Tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability;
- Making cities more livable;
- Strengthening governance and institutional capacity and
- Fostering regional cooperation and integration.

70. As a trusted partner and knowledge provider, ADB offers practical value that fits local conditions, identifying good practices across a region. Since the Paris Climate Accord, ADB is committed to support its developing member countries in achieving their respective intended NDCs for mitigating the harmful effects of climate change, so that global warming is arrested at a maximum of 1.5°C.

71. ADB recognizes that rapidly developing cities of Asia will have to play a significant role in achieving these targets. Through the CAREC regional technical assistance effort, ADB is supporting knowledge sharing, mobilizing, and catalyzing finance from other sources to bridge the incremental investments required for low-carbon development.

B. Next Steps

72. Over 2019, ADB is committed to support the cities of Changsha, Zhuzhou, and Xiangtan in China, Ulaanbaatar city in Mongolia, and Nur-Sultan (Astana) in Kazakhstan to develop their low-carbon city strategies and investment plans through this regional technical assistance programs. The lessons learned will be shared with other CAREC countries. ADB is also financing the Xiangtan Low-carbon Transformation Loan project, which will help the city operationalize its competitive, green and resilient strategies.

SPEAKERS' PROFILES

Opening Plenary

M. Teresa Kho

DEPUTY DIRECTOR GENERAL
EAST ASIA DEPARTMENT
ASIAN DEVELOPMENT BANK

Ms. M. Teresa Kho is the Deputy Director General of the East Asia Department covering operations in the People's Republic of China and Mongolia.

Prior to this, she was ADB's Country Director in India (2013–2016) and Country Director in Bangladesh (2012–2013). Ms. Kho was Director of South Asia Urban Development and Water (2010–2011) and Director of the Office of Cofinancing Operations (2008–2010).

Ms. Kho joined ADB in 1997 and worked in various departments, including Budget, Personnel and Management Systems Department, Office of the Vice-President Finance and Administration, South Asia Department, and Private Sector Operations Department.

Before joining ADB, Ms. Kho spent 12 years in the U.S. private sector, performing finance, treasury, and audit functions for Fortune 500 companies.

A U.S. national, Ms. Kho obtained an MBA from Stanford University, California, U.S.A. in 1991 and B.A. Economics from the University of Notre Dame, Indiana, U.S.A. in 1983

Huaqing Xu

DIRECTOR GENERAL
NATIONAL CENTER FOR CLIMATE CHANGE STRATEGY AND INTERNATIONAL COOPERATION

Xu Huaqing is the Director General of National Center for Climate Change Strategy and International Cooperation (NCSC). He served as the Assistant Director General of Energy Research Institute (ERI) of the National Development and Reform Commission. He studied thermal energy engineering at Harbin Institute of Technology and environmental engineering at Tsinghua University. He has been involved in numerous key research projects as team leader, including "The Pathway and Support System for China to Realize Its GHG Emissions Control Objectives in 2020." He was a Lead Author for the TAR and Review Editor for the AR4 of the IPCC. Since 2000, as a delegate of the Government of China, Mr. Xu has participated in the COPs of the UNFCCC.

Alex Perera

DEPUTY DIRECTOR OF ENERGY
WORLD RESOURCES INSTITUTE

Alex Perera is Deputy Director of WRI's Energy Program. Joining WRI in 2007, Alex has over 20 years of experience in energy policy, finance, and corporate energy strategy. Prior to joining WRI, he helped found a company called Bigbelly Solar, a renewable energy company with a mission of developing innovative new solar energy products that are helping reduce transportation related emissions. Alex has worked at the Natural Resources Defense Council, where he participated on New York Governor Pataki's Greenhouse Gas Task Force. He also served on two advisory committees that invested in over $7 million in renewable energy R&D projects in New York. Alex was a Financial Analyst at the investment bank Bear, Stearns and Co. Inc. where he helped to structure over $1 billion in municipal financing in the utility sector. He has served as the Program Director for the New York Energy Efficiency Council, an organization that represented Energy Service Companies (ESCOs) in New York State electric deregulation proceedings.

Alex has an MBA from F.W. Olin Graduate School of Business at Babson College, and a BA from Boston University in Environmental Science, Economics, and French. He has written and co-authored numerous publications on corporate strategy and renewable energy. He is a watercolor painter and lives in Bethesda, MD with his wife and two children.

Prof. Dr. Manfred Fischedick

VICE-PRESIDENT
WUPPERTAL INSTITUTE

Dr. Fischedick is Vice President of the Wuppertal Institute. He has 20 years of experience in analysis, policy, and governance for sustainable development at global, national, regional, and local scales. His work has spanned GHG mitigation strategies and multi-criteria evaluation, renewable energy and integration with sustainable infrastructure, system innovation and transformation, scenario analysis, national regional, and urban climate policies and road-mapping, low carbon urban infrastructure analysis, and low carbon technology assessment and forecasting.

Dr. Fischedick also serves as policy and sustainability adviser to the European Union, the German government, the German state of North Rhine-Westphalia, as well as a variety of private companies. He has been engaged in low carbon urban development in Asia through several projects, including as advisor to the Low Carbon Future Cities project which aimed to develop integrated low carbon strategies in one Chinese city, and as member of the "Seoul International Scientific Advisory Council."

Sessions 1 to 5 and Concluding Session

(in alphabetic order)

Aigerim Akiltayeva

CLIMATE CHANGE AND PROJECT MANAGEMENT SPECIALIST
RETA: PROMOTING LOW CARBON DEVELOPMENT IN CENTRAL ASIA REGIONAL ECONOMIC COOPERATION PROGRAM CITIES, ASIAN DEVELOPMENT BANK (PILOT CITY – ASTANA, KAZAKHSTAN)

Mrs. Aigerim Akiltayeva is currently working as a Climate Change and Project Management Specialist for ADB RETA “Promoting low-carbon development in CAREC Program cities”. She has completed her bachelor’s degree in Energy Engineering with First class diploma at the University of Leeds, the United Kingdom. Mrs. Akiltayeva successfully designed a group project “Hydrogen Production via Steam Reforming of Natural Gas” at the University of Leeds. She also conducted different laboratory experiments in solar energy, filtration, natural gas and other climate change and energy engineering related matters. Her design projects include Critical review of Kazakhstan’s policies for meeting the Kyoto Agreement, Efficient plastic recycling, Wind characteristics of electricity production in rural area and Solar production project.
Aigerim previously worked at Turkuaz Machinery Kazakhstan for Rolls Royce Power systems MTU-engines and natural gas generators brand. She has a vast experience working with International organizations, including UNDP, SE4ALL, and IRENA during the International Exhibition Astana EXPO-2017, Kazakhstan, where she helped to organize their thematic pavilions under the theme of the Exhibition “Future Energy”. While working for ADB, Aigerim works extensively on climate change and renewable energy potential in Kazakhstan. She is also the member of Sustainable Development Goals Kazakhstan working group “Planet”, where she promotes low-carbon development in Astana city. She is also the member of public speaking and leadership club Toastmasters International, where she achieved the highest recognition award Distinguished Toastmaster.

Bi Lei

DIRECTOR
RESOURCES AND ENVIRONMENTAL DEPARTMENT (CLIMATE CHANGE OFFICE), SHENYANG DRC, PR CHINA

Mr. Bilei, PhD from Tsinghua University, oversees green, low-carbon and circular development and the control of green-house gas emission. During the past years, Mr. Bi has been working on establishing local carbon emission trade system of Shenyang city, planning major low-carbon project, and researching about the green finance system. Mr. Bi has organized twice Shenyang Energy Consumption and Carbon Emission Management International Forum in 2013 and 2016.

Brent Habig

VICE PRESIDENT
INTERNATIONAL PROGRAMS, INSTITUTE FOR SUSTAINABLE COMMUNITIES (ISC)

As ISC's senior representative in Asia, Brent is responsible for advancing ISC's climate and sustainability mission in the region, including the design and management of programs in China, India, Bangladesh, Thailand and Vietnam, with support from donors including USAID, MacArthur Foundation, Swedish development agency SIDA, and corporate partners such as Walmart, Gap Inc., and Mahindra and Mahindra. Brent also serves as Director of ISC's EHS+ Network of training centers, which has trained over 40,000 factory managers in Asia.

Prior to ISC, Brent was Vice President, West and Southern Africa, for TechnoServe, where he led numerous value chain and manufacturing programs focused on stimulating inclusive and competitive economic growth. Earlier in his career, he founded a supply chain start-up and developed it into a world class consulting company, managing expansion across North American and European markets and serving clients such as Pepsi, Unilever, Proctor and Gamble, Mittal Steel, Kraft, Heinz, Alcan and NBC.

Brita Staal

SENIOR ADVISOR AT NORDIC SUSTAINABILITY

Brita works on building sustainability strategies in private and public sector organizations, both within the Nordic countries as well as in South Asia. Her area of specialization is within climate risk &resilience.

Based in Norway and Sweden, Brita holds an MSc in Development Management from UN Universities UIA and University of Ruhuna and is a trained Climate Reality Leader.

Brita has experience from quality and sustainability management positions from international organizations such as Staples and BRIO, where she obtained broad competencies with managing risk & responsibility in global operations. She has also worked on urban recycling systems, and more recently on implementing the development agenda on the municipal level in Norway.

Bruce Taper

CEO AND FOUNDER
KINESIS

Bruce is a former Director of Sustainability and Metropolitan Planning for the NSW Government. Now as founder and a Director of Kinesis, a sustainability and data driven urban advisory and technology firm, they are establishing relationships with cities and urban service providers globally. Their reason for existence is to give decision makers the tools and information they need to make better cities.

Daizong Liu

CHINA DIRECTOR
WRI ROSS CENTER FOR SUSTAINABLE CITIES

Daizong Liu the is China Sustainable Cities Program Director and China Transport Program Director. He has led and managed a number of projects, including Transit Metropolis project partnered with the Ministry of Transport, and local governments like Kunming, Guiyang, Suzhou and Zhuzhou, Low Emission Zone/Congestion Charging project with Beijing Municipal Commission of Transport, Road Safety project with China Academy of Urban Planning & Design, and Sustainable and Livable Cities project with Chengdu and Qingdao Development and Reform Commission. In 2014, he was appointed as the Independent Board Member of Chongqing City Transportation Development & Investment Group Co. In 2017, Mr. Liu was appointed as the member of the third Expert Committee of Beijing Municipal Commission of Transport and was appointed as the member of Expert Advisory Committee on Transportation of Guangzhou Municipal Government. Since 2017, Mr. Liu serves as a chair of Future Transportation Technology and Policy Section, Transportation Planning Division, World Transportation Convention.

Mr. Liu has obtained master’s degree in Civil Engineering from National University of Singapore, and bachelor’s degree in Transportation Engineering from Southeast University in China. Prior to joining WRI, he has worked 10 years for China Sustainable Transportation Center of Energy Foundation as a senior program associate, and 3 years for CPG Consultancy Company in Singapore as the transport project manager

Dorjgotov Otgonbaatar

URBAN TRANSPORT SPECIALIST
RETA: PROMOTING LOW CARBON DEVELOPMENT IN CENTRAL ASIA REGIONAL ECONOMIC COOPERATION PROGRAM CITIES, ASIAN DEVELOPMENT BANK

Otgonbaatar Dorjgotov is working as the Urban Transport Specialist for ADB RETA on Low carbon development. D.Otgonbaatar is a graduate of Yonsei university in South Korea, where he received a MS in Public Administration. Prior to his appointment as Head of Project and cooperation department at the Governor's Office of the Capital city (Ulaanbaatar, Mongolia) for 4 years; from 2012 to 2016, working as a Head of Project and Cooperation department at the Governor's Office, he was in charge of all projects implemented by World Bank, Asian Development Bank, KOICA, Asia Foundation, JICA and other International organizations. He was the key person in getting project approvals from the Mongolian Parliament.

Enkhtumen Tumentsogt

INVESTMENT FUND SPECIALIST
DBM ASSET MANAGEMENT SC LLC

Mr. Enkhtumen Tumentsogt has experience working in the financial sector of Mongolia. He started his career at the Financial Policy department of the Ministry of Finance working on Sovereign debt issuance and worked on the USD 600 million Khuraldai bond, which was the first international bond exchange offer in Mongolia as well as the development of the Extended Fund Facility of the IMF before joining the team at Development Bank of Mongolia to establish the DBM Asset Management company. He has been playing a leading role in the development of the financing mechanism of the ADB's Affordable Housing and Urban Renewable project of Ulaanbaatar city, Mongolia. Mr. Enkhtumen holds a BA in Financial Economics from the University of Rochester, NY.

Dr. Gyeng Cheul Kim

TRANSPORT PLANNING AND POLICY CONSULTANT
DEPARTMENT OF TRANSPORT, PHILIPPINES AND
FORMER PRESIDENT OF KOREA
TRANSPORT INSTITUTE

Dr. Gyeng Chul KIM is a Transport Planning and Policy Consultant at the Department of Transportation (DOTr, www.dotr.go.ph) of the Republic of Philippines. He is the former president of the Korea Transport Institute (KOTI, www.koti.re.kr). Dr. Kim went on leave as a professor at the Korea Advanced Institute of Science and Technology (KAIST,www.kaist.ac.kr), where he teaches Public Transport Management and Planning, National Green Transport Policy, and New Technology for Green Transport at the Graduate School of Transport. He also taught Public Transport Management and Planning at Leeds University in the United Kingdom.

His career in dealing with low-carbon transport policies and management spans nearly two decades, with specific interests in various modes of public transport. He conducted key research for the Seoul bus reform and was then appointed as Director General of T/F team of Seoul Metropolitan Government for four years. From 2009 to early 2011, he served as the CEO of the operator of Seoul Subway Line 9. From time to time, he shares his expertise in public transport reform as a consultant in developing countries, such as Indonesia, India, Myanmar, Nepal, and Vietnam.

Haiping Yu

PROGRAM OFFICER
ICLEI-EAST ASIA

A young and experienced professional in urban sustainability field, Hai ping has worked extensively with Chinese cities in advocating, capacity building, and on-ground implementation of green public procurement (GPP) through organizing training, delivering tender advice, formulating green specifications, conducting onsite consultation, and managing a regional network – Procura+ Green Procurement East Asian Network – the 1st of its kind in this region. Haiping is in charge of implementing The United Nations One Planet Network (former 10YFP) “GPP Tender Implementation and Impact Monitoring” with five Chinese local governments under which a pioneering local GPP evaluation scheme for furniture procurement has been developed for Tianjin Bin hai New District in 2018. Aside from GPP, Haiping is also a qualified trainer of UNISDR “Making Cities Resilient” methodologies and tools and has been in cooperation with UNISDR to jointly deliver climate adaptation and disaster risk reduction training to Chinese cities since 2017.

Hao Zhang
DEPUTY COUNTRY DIRECTOR
PRC RESIDENT MISSION, EAST ASIA DEPARTMENT
ASIA DEVELIOPMENT BANK

H. Zhang, a national of the People's Republic of China (PRC), has more than 23 years of professional experience, including over 10 years with ADB. Since joining ADB in January 2008, he has progressed through different position levels in various departments, including Senior Advisor for the Vice President (Operation 1), and Principal Urban Development Specialist at Urban Development and Water Division of Central West Asia Department. Prior to joining ADB, he worked as a Sanitary Engineer and Project Officer in The World Bank and as Assistant/Project/Process Engineer at several construction and engineering companies, where he managed construction of various large scale infrastructure projects in China and Hong Kong. He obtained his master's degrees in Business Administration, and Civil/ Environmental Engineering from the University of Warwick, United Kingdom and Hongkong Polytechnic University, PRC.

Hong Miao
ENERGY PROGRAM LEAD
WRI CHINA

Ms. MIAO Hong is WRI China Energy Program Lead, responsible for development, implementation and management of projects in clean energy fields, mainly renewable energy and energy efficiency sectors in China. With over 20 years of work experience, she accumulated, not only, rich skills and knowledge in policy research, project development, investment and financing, especially for the development and implementation of international cooperation projects, but also a broad network of stakeholders in RE and EE sectors in the world and in China. She used to work as the deputy director of the PMO of China Renewable Energy Scale-up Program phase I, which is the largest WB and GEF project in renewable energy. Before joining WRI China Office, as a consultant of ADB and WB, she was involved and participated in innovative mechanism design work, like PPP and specific funds to address the bottlenecks of scaling up investments in RE and EE development.

Jack S. Robinson

EDITOR AND PROJECT MANAGER
SUSTAINIA

Mr. Robinson is an Editor and Project Manager at the Danish sustainability think tank and consultancy, Sustainia. Mr. Robinson possesses a bachelor's degree from the University of Cambridge and a master's degree in Climate Change from the University of Copenhagen. Mr. Robinson's strong academic foundation is displayed throughout his work, writing about and working with some of the most innovative global organizations contributing to the UN Sustainable Development Goals. Mr. Robinson is the Editor and Lead Writer for the Global Opportunity Report 2019, working with DNV GL and UN Global Compact. He has also published articles on climate change and blockchain with international media platforms.

Jiangning Sun

DIRECTOR OF TECHNOLOGY DEPARTMENT
CHINA ECO-CITY ACADEMY

Sun Jiangning is a senior urban planner. He is graduated from the Department of Urban Planning, Tongji University, with a master's degree. As a member of the Board of Directors and Urban Renewal Committee of China Urban Science Research Association, he is currently the Director of Livable Center of China Eco-city Research Institute. Over the years, he has devoted himself to the planning practice and technological research and development of eco-cities. His scientific research achievements have been awarded many times at the provincial and ministerial levels for outstanding achievements. He has published many papers in periodicals and forums at home and abroad. He has presided over the completion of two national ministries and commissions and has held over 30 urban planning and design achievements.

Lulu Xue

RESEARCH ASSOCIATE
SUSTAINABLE CITIES, WRI CHINA

Lulu Xue is a Research Associate in WRI China office. Lulu previously worked in the public and private sectors in both developing and developed countries, involving regional travel demand modeling, transit-oriented development, parking management strategies, and non-motorized environment evaluation.

Lulu earned her master's degree from MIT, where she focused on the human dimension in travel and land use planning. Prior to MIT, Lulu received a bachelor and master's degree in GIS from Peking University, China. Lulu is a regular bicycle commuter and loyal public transit patron.

Maia Bitadze

DEPUTY MAYOR
TBILISI, GEORGIA

Education and Qualifications

- 2004-2007 - Faculty of Law, PhD in Law, IvaneJavakhishvili Tbilisi State University
- 1994-1999 - Faculty of International Law and International Relations, qualification - lawyer, specialty - International Relations, IvaneJavakhishvili Tbilisi State University;

Working Experience

- 2014-2017 - Deputy Minister of Environment and Natural Resources Protection of Georgia
- 2015- present - Chairperson of the Bureau of the Meeting of the Parties of Aarhus Convention (twice elected), UNECE
- 2011-2014 - Head of Legal Department, Ministry of Environment and Natural Resources Protection of Georgia
- 2012 - present - Associated Professor, IvaneJavakhishvili Tbilisi State University
- 2012-2014 - Associated Professor, School of law, University of Georgia
- 2007 - present Associated Professor, Caucasus School of Law

Mao Qin

DEPUTY DIRECTOR
LOW CARBON MANAGEMENT AND DEVELOPMENT CENTER OF CHANGNING DISTRICT, SHANGHAI

Mao Qin is the deputy director of the Urban Renewal and Low Carbon Project Management Center of Changning District, Shanghai, executive director of project office of the World Bank's "Shanghai Building Energy Conservation and Low Carbon City Demonstration Project", registered supervision engineer. From 2012, he has been responsible for the implementation of the World Bank's project and has done 27 research projects related to low-carbon city, including Research on Constraints Policy, Research on Building Energy Audit and Transformation Program Standardization Tools Preparation, Research on Public Building Adjustment and Management Model, Management and Research of Whole Process of New Public Building. He promoted the low-carbon energy-saving renovation of 39 existing public buildings in Changning District, Shanghai; implemented the market-oriented construction of two near-zero buildings in Shanghai.

Michael Steinhoff

PROGRAM DIRECTOR
ICLEI-LOCAL GOVERNMENTS FOR SUSTAINABILITY USA

Mike Steinhoff been with ICLEI-USA since April of 2009 working at the intersection of GHG accounting and software tools to deliver to climate change mitigation and adaptation resources to local governments nationwide and internationally. Mike has helped shape the community-scale emissions accounting landscape through work on both the US Community Protocol and the advising developments on the Global Protocol for Community Scale Emissions Inventories (GPC) and has achieved the GBCI City Climate Planner Certification for GHG inventories. In addition to standards development, Mike provides direct technical assistance to hundreds of cities across the United States. Mike holds a BS in Plant and Soil Science from the University of Tennessee and master's degrees in environmental science and Public Affairs from Indiana University.

Nawon Kim

SENIOR ENVIRONMENT SPECIALIST
SUSTAINABLE INFRASTRUCTURE DIVISION, EAST ASIA DEPARTMENT ASIAN DEVELOPMENT BANK

Na Won Kim is a Senior Environment Specialist working at Sustainable Infrastructure Division, East Asia Department of Asian Development Bank. She has managed and worked on various range of technical assistance and loan projects relating to clean and renewable energy, emissions trading, energy labelling system, sustainable transport, and others. She is currently focusing on low carbon city development projects promoting cross-sectoral intervention and system innovation for sustainable and climate friendly urban development. She has more than 18 years of experience in the field of sustainable development, sustainable production and consumption, system innovation, climate change, environmental policy and governance. Prior to joining ADB, she worked at various organizations including Alberta Environment, United Nations Environment Programme, Institute for Global Environmental Strategies, and UNDP/Zero Emission Research Initiatives. She holds Master of Science in Environmental Policy and Management from International Institute for Industrial Environmental Economics at Lund University in Sweden.

Om Prakash Agarwal

CEO OF WRI INDIA

Since June 2017, Dr O.P. Agarwal is the country director of the World Resources Institute in India and is also the Chief Executive Officer of WRI (India). Prior to this, from 2009 to 2016, he was the World Bank's Urban Transport Adviser located at its headquarters in Washington DC. As part of this assignment he guided urban transport projects in many parts of the world, including India, China, Vietnam, Saudi Arabia, Egypt, South Africa, Kenya, etc. He has travelled extensively and has a very good overview of urban transport systems across the world.

He chaired the TRB committee on Transportation in Developing Countries from 2012 to 2017.

Dr Agarwal was led the urban transport function in the National Ministry of Urban Development in India and was the principal author of the National Urban Transport Policy for the country, which was adopted in 2006 and has remained the key document guiding urban transport investments since then.

He has written several papers on urban transport policy and governance issues. He has a PhD from the Indian Institute of Technology, Delhi, a master's degree in Transportation from the Massachusetts Institute of Technology, and a bachelor's degree in Electrical Engineering from the Indian Institute of Technology, Madras.

Pengfei Xie

CHINA CHIEF REPRESENTATIVE
C40 CLIMATE LEADERSHIP GROUP

Pengfei Xie, PhD, research scientist, Certified Urban Planner. Main area of work is low carbon city planning and development. China Chief Representative of C40 Cities Climate Leadership Group. Prior, he worked on management and research in international and domestic organizations, such as the Natural Resources Defense Council (NRDC), the Smithsonian Institution, and the China Society for Urban Studies under MoHURD. He led and participated in compiling the national standards on urban sustainability, and has also acted as consulting expert for ADB, UNDP and IUCN.

Philipp Tepper

SENIOR EXPERT
ICLEI'S GLOBAL SUSTAINABLE PROCUREMENT CAPACITY CENTRE

Since more than 12 years Philipp Tepper works as coordinator and senior expert for ICLEI contributing to Global, European and National projects on Sustainable Public Procurement (SPP). His focus is on developing research and guidance on social responsible public procurement (SRPP), costs and benefits, criteria and tools, innovative approaches in public procurement (pre-procurement, early market engagement, LCC- CO2 tools, supply chain mapping) and legal requirements and opportunities within SPP.

Since 2008 he is the Procura+ Network Manager (www.procuraplus.org) and co-ordinates strategic projects such as the GPP 2020 project on procurement for a low carbon economy (www.gpp2020.eu), the Update of the EC Buying Green Handbook, ICLEI's contribution to the United Nations 10 Years Framework Programme on SPP (One Planet Network) and sustainable impact finance initiatives.

His professional background includes experiences of more than 15 years in capacity building and research in international consultancy work using participative methodologies and approaches. Philipp has formerly worked for European research organizations and NGOs, publishers and development organizations in Europe, Latin America and the Higher Caucasus region.

Ralf Schüle

CO-DIRECTOR
RESEARCH GROUP OF ENERGY, TRANSPORT AND CLIMATE POLICY, WUPPERTAL INSTITUTE FOR CLIMATE, ENVIRONMENT, ENERGY

Dr. Ralf Schüle is Co-director of Research Group „Energy, Transport and Climate Policy“ of the Wuppertal Institute. He studied sociology, political sciences and economics (1988–1994, Technical University Darmstadt) and holds a PhD in sociology. He is an expert in low carbon urban transformation and strategic planning of urban sustainability paths along the whole policy cycle (analysis, targets, strategies, evaluation) covering the energy supply, buildings and transport sector at national and local levels. He has 12-year of experience working in this field in European and Chinese cites. He is also lecturer at University Duisburg/Essen in Urban Systems Master Studies.

Reinder Brolsma

WATER MANAGEMENT SPECIALIST
DELTARES

Reinder Brolsma is a specialist on urban water management at Deltares, integrating knowledge on hydrology, urban-heat islands and eco- hydrology. He applies his experience to increase flood resilience and water security of urban areas, with a focus on Nature Based Climate Adaptation. He has worked on projects on sustainable drainage systems in Europe, North-America and Asia.

To facilitate the climate adaptation process, he has a leading role in the development and application of the Adaptation Support Tool for co-creating spatial designs of sustainable urban water systems, with successful application in the communities of e.g. Berlin, Amsterdam, New-Orleans and London. His PhD-research at Utrecht University focused on the effect of climate change on carbon and water balance of forest ecosystems.

Steven J. Goldfinch

DISASTER RISK MANAGEMENT SPECIALIST
ASIAN DEVELOPMENT BANK

Steven Goldfinch supports the implementation of ADB's disaster risk management policy and plan, and the provision of support to ADB's operational departments in implementing disaster risk management projects. Prior to joining ADB, Steven worked for over a decade at the United Nations, both in the field with the UN Development Programme (UNDP) and at headquarters with the UN Office for Disaster Risk Reduction (UNISDR). In Uganda, he provided advice and support to the Government on disaster risk management strategy and programmatic development. At UN headquarters he was responsible for the provision of analytical support to New York-based political processes relevant to disaster risk reduction and sustainable development. Earlier in his career, he worked in Bangladesh with UNDP on disaster risk reduction, response and recovery. He holds a master's degree in peace & conflict studies from the University of Sydney, and a bachelor's degree in Asian studies and political science from Victoria University of Wellington.

Steven Zeng

COUNTRY DIRECTOR
INSTITUTE FOR SUSTAINABLE COMMUNITIES

Dr. Zeng is ISC's Country Director for China. In this role, he manages ISC's projects working with local partners to design and implement projects that mobilize communities to bring clean air, water, and land to their communities; help selected partner Chinese cities to reduce their emissions; accelerate emissions reductions by creating a network of Chinese low emissions trainers that will assist other cities reach their peaking goals; and support the expansion of national-level policies and regulations that draw upon program-generated best practices.

Before ISC, Steven worked as country director for Mercy Corps, a leading international development NGO, and country director for CLASP, a US-based NGO working on climate change and clean energy, and country manager for USAID's Clean Development and Climate Program in China. He also created a company which worked on disseminating clean technology and developing CDM programs for Chinese industrial enterprises.

Lei Zeng holds a PhD Degree on energy and environment engineering from Malardalen University, Sweden.

Sven Beyersdorff

FOUNDING PARTNER OF NORDIC SUSTAINABILITY

Sven Beyersdorff is co-founder of Nordic Sustainability, a Copenhagen-based consulting firm focusing on sustainability-related projects for public and private sector clients across the Nordics and beyond.

Sven has a background in strategy consulting, having previously worked at a McKinsey spin-off with the largest German and Danish companies. He has also worked in international development for the United Nations Office for Project Services (UNOPS).

A large part of his current work is focused on national and municipal-level SDG implementation across the Nordic and Baltic regions in relation to the EU's regional strategy. In this context, he has, among others, authored a publication for the Nordic Council of Ministers.

Sven holds an MSc in International Political Economy from the London School of Economics (LSE), and studied Mandarin at the University of Sheffield and the Beijing Language and Culture University.

Taedong Lee

ASSOCIATE PROFESSOR
YONSEI UNIVERSITY

Taedong Lee is associate professor at the Department of Political Science and International Relations and the director of Environment, Energy and Human Resource Development Center in Yonsei University, Seoul. His areas of research include global and sub-national environmental-energy politics and policy, NGO and civic politics. Professor Lee recently published his monograph, Global Cities and Climate Change: Translocal Relations of Environmental Governance (Routledge, 2015), Village Community Politics (2017, in Korean) and Debates in Environment and Energy Politics (2017, in Korean), and Politics that We Make: Actions for Neighborhood Democracy (2018, in Korean). His articles have appeared in journals including Policy Sciences, Nonprofit and Voluntary Sector Quarterly, Review of Policy Research, Policy Studies Journal, Energy Policy, International Environmental Agreements, Environmental and Planning C, Global Environmental Politics and other Korean and international peer-reviewed journals.

Tjitte Nauta

REGIONAL MANAGER ASIA / STRATEGIC ADVISOR
ADVISOR INTEGRATED WATER MANAGEMENT, DELTARES

Mr. Nauta has 30+ years of specialist consultancy experience as Strategic Advisor at the applied research institute Deltares. His experience includes integrated flood risk management, master planning and IWRM studies for inland and coastal water systems in numerous countries worldwide.

In 2013 Mr. Nauta has been appointed by the Netherlands government as a Dutch Risk Reduction Team Leader with the objective to assist countries in their efforts for recovery from or prevention against water related hazards.

During the last two years Mr Nauta has supported the ADB in the execution of pipeline infrastructure projects of ADB's Philippines Country Operations Business Plan. As Deltares Regional Director for Asia, Mr. Nauta is responsible for the coordination and development of research and specialist consultancy studies in the Asian region. Finally, as board member of one of the regional water authorities in The Netherlands he is accountable for the rightful responsibilities of this authority to govern well, make sound strategic decisions, and provide guidance and approval on often large investments in water safety and quality in the Rotterdam region.

Tony S. Jun

PROJECT ADVISOR
OVERSEAS PROJECT DEVELOPMENT,
SEOUL URBAN SOLUTIONS AGENCY, KOREA

Mr. Tony S. Jun is a Project Advisor at the Seoul Urban Solutions Agency (SUSA), an entity dedicated to sharing and providing integrated urban solutions to cities in need of Seoul's experience to grow into smart, livable, environmentally and economically sustainable urban domains. Mr. Tony has 20 years of experience in managing global business abroad for top-tier firms and has excellent project-management and effective administration skills. He received his MBA from the University of Seoul.

Toru Hashimoto

EXECUTIVE DIRECTOR
DEVELOPMENT COOPERATION DEPARTMENT INTERNATIONAL AFFAIRS BUREAU CITY OF YOKOHAMA

Toru Hashimoto is in charge of program Y-PORT (Yokohama Partnership of Resources and Technologies). Y-PORT is public private partnership endeavor to deliver knowledge and cutting-edge technology for urban solutions. He was instrumental to conclude Memorandum of Understanding between ADB and the City of Yokohama in regards of urban management and solutions and recently to initiate collaborations under City Partnership Program with the World Bank. Before joining the City of Yokohama he took technical as well as managerial positions in World Bank and Asia Development Bank Institute. He was educated in University of Tokyo, Asia Institute of Technology, and Massachusetts Institute of Technology on urban planning, engineering and human settlements. For further information regarding Y-PORT, please refer to the following website. http://www.city.yokohama.lg.jp/kokusai/yport/en/

Vijay Jagannathan

SENIOR FELLOW AT WRI

Senior Fellow Vijay Jagannathan provides strategic and technical advice to WRI's sustainable cities initiative.

Vijay comes from the World Bank where he was Sector Manager for infrastructure in the East Asia and Pacific region. He was responsible for an annual lending program of about $5 billion in the urban, water, transport and energy sectors. Vijay has been also associated with the APEC-led green growth and green finance initiatives. Prior to that he managed the water program of the World Bank in the Middle East and North Africa region. He has worked in the infrastructure, environment and urban development sectors in his twenty-four years in the Bank. Prior to that he spent 10 years in Indian Administrative Service (elite civil service program) including his last stint as Secretary of the
Calcutta Metropolitan Development Authority, which was responsible for all urban development programs in one of the largest cities of the developing world.

Vijay is an economist by training, with a PhD from Boston University. His dissertation on the informal markets for the poor was published by Oxford University Press in 1987 and recognized as one of the "Outstanding Academic Books of the Year" by the American Library Association. He has published extensively on water, urban development, agricultural development and environmental issues.

Wee Kean Fong

DEPUTY CHIEF REPRESENTATIVE
WRI CHINA

Dr. Wee Kean Fong is the Deputy Chief Representative of WRI China. He leads the Greenhouse Gas Protocol City Accounting Project to develop an international standard for accounting and reporting greenhouse gas emissions from cities and communities. His latest publication is the Pilot Version 1.0 of the Global Protocol for Community-Scale Greenhouse Gas Emissions that jointly developed with the C40 Cities Climate Leadership Group and ICLEI – Local Governments for Sustainability. Under the same partnership, Fong is currently working on a full value chain (all direct and indirect emission sources) greenhouse gas accounting standard for cities, which will be completed in 2015. He also provides technical assistance and training to help cities implement citywide greenhouse gas inventories according to the Global Protocol.

Weiwei Kou

DIRECTOR
INVESTMENT AND CORPORATE DEVELOPMENT, ANT FINANCIAL SERVICES GROUP

Ms. Weiwei Kou currently works as the Director of the Investment and Corporate Development Department in Ant Financial Services Group, and the President of Tianjin Climate Exchange. She holds master's degrees in Sustainable Development Leadership from Cambridge University and Management Studies from Cardiff University. It has been 11 years since Ms. Weiwei joined the Carbon Trading industry when she started in EU Carbon Trading Center in 2007 in London. She is one of those Chinese who engaged in Carbon trading industry in the earliest stage. She has worked as the Director of Carbon Trading Department in Yi Zhi Ren He International Environmental Technology Ltd., one of the largest United Nation Clean Development Mechanism (CDM) consulting companies in China. She has also served as the Director of Carbon Structuring and Financing for Carbon Trading Capital, a UK carbon fund, and the Executive Director and Vice President for China Carbon Futures (Beijing) Asset Management. Ms. Weiwei has assisted multiple clients to close international carbon deals, and leads several significant deals, such as the largest refinancing CDM projects between BNP Paribas and Long Mei Group from China, the carbon loaning management deal with a large Shanghai state-owned power company, etc. Ms. Weiwei is dedicated in volunteering too. She is the Chinese ambassador of the Sustainable Development Leadership Academy of Cambridge University, the Charity officer of Beijing Cambridge Alumni, and several other social roles. Prior to her career in Carbon Trading industry, Ms. Weiwei worked in finance and public relationship management areas in London. Weiwei has multi-culture background and is fluent in Mandarin, English and Cantonese.

Xu Yong

MANAGING DIRECTOR
HUNAN INNOVATIVE LOW CARBON CENTER (HILCC)

Mr. Xu Yong, has a postgraduate degree in environmental economics, is one of national experts of ADB expert database. In 2009, Xu Yong was granted the PMI Project Manager Certificate in USA. Xu Yong has 12 years of professional experience in policy study of climate change mitigation and low carbon development and gained rich experience in low-carbon energy system planning in the city level, regional GHG emission inventories and low-carbon technology industry development (especially in renewable energy and industrial energy efficiency sectors).

Dr. Xuedu Lu

LEAD CLIMATE CHANGE SPECIALIST
EAST ASIA SUSTAINABLE INFRASTRUCTURE DIVISION
EAST ASIA REGIONAL DEVELOPMENT. ADB

Dr. Xuedu Lu is Lead Climate Change Specialist, East Asia Department, Asian Development Bank (ADB), working on climate change business. He joined ADB in 2010 leading ADB business in carbon market, climate technology promotion and climate investment. Prior to joining ADB, Dr. Lu worked in Chinese Government, engaged in science and technology program management, policy-making, international cooperation and negotiation on climate change. He joined the negotiation on UN Framework Convention on Climate Change and Kyoto Protocol for 15 years.

Y.T. Tzeng

DIRECTOR, GREATER CHINA DISTRICT
KEFENROD RAINWATER MANAGEMENT TRAINING CENTER

Mr. Tzeng has been involved in Rainwater Management in the past 15 years and in the Chinese Sponge-city engineering work in the past 5 years in many big cities in China. He and his German research team have developed complete theory and practice of Sponge-City engineering, for the market of China, which has proven to be unique and practical, and which coincides completely with low-carbon objectives.

Rainwater harvesting fosters tree planting in dry areas alongside highways and streets in China, while trees directly improves CO_2 problems. Also Rainwater has been widely used in German houses and residential buildings and has replaced roughly 50% consumption of city water supply. The power consumption used in water plants and delivery of city water to households represents 13% of total national power consumption in USA.

Yuanguo Li

DEPUTY DIRECTOR GENERAL
CHANGDE CLIMATE-ADAPTIVE CITY CONSTRUCTION LEADING GROUP OFFICE

Li Yuanguo, born in Anxiang County in1960, Hunan Province. Since 2002, he has been a member of the Party Leadership Group of Changde Municipal Public Utilities Administration, chairman of trade unions, secretary and deputy director of the Party Branch of the government, deputy director of the Office of the Leading Group of Sponge City Construction in Changde City, and deputy director of the Office of the Leading Group of the National Climate-Adaptive City in Changde City. He is the main pusher for Changde to optimize urban water development, create a national water-saving city, successfully declare and build the first batch of sponge city construction pilot cities and the first batch of climate-adapted city construction pilot cities. He has participated in the International Summit Forum on Sponge City Construction dozens of times, made hundreds of speeches in Changde City and other fraternal cities across the country, in order to advocate building water-saving cities, sponge cities and climate-adapted cities, and to promote successful experiences and examples of Changde, and constantly promote the civilization and popularity of Changde City.

Zolzaya Enkhtur

CLIMATE CHANGE AND PROJECT MANAGEMENT SPECIALIST
RETA: PROMOTING LOW CARBON DEVELOPMENT IN CENTRAL ASIA REGIONAL ECONOMIC COOPERATION PROGRAM CITIES, ASIAN DEVELOPMENT BANK

Ms. Zolzaya Enkhtur is working as a Climate Change and Project Management Specialist for ADB RETA on low carbon development. She has completed her Master's in Environmental Science and Natural Resources Management and worked extensively on various environmental and sustainable projects in Mongolia since 2010. Previously she worked as a senior projects officer at Capital city's Environmental Agency to expand cooperation opportunities with international organizations to meet the commitments of Green development policy and Climate policy of Ulaanbaatar city. Ms. Zolzaya Enkhtur is also working on broader communications program to encourage behavior change and awareness within her NGO called Climate campaign. Climate campaign is consultancy and advocacy NGO based in Ulaanbaatar, Mongolia. She conducts and promote policy relevant analysis to help drive green growth in Mongolia. Her NGO offer integrated carbon-reducing sustainable growth solutions for policymakers and practitioners at the national, subnational and community levels in the fields of low carbon city policy. Climate campaign's current partners include Energy Regulatory Commission of Mongolia (www.erc.mn), iGDP (China) and Global Environment Institute (GEI China).

LIST OF PARTICIPANTS

A. Developing member countries

LAST NAME	FIRST NAME	POSITION	AGENCY	COUNTRY
Abakanov (Nurbolovich)	Yeldos	Deputy Chairman	Association of Ecological Organizations of Kazakhstan	Kazakhstan
Abduhafizov	Fariz	Leading Specialist	State Committee for Roads	Uzbekistan
Abdussabooh		Director of R & RT	Ministry of Communications	Pakistan
Ahadzoda	Bahodur	Head, Department of Real Economic Sectors	Ministry of Economic Development and Trade	Tajikistan
Akyniyazov	Ahmedyar	Deputy Director of Ecological Control Service	State Committee on Environment Protection	Turkmenistan
Alasgarov	Ulfat	Head of Division	Urban Planning Department	Azerbaijan
Altangerel	Amarsaikhan	Deputy Director	Ulaanbaatar Air Pollution Reduction Office	Mongolia
Annagurbanov	Orazmuhammet	Specialist, Foreign Economic Relations Department	Ministry of Energy	Turkmenistan
Azimov	Tokhir	Deputy Head, Department of New Technology	Ministry of Industry and New Technology	Tajikistan
Babayev	Subahi	Head, Environment and Labor Protection Department	Tamiz Sharar JSC	Azerbaijan
Batbold	Sandagdorj	Director, Auto Transportation Department	Ministry of Roads and Transport	Mongolia
Batsukh	Bolortuya	Head	Environment and Natural Resources Division	Mongolia
Bitadze	Maia	Deputy Mayor	Tbilisi Government	Georgia
Chinsanaa	Munkhbaatar	Head of Division	Ulaanbaatar Environmental Agency	Mongolia
Dalanjargal	Sambuu	Head, Urban Plan Department	Ulaanbaatar Masterplan Agency	Mongolia

Dalkhaa	Luvsanchimed		Ulaanbaatar Municipality	Mongolia
Djumaboev	Makhmud	Main Specialist	State Committee for Roads	Uzbekistan
Dunenbayev (Plasovich)	Dias	Director, Department of Climate Change	Ministry of Energy	Kazakhstan
Enkhee	Sainbuyan	Officer	Ulaanbaatar Environmental Agency	Mongolia
Enkhzul	Erdenebaatar	Specialist for Urban Transport	Urban Transport Department	Mongolia
Gafurov	Ashraf	Head, Environment Division Panjakent	State Committee on Environment Protection	Tajikistan
Ghyasy	Ahmad Behzad	Director	Kabul Municipality	Afghanistan
Gigashvili	Giga	Head, Department of Environmental Protection	Tbilisi City Hall	Georgia
Gurbanov	Dovran	Head	Special Department for Municipal Improvement and Control of Ecology	Turkmenistan
Huseynova	Fidume	Deputy Head	Baku City Executive Authority	Azerbaijan
Islomov	Shakhzod	Leading Specialist	Ministry of Economy	Uzbekistan
Jumadildayev	Abdimanap	Head, Government Services in the Sphere of Nature Management	Environmental Protection and Nature Management of Astana	Kazakhstan
Khan	Mavra	Assistant Director, Planning and Development	Government of Punjab	Pakistan
Kim	Elena	Head of Department	State Committee for Investments	Uzbekistan
Kohestani	Muhammad Mahfouz	Director	NEPA	Afghanistan
Kuatbekov	Alikhan	Deputy Head	Department of Transport and Development of Road Transport Infrastructure of Astana	Kazakhstan
Kussainova	Gulnar	Senior Economic Department Director, Limited Liability Partnership	Astanagenplan Scientific Research Design Institute	Kazakhstan

Meshitbaev	Amangeldy	Head, Department of Support of Infrastructure Projects and Mobilization Work	Ministry of Investments and Development	Kazakhstan
Munkh-Erdene	Dembereltseren	Senior Advisor for Mayor and Governor	Municipality of Ulaanbaatar	Mongolia
Musamim	Ahmad Shekib	Legal Adviser	Office of Deputy Minister for Finance	Afghanistan
Mussayeva	Dariya	Head, Committee of Transport	Ministry of Investments and Development	Kazakhstan
Narmandakh	Luvsandorj	Senior Officer	Ulaanbaatar Air Pollution Reduction Office	Mongolia
Naseri	Jalaludin	Director	Natural Heritage Protection	Afghanistan
Nurmagambetov	Kanat	Deputy Director General	Distribution Government-Commercial Enterprise	Kazakhstan
Ochgerel	Anungoo	Specialist of Project and Cooperation Unit	Municipality of Ulaanbaatar	Mongolia
Rahmanov	Dovletmyrat	Senior Specialist, Division of Financial Analysis of the Construction and Public Utility Sectors	Ministry of Finance and Economy	Turkmenistan
Rentsenkhand	Jamiyandori	Officer	Ulaanbaatar Air Pollution Reduction Office	Mongolia
Roinishvili	Zurab	Senior Specialist, Public Debt Management Department	Ministry of Finance	Georgia
Rzayev	Elnur	Deputy Head	Ganja City Executive Authority	Azerbaijan
Samadov	Teymur	Deputy Head	Sumgayit City Executive Authority	Azerbaijan
Samenova (Tursynkyzy)	Zerza	Senior Expert, Department of Green Energy	Ministry of Energy	Kazakhstan
Sediqee	Abdul Ghafar	Office Manager	Office of Deputy Minister for Finance	Afghanistan
Shalikashvili	Mamuka	Head, Infrastructure Development Partners Relations Division	Ministry of Regional Development and Infrastructure	Georgia

Shengelia	George	Director, Municipal Development Fund	Ministry of Regional Development and Infrastructure	Georgia
Shoshitashvili	David	Head, European Integration and Programs Division	Ministry of Finance	Georgia
Sitnikov	Maxim	Vice Mayor	Bishkek City	Kyrgyz
Sudurov	Sayismon	Head, State Control and Protection of Ecology	State Committee on Environment Protection	Tajikistan
Sukhbaatar	Ariumbold	Officer- Fuel Policy Implementation Coordination	Ministry of Energy	Mongolia
Sultanbekov	Daniel	Deputy Head, Economic and Investment Division	Office of the Prime Minister	Kyrgyz
Sultanov	Bakhyt	Akim of Astana	Akimat of Astana	Kazakhstan
Sultanov	Aziz	Head, Environment Protection Department	State Committee on Environment Protection	Turkmenistan
Tanabayev	Mussa	Head of State Division	Environmental Protection Nature Management of Astana	Kazakhstan
Tyulyubayev	Marat	Head, Department of State Supervision on Nuclear Facilities	Ministry of Investments and Development	Kazakhstan
Ulzii-Yondon	Chuluuntsetseg	Staff Member	Energy Regulatory Council of the Capital City	Mongolia
Wajid Rana	Abdul	Chief Secretary Planning and Development	Government of Khyber Pakhtunkhwa	Pakistan
Yunusov	Nadir	Head of Department	State Committee on Ecology	Uzbekistan

B. Chinese cities

LAST NAME	FIRST NAME	POSITION	AGENCY/CITY
Bai	Songhai		Guilin
Bashirli	Samad	Head, Knowledge Services Unit	Central Asia Regional Economic Cooperation (CAREC) Institute
Bi	Lei		Shenyang
Chen	Changzhi	Associate Deputy Researcher	Zhenjiang Municipal Development and Reform Commission
Chen	Guidong		Hunan
Cheng	Zhi		
Cheng	Shidong		
Cheng	He		Shanghai
Chun	Yu		Shanghai
Deng	Meiping		Changsha
Dong	Hongming	Environment and Sustainable Development in Agriculture	Chinese Academy of Agricultural Sciences (CAAS)
Dong	Hai	Vice Director, Foreign Economic Cooperation and Trade	Qingdao Municipal Development and Reform Commission
Fan	Ling		Hanzhou
Fang	Zhouan		Changsha
Feng	BIN	Deputy Director, Low Carbon Division	Zhenjiang Municipal Development and Reform Commission
He	Zheng	Focal for TA 9387	The Administrative Centre for China's Agenda 21 (ACCA21)
Jiang	Dongming	Director, Foreign Economic Cooperation and Trade	Qingdao Municipal Development and Reform Commission
Lai	Qunying		Hanzhou
Lan	Yan		Guilin
Li	Qiang		
Liang	Guorong	Deputy Director	Zhuzhou Municipal Development and Reform Commission
Ling	Hao	Member of Low Carbon City Construction Management Center	Nanjing Municipal Development and Reform Commission
Liu	Qing	Focal for TA 9387	Shenzhen Municipal Government

Liu	Jianjun		Dunhuang Municipal Development and Reform Commission
Liu	Zhichen		Xiangtan
Liu	Faai		Hunan
Lu	Wei		Dunhuang Municipal Development and Reform Commission
Lu	Fengle		Hanzhou
Luo	Xianbo		Chenzhou
Meng	Yuepeng	Deputy Director General	Dezhou Finance Bureau, Shandong Province
Mo	Fengjiao		Hunan
Qadir	Saeed	Senior Research Officer	Central Asia Regional Economic Cooperation (CAREC) Institute
Ruan	Monica		Chenzhou
Shi	Zhirong		Taiyuan
Shu	Lulei		Zhenjiang Provincial Development and Reform Commission
Su	Lianjin	Deputy Director of Low Carbon City Construction Management Center	Nanjing Municipal Development and Reform Commission
Wang	Dan	Senior Staff	Qingdao Municipal Development and Reform Commission
Wang	Guiping	Deputy Director General	Changzhi Municipal Development and Reform Commission, Shanxi Province
Wang	Yexun	Director General	Xintai Municipal Development and Reform Commission, Shandong Province
Wu	Lie	Center for Global Environmental Policy	Beijing Normal University
Xu	SHAOCE		Wenzhou
Xu	Yong		Changsha
Yan	Fenghu		Dunhuang Municipal Development and Reform Bureau
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Yung	Yuting		Jiaxing
Zhang	Jisheng		
Zhang	Zhiguo		Changsha
Zhang	Guixiang		Jiaxing
Zhao	Jing		Xiangtan

Zhao	Xiaoli		Taiyuan
Zhao	Hong		Shenyang
Zhou	Derong	Deputy Director	Zhenjiang Municipal Development and Reform Commission

C. Speakers

LAST NAME	FIRST NAME	POSITION	AGENCY
Agarwal	OP	Chief Executive Officer	WRI India
Beyersdorff	Sven	Founding Partner	Nordic Sustainability
Brolsma	Reinder	Specialist, Urban Water Management	Deltares
Fishcdick	Manfred	Vice President	Wuppertal Institute
Fong	Wee Kean	Deputy Country Director	WRI China
Habig	Brent	Vice President, International Programs	Institute for Sustainable Communities
Haiping	Yu	Program Officer	ICLEI East Asia
Hashimoto	Toru	Director, Development Cooperation Department	City of Yokohama
Jun	Tae Suk	Project Advisor, Overseas Project Development	Seoul Urban Solutions Agency
Kim	GC	Senior Advisor	Department of Transportation (DOTr), Philippine
Lee	Taedong	Department of Political Science and International Studies	Yonsei University
Li	Yuanguo	Vice Chairman	Chengde Municipal Public Utility Administration Bureau
Liu	Daizong	Sustainable Cities China Program Director	WRI China
Mao	Qin	Director	Low Carbon Management and Development Center of Shanghai Changning District
Miao	Hong	Energy Lead	WRI China
Nauta	Tjitte	Regional Manager, Asia	Deltares
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Staal	Brita	Senior Advisor	Nordic Sustainability
Sun	Jiangning	Director, Technology Department	China Eco-City Academy

Taper	Bruce	CEO and Founder	Kinesis
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Xue	Lulu	Research Associate, Sustainable Transport	WRI China Sustainable Cities

D. Other participants

LAST NAME	FIRST NAME	ORGANIZATION
An	Zhirong	Beijing Institute of Technology
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Cai	Xiaodi	Beijing caben energy
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Cao	Sunzhe	China Academy of Railway Sciences
Cao	Yuan	KOE Environmental Consultancy, Inc.
Chen	Maowang	Environmental Protection Bureau of Xinghua Municipality
Chen	Cai	GreenTech Group
Chen	Xiaoxin	Asian Development Bank (ADB)
Chen	Xuejing	Tsinghua University
Cui	Can	Wuhan University
Dong	Jiao	RMRT (Beijing) technology development co., LTD
Du	Juan	CEPREI Certification Body
Duan	Xinkai	Urban Center of National Development and Reform Commission
Feng	Danyan	China Quality Certification Centre, Canton Branch
Feng	Ling	Chinese Academy of Personnel Sciences
Feng	Yingxin	China Environment Magazine
Fu	Yu	China Building Energy Conservation Association
Gao	Pengyi	Hanergy carbon asset management (Beijing) co., Ltd
Gao	Ya	Beijing Municipal Institute of City Planning and Design
Ge	Tantan	Low Carbon of China
Geng	Qingfen	CEPREI Certification Body
Sigsteinn	Gretarsson	Arctic Green Energy
Guo	Cenzhi	Tianjin Climate Exchange
Han	Cuilian	Tianjin Climate Exchange
Han	Zhilong	Beijing Yitan Co-Creation Energy Technology Co., Ltd
Hao	Qingming	Renewable Energy Industry Association of Hebei
He	Jianying	Ningbo City Information Center
He	Linghao	U.S. Green Building Council
He	Linghao	U.S. Green Building Council
Hong	Jianghan	WRI China
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Hu	Zhengli	China Association for Science and Technology
Hu	Nan	Section Chief of Operation and Development Department
Huang	Fei	Tsinghua University
Huang	Hongbo	ARUP
Huang	Lijun	China Quality Certification Centre
Jiang	Haoxiang	China Energy Research Society
Jiang	Yucong	Chinese Research Academy of Environmental Sciences
Jin	Yuting	Jiaxing Economic Construction Planning Institute
Lei	Suijiang	Shanghai DianJi University
Li	Bing	Inner Mongolia Tendering Company
Li	Cai	Wuhan University
Li	Chunyan	International Project Office of Science and Technology and Industrialization Development Center, Ministry of Housing and Urban-Rural Construction
Li	Hengyi	Beijing Institute of Water
Li	Hu	Zhengdejin Huanjing (Beijing) Technology Development Co., Ltd
Li	Qianqian	North China Electric Power University
Li	Qian	Institute of Comprehensive Transportation of National Development and Reform Commission
LI	Sitong	Resource-efficient Product Certification and Government Procurement Promotion Office
Li	Weiwei	Human Settlement Magazine
Li	Xiaolu	Institute of New Structural Economics, Peking University
Li	Xiaozhen	Paulson Institute
Li	Yan	National Center for Climate Change Strategy and International Cooperation
Li	Ye	Rocky Mountain Institute (RMI)
Li	Ying	World Wildlife Fund (WWF)
Li	Zhexing	China Fortune Land Development Co., Ltd
Liang	Zhe	Guangdong Energy Efficiency and Environment Improvement Investment Program
Lin	Feng	Nature University
Lin	Weiwei	The Energy Foundation (EF)
Liu	Hongzhi	China Environmental Protection Association
Liu	Jia	Energy Research Institute (ERI)
Liu	Jinxiang	Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences
Liu	Jingru	International Union for Conservation of Nature (IUCN)

Liu	Jing	China Energy Research Society
Liu	Lei	Hongwang (Shanghai) Electronic Commerce Co., Ltd
Liu	Liping	Beijing Low Carbon World Technology Co., Ltd
Liu	Siyuan	The Administrative Center for China's Agenda 21 (ACCA21)
Liu	Xiaoyu	Beijing Qilong Weiye International Energy and Environmental Protection Technology Co., Ltd
Long	Xiaolin	CDM
Lu	Yan	Ningxia CDM Environmental Protection Service Center
Lu	Yaodong	Beijing Carbon New Energy Technology Co., Ltd
Lv	Qian	China University of Mining and Technology, Beijing
Ma	Yingfang	APEC Cooperation Network on Green Supply Chain Tianjin Pilot Center (TGCC)
Ma	Zhanyun	Chinese Research Academy of Environmental Sciences
Mei	Jiayong	Oxfam Hong Kong
Meng	Zaoming	Beijing Peace Carbon Environmental Technology Co., Ltd
Mo	Lingshui	Asian Development Bank (ADB)
Mu	Lingling	APEC Cooperation Network on Green Supply Chain Tianjin Pilot Center (TGCC)
Nogami	Kazuyoshi	City of Yokohama
Ou	Haoyuan	Shanghai Changning District of Urban Renovation and Low-carbon Project Management Center
Pan	Jingnan	Tencent Technology (Beijing) Co., Ltd
Qi	Junhui	China Urban Studies Society
Qian	Weicong	Research Institute of Forestry Policy and Information, China Academy of Forestry
Qin	Liyi	European Forest Institute
Qin	Yuan	The Administrative Center for China's Agenda 21 (ACCA21)
Qiu	Aijun	China Center for Urban Development
Qiu	Dengke	Guangzhou Low Carbon Industry Association
Qiu	Fengqing	SinoCarbon Innovation and Investment Co., Ltd
Ren	Jingya	Atkins
Shen	Lelin	National Climate Centre
Shou	Huantao	National Center for Climate Change Strategy and International Cooperation
Song	Jin	Tianjin Climate Exchange
Sun	Liping	School of Environmental and Municipal Engineering, Tianjin Chengjian University
Sun	Wei	Rosa Luxemburg Stiftung
Sun	Yiyun	China Center for Urban Development

Tang	Lixia	SinoCarbon Innovation and Investment Co., Ltd
Tang	Weimin	Zhongcheng Carbon Asset Management Co., Ltd
Tao	Wendi	Natural Resources Defense Council
Tian	Zhibin	CECEP Consulting Co., Ltd.
Wang	Chengbo	Beijing Shuihuitong Institute of Environmental Technology
Wang	Fang	China Energy Efficiency Investment and Assessment Committee CERS
Wang	Haifeng	Chinese Research Academy of Environmental Sciences
Wang	Guangzhen	China Report
Wang	Haixia	China Energy News
Wang	Hua	China Biodiversity Conservation and Green Development Foundation
Wang	Jianglei	ARUP
Wang	Jiao	WRI China
Wang	Jing	Beijing University of Civil Engineering and Architecture
Wang	Kaizhong	Beijing-Tianjin-Hebei Regional Liaison Office of Xinghua Municipal Government
Wang	Li	China Academy of Urban Planning and Design (CAUPD)
Wang	Liyan	Swiss Agency for Development and Cooperation (SDC)
Wang	Minna	Hangzhou Chaoteng Energy Technology Co., Ltd
Wang	Wentang	Beijing Wanqilong Energy Conservation and Low Carbon Technology Research Institute
Wang	Xumei	China Environmental United Certification Center (CEC)
Wang	Ye	WRI China
Wang	Zhigang	Shanghai Changning District of Urban Renovation and Low-carbon Project Management Center
WANG	Zhigang	Deputy Director of Operation and Development Department, Secretary General of Resource-efficient Product Certification and Government Procurement Promotion Office
Wei	Yuping	21st Century Business Herald
Wen	Bo	Snow Alliance
Wu	Mingbang	ARUP
Wu	Chengzhuo	Greenovation: Hub
Wu	Hailing	Beijing Institute of Technology
Wu	Jingshan	China Building Energy Conservation Association
Wu	Wenying	ARUP
Xi	Wenyi	WRI China
Su	Haiying	Research Institute of Forestry Policy and Information, China Academy of Forestry

Xu	Liping	Beijing Research Center of Urban System Engineering
Xu	Tingya	National Center for Climate Change Strategy and International Cooperation
Yang	Guangxi	Jiashu Consulting
Yang	Jiajie	China Academy of Building Research
Yang	Shu	China Quality Certification Centre, Canton Branch
Yang	Xue	National Climate Centre
Ye	Ruike	Zhejiang University of Technology
Yin	Zhifang	Ministry of Transport
Yu	Bo	Jiashu Consulting
Yu	Qingchan	Global Environmental Institute (GEI)
Yu	Youxing	SgurrEnergy
Yu	Zhiyong	Beijing BeiNei Co., Ltd
Yuan	Jing	Energy Foundation China
Yuan	Min	WRI China
Zhang	Can	Shanghai Changning District of Urban Renovation and Low-carbon Project Management Center
Zhang	Fan	Beijing Zhenghe Hengji Design and Research Institute
Zhang	Guixiang	Jiaxing Economic Construction Planning Institute
Zhang	Han	iGreenbank
Zhang	Jianhong	China International Engineering Consulting Co., Ltd
Zhang	Jian	Tsinghua University
Zhang	Mofan	WRI China
Zhang	Qing	Zhongke Intelligence Urban and Rural Transportation Planning and Design Institute Co., Ltd
Zhang	Wandi	Ministry of Transport
Zhang	Wei	LONGi New Energy Co., Ltd. (Beijing)
Zhang	Xi	China Classification Society Quality Certification Company
Zhang	Xian	The Administrative Center for China's Agenda 21 (ACCA21)
Zhang	Yao	Shanghai Environmental and Energy Exchange
Zhang	Yichi	China National Offshore Oil Corporation
Zhang	Yue	China Petroleum and Chemical Industry Federation
Zhang	Zhongjuan	China National Textile and Apparel Council
Zhao	Feiyan	Top10
Zhao	Mingli	Top10
Zhao	Xin	China Gas Association Distributed Energy Committee
Zheng	Jiangzhuo	Arctic Green Energy

Zhou	Liuxin	Kingeta Group Co., Ltd
Zhou	Pei	Energy Foundation (EF)
Zhou	Ruifen	Inner Mongolia Tianhe Forestry Carbon Sequestration Research Institute
Zhou	Yimin	European Forest Institute
Zhou	Yun	School of Public Policy and Management, Tsinghua University
Zhou	Zhengsheng	Asian Development Bank (ADB)
Zhu	Kai	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

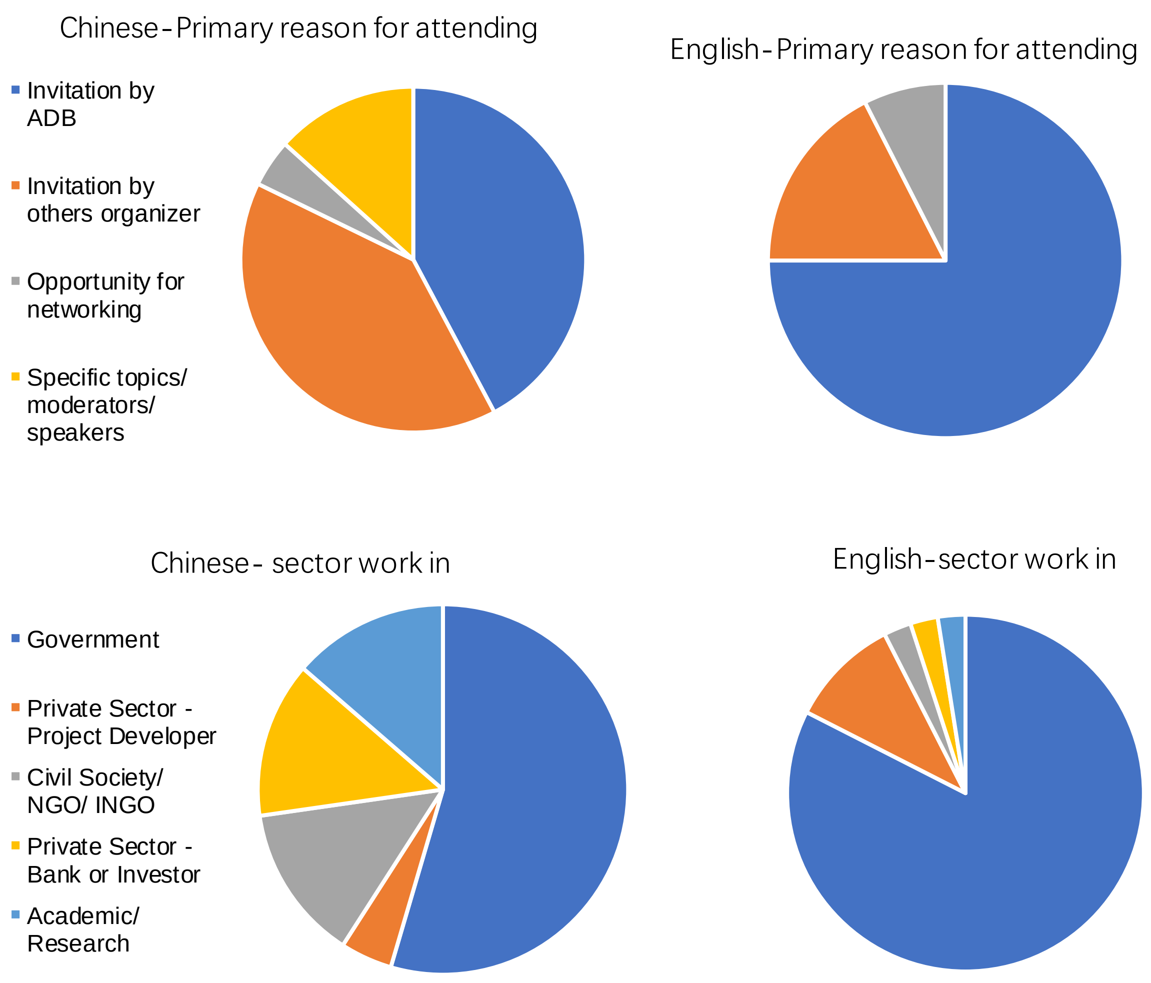
FEEDBACK FROM PARTICIPANTS

Evaluation forms were distributed in Chinese and English on both days of the Conference. Feedback was received from 94 participants, 54 in Chinese and 40 in English respectively.

A. Attendance

Most participants attended the conference because of ADB's invitation, and about one half of the Chinese participants reported responding to the WeChat invitation received from WRI and Wuppertal Institute.

The major group of participants were from government sector, with participation from the private sector as the second group. Among the Chinese participants there was representation from academia and civil society.

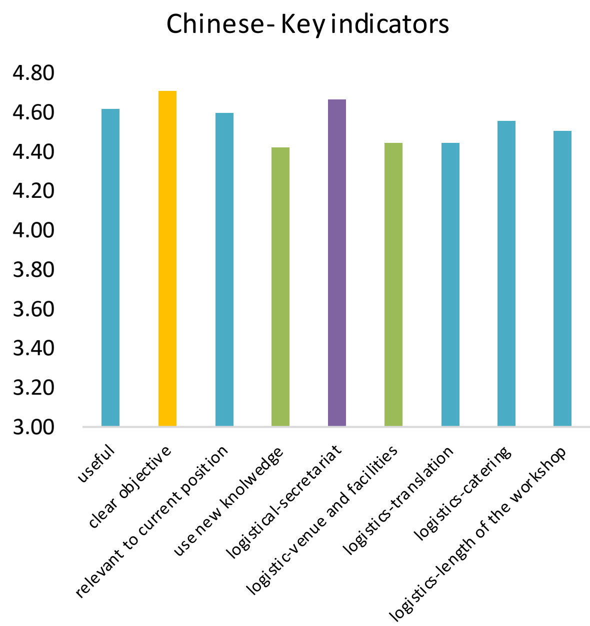


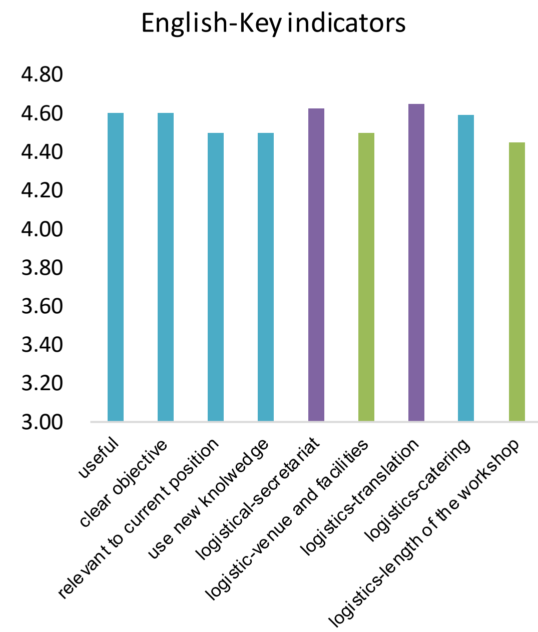
Composition of audience

B. Key Indicators

Based on feedback received, participants reported very high satisfaction from both Chinese and English evaluations submitted. Ranking from 1 to 5, the average of each indicator of conference organization is above 4.4. Highlighted in yellow are the two best indicators (clear objectives and logistical support provided by the secretariat).

Relatively lower satisfaction was reported with the venue and the intensity of engagement; the latter by English respondents.



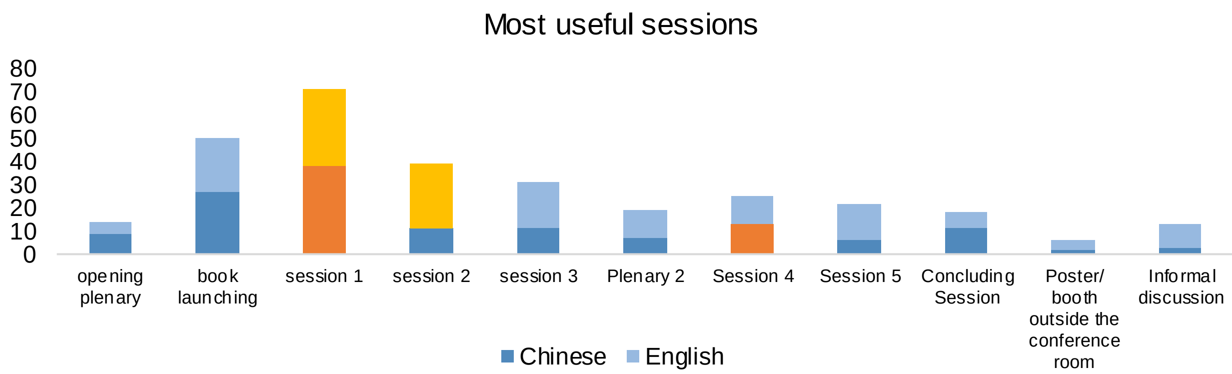


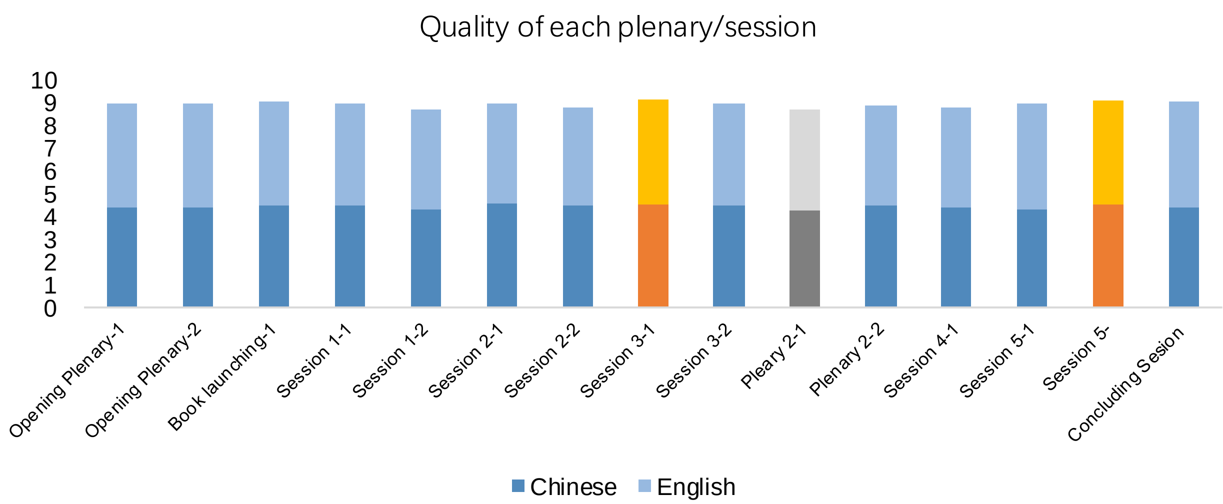
Feedbacks by indicators

C. Quality of Sessions

Session 1 (From dirt to smart) is ranked as the most useful sessions. Apart from the book launching session, English-speaking participants found Session 2 (Fast development/New Districts) the second most helpful, while the Chinese participants reported Session 4 (From data to action) to be most useful.

Regarding quality of each plenary/ session, respondents were requested to rank 1 as usefulness and 2 as relevance to participants' work. Session 3 (Panel discussion on low-carbon urbanization) was reported as the most useful session, and Session 5 (Engaging private investors) as the most relevant session respectively





Scaling from 1-10, the usefulness of Plenary 2 (Round Table on low-carbon cities) was rated slightly below 8. The overall quality of each plenary/ session was reported as very satisfactory.

Quality of Sessions

D. Suggestions for Forum 2019

Conference organization: (rank in frequency)

- Adding more interactive sessions and elements, including break-out sessions
- Better focus and less topics, fewer presentations
- Bigger and clearer screens
- Ensuring uniform quality among speakers
- More of multi-language interpretation service, e.g. Mongolian
- Alternative conference hosting country, e.g. Georgia

Suggested additional topics:

Most English respondents suggested less and more focused topics, while the Chinese participants suggest the following additional topics:

- Climate disaster and responses
- Indicators and standards of a low-carbon city
- Promotion of renewable and clean energies, especially on affordable access by the vulnerable population
- Different pathways and practices towards ultra-low-energy-consuming buildings

Site visits

The survey did not extend to seeking feedback on site visits because some participants had left after the two days of meetings. However, based on informal feedback from Chinese city participants and some Russian-speakers, the two site visits were viewed positively. There was a total of 68 participants at the first site and 54 at the second site. Some suggestions included:

- Too intensive, half-day for one site would have been much better
- The Russian translation was good, but when three languages were utilized in sequence there was too much distraction. Simultaneous translation would have been ideal.
- Time spent at the Golden Wind Technology Park could have been extended because participants wanted to learn about the distributed system. Time constraints prevented this from happening.

PRESENTATION HAND-OUTS

ADB

International Forum on Low Carbon Development for Central Asia Regional Economic Cooperation Program Cities, Beijing 4-6 December 2018

Welcome Remarks

Ma. Teresa Kho
Deputy Director General, East Asia Regional Department
Asian Development Bank

- Welcome to the Forum, which is happening in parallel to COP24 in Katowice, Poland.
- AT COP 24, countries are expected to finalize the rules for implementation of the Paris Agreement.
- The targets set forth in the nationally determined contributions (NDCs) submitted by 177 parties including many CAREC countries must be put into concrete actions.
- Climate-oriented development can advance the achievement of **Sustainable Development Goals.**

Urgency of Climate Actions

- The Asia and the Pacific has experienced a significant increase in the number, intensity, and impact of extreme weather events.
- Climate induced impacts led to economic loss already.
- Without urgent climate actions, the impacts could severely affect our future growth and reverse current development gains.

ADB

Cities play a crucial role

- Cities are responsible for about 70% of the total greenhouse gas (GHG) emissions.
- By 2050, cities will hold about 66% of Asia's total population.
- Cities provided better living standards and higher productivity, but also became major sources of GHG emissions.
- Cities needs to maintain vital economic growth, and to curb GHG emissions, while creating livable cities for all.

ADB

What is Low Carbon Development?

- It aligns with sustainable development
- It is grounded in systems-thinking.
- Measuring the SD progress by a quantifiable indicator of GHG emissions reduction.
- It encourages integrated city planning; and collaborative and coherent sector development across energy, transport, buildings, waste, and land use.
- It emphasizes preventive approach to improve city resilience.
- It requires active governance through engaging and activating stakeholders while providing right incentives.

ADB

Challenges and Forum Objective

- Our cities are experiencing significant population and economic growth through carbon-intensive industrialization, urban sprawl and migration, and environmental pollution.
- Empowering city governments will enable them to develop strategic plans and successfully execute climate actions to transform city growth.
- This forum is a platform to address challenges and present innovative solutions and tools.

ADB

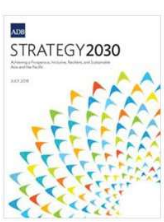
ADB's Ongoing efforts

- ADB promotes climate actions through different approaches like climate finance, carbon market, clean and renewable energy and energy efficiency, clean transport system, sponge cities, and smart cities.
- Through low carbon city development projects at ADB, we promote integrated and comprehensive approach of all these efforts.

ADB

ADB Strategy 2030 (1)

- **ADB Strategy 2030** identified several key operational priorities, of which:
  - ✓tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability,
  - ✓making cities more livable,
  - ✓strengthening governance and institutional capacity, and
  - ✓fostering regional cooperation and integration,



ADB

ADB Strategy 2030 (2)

- ADB will strengthen customized support specific to local circumstances, promote the use of innovative technologies, and deliver integrated solutions by combining expertise across a range of sectors and themes.
- ADB committed that at least 75% of the number of ADB's committed operations will support climate actions by 2030 like low carbon city development, and climate finance from ADB's own resources will reach $80 billion for the period 2019 to 2030.

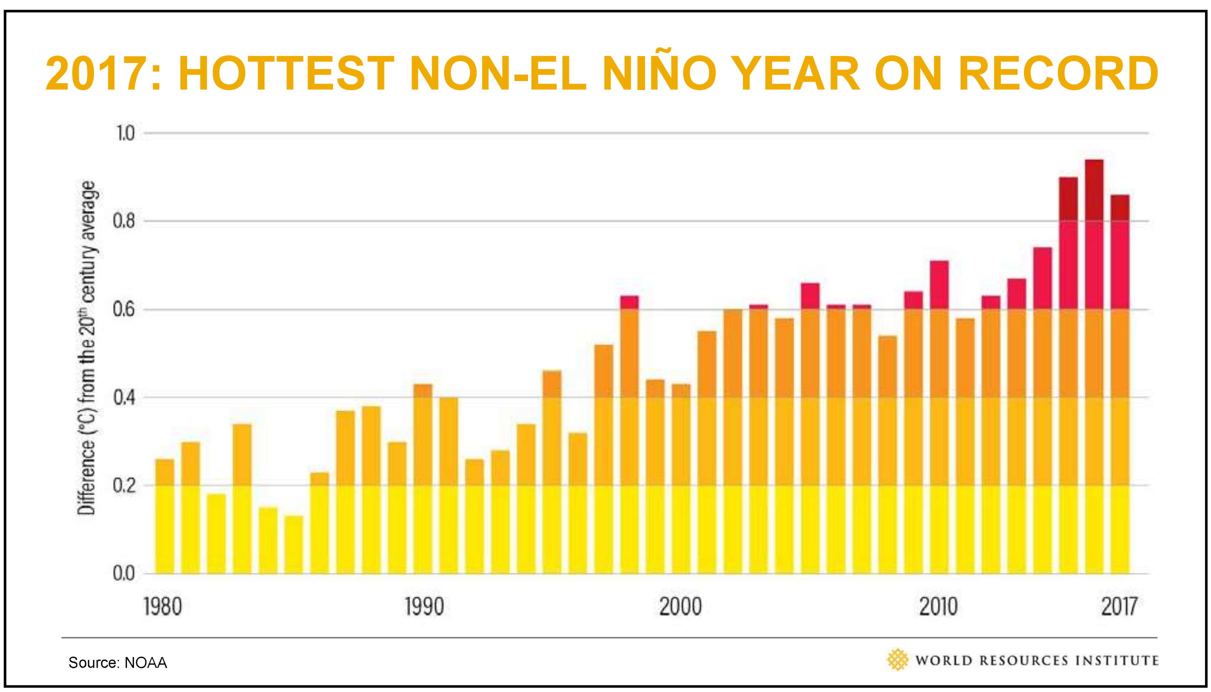
ADB

ADB

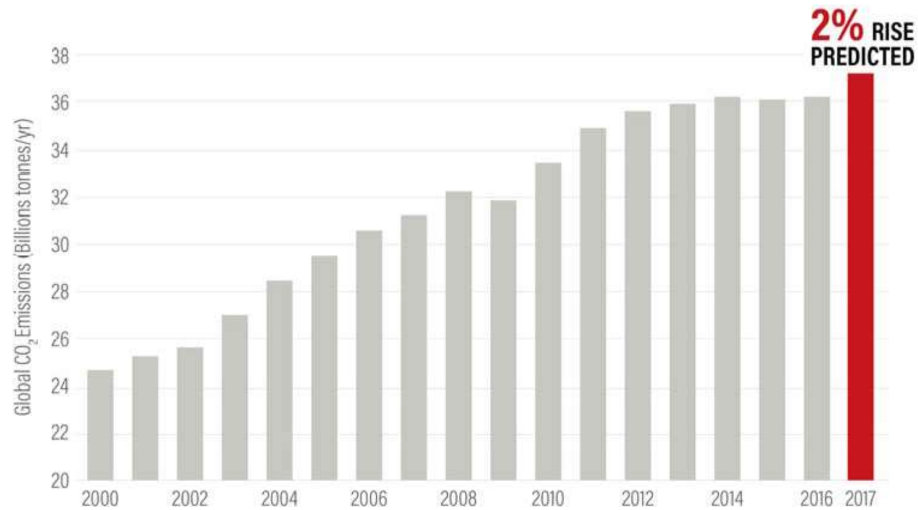
"Through this Forum, ADB reinforces our roles as trusted partner, reliable financier, knowledge provider, and a convener of strategic partner for your low carbon city development efforts."

Thank you.

Key Note Speeches



2017: GLOBAL EMISSIONS RISE



Source: WMO

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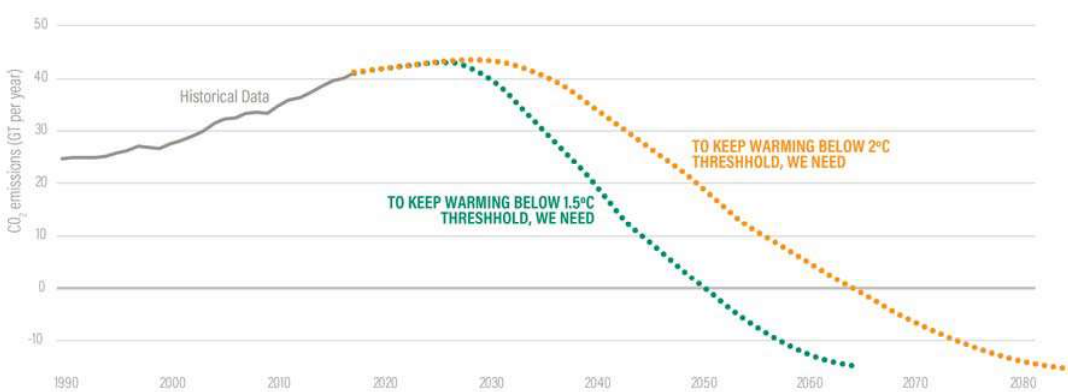
SOUTHEAST ASIA: WORST FLOODING IN A DECADE
1,400
people killed
41 million
impacted
Photo: Flickr/CAN Europe
WORLD RESOURCES INSTITUTE

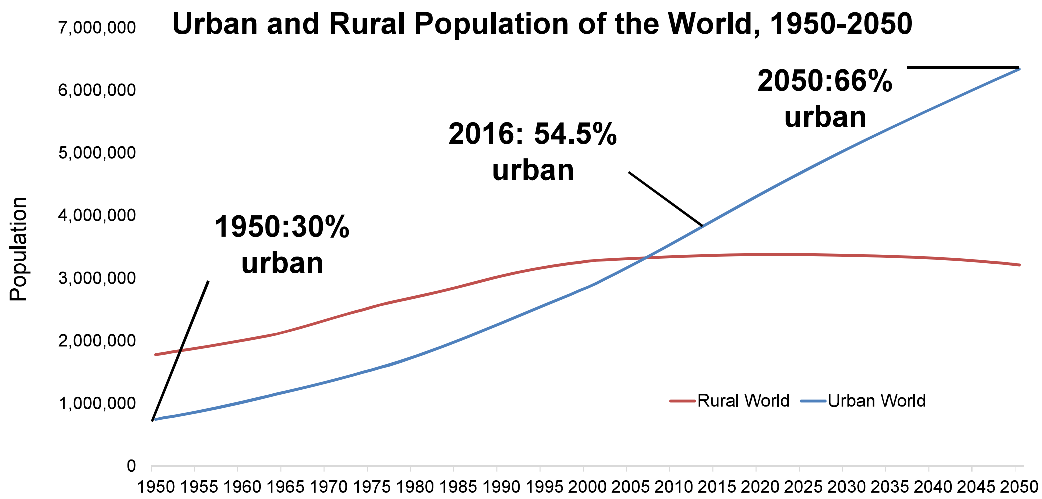

BIGGEST FIRES EVER RECORDED IN CALIFORNIA
1.2 million
acres burned
Photo: Flickr/US Department of Agriculture
WORLD RESOURCES INSTITUTE

WHAT'S NEEDED AND WHY



Source: WRI

THE URBAN EXPLOSION



Source: United Nations Development, The World's Cities in 2016 Data Booklet

WORLD RESOURCES INSTITUTE

HOW WE GET THERE

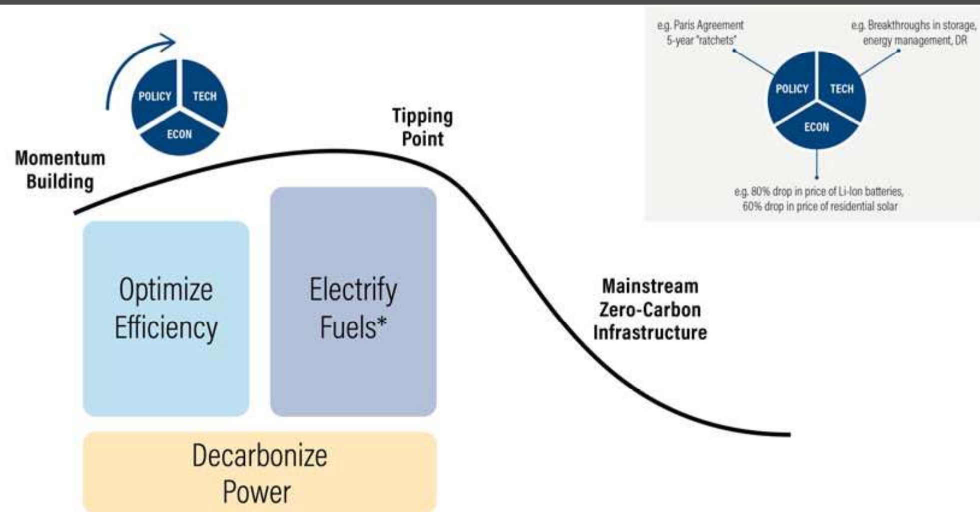
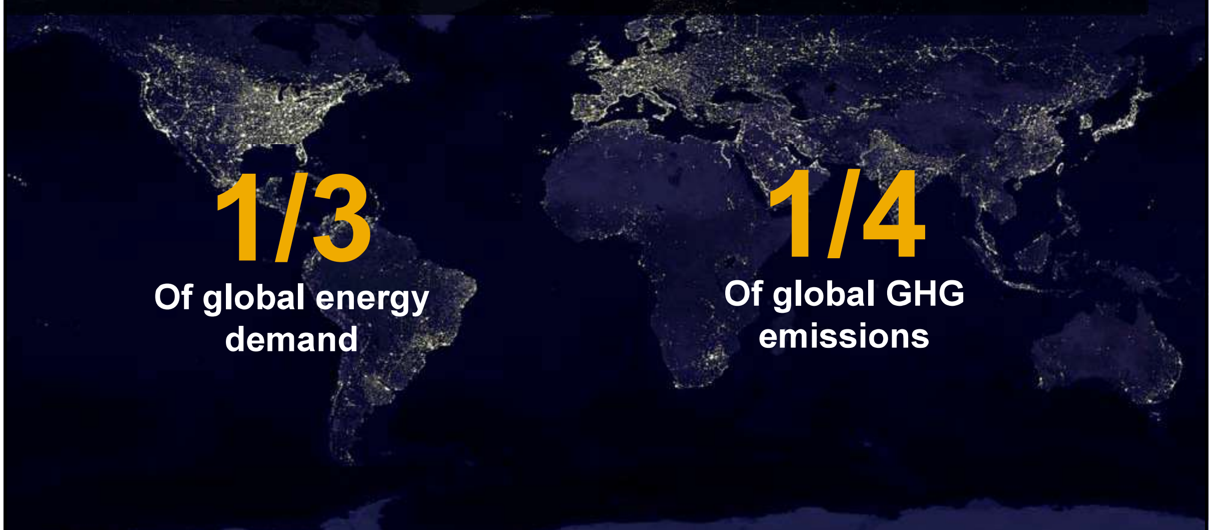


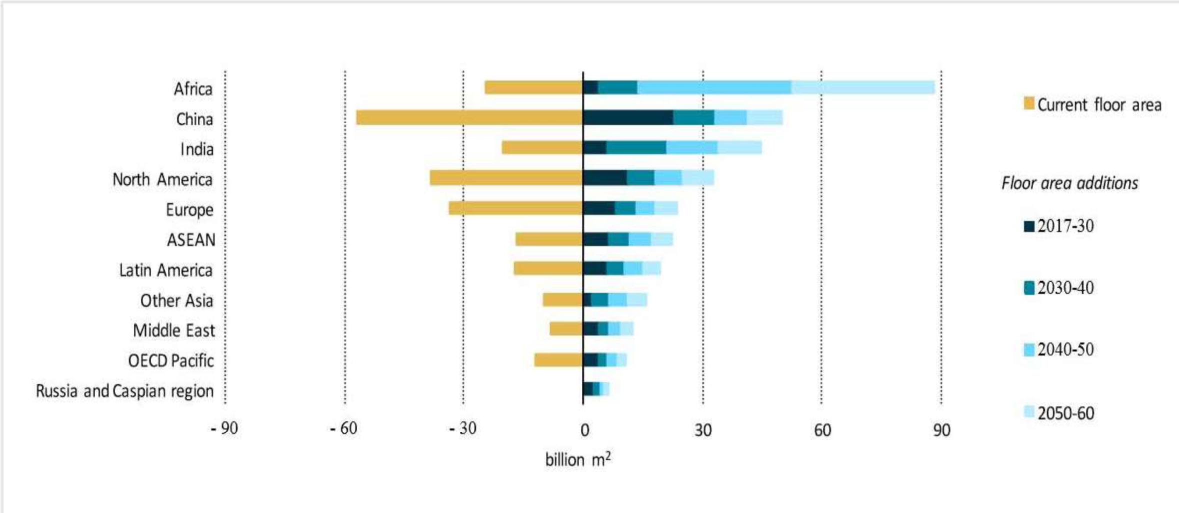
Image inspired by ClimateWorks; Price trend graphs from NREL, Bloomberg New Energy Finance

WHY BUILDINGS?



Source: IEA 2013; IPCC 2014

NEW ADDITIONS TO FLOOR AREA BY 2060



Notes: OECD Pacific includes Australia, New Zealand, Japan and Korea; ASEAN = Association of Southeast Asian Nations.
Source: IEA (2017), Energy Technology Perspectives 2017, IEA/OECD, Paris, www.iea.org/etp

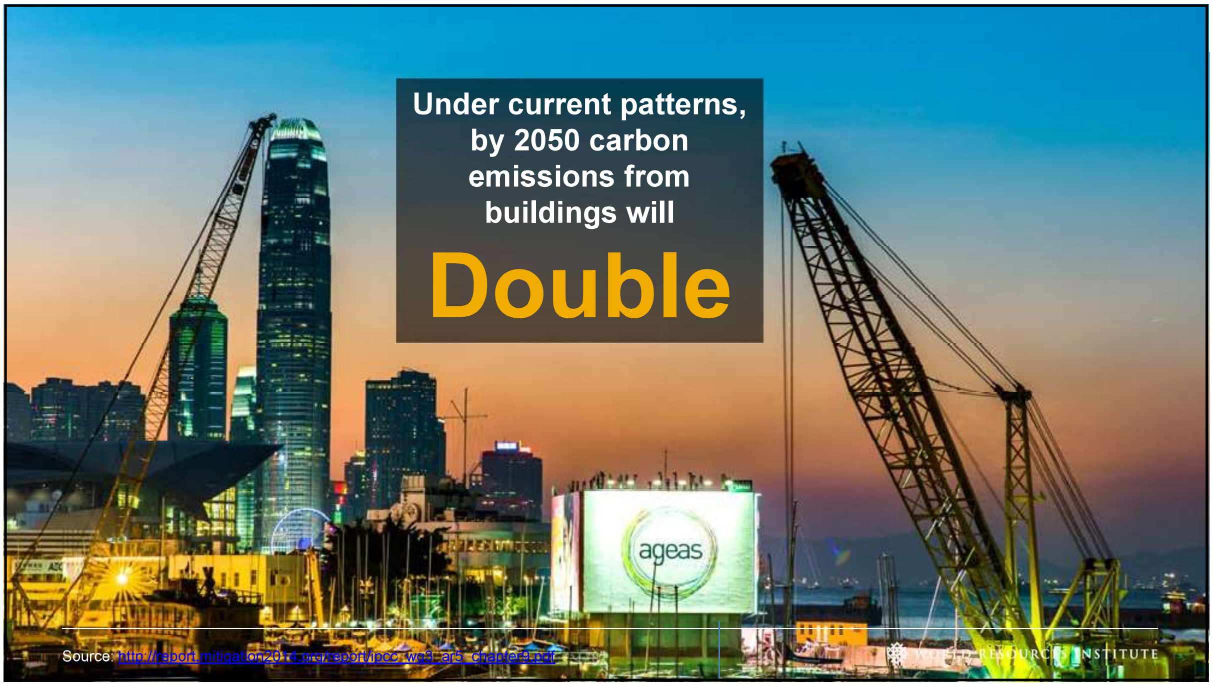
BUILDINGS PROMINENT IN CLIMATE COMMITMENTS (NDCs)

132
Mention buildings

101
Contain Building Efficiency opportunities

38
Call out building energy codes

BUT… WE ARE LOSING THE BATTLE
1.5%
Yearly increase in energy productivity
2.3%
Yearly increase global Floor area
WORLD RESOURCES INSTITUTE



Under current patterns, by 2050 carbon emissions from buildings will
Double
ageas
Source: http://report.mitigation2014.org/report/ipcc_wg3_ar5_chapter9.pdf
WORLD RESOURCES INSTITUTE


BUENOS AIRES: ENERGY EFFICIENCY IN PUBLIC BUILDINGS
30%
Reduction in GHG emissions by 2030
Photo: Flickr/Daid O'Leary
WORLD RESOURCES INSTITUTE


BRUSSELS: NEARLY ZERO ENERGY BUILDINGS
NEARLY ZERO ENERGY BUILDINGS DEFINITIONS ACROSS EUROPE
FACTSHEET
BPIE
Photo: Flickr/Francisco Anzola
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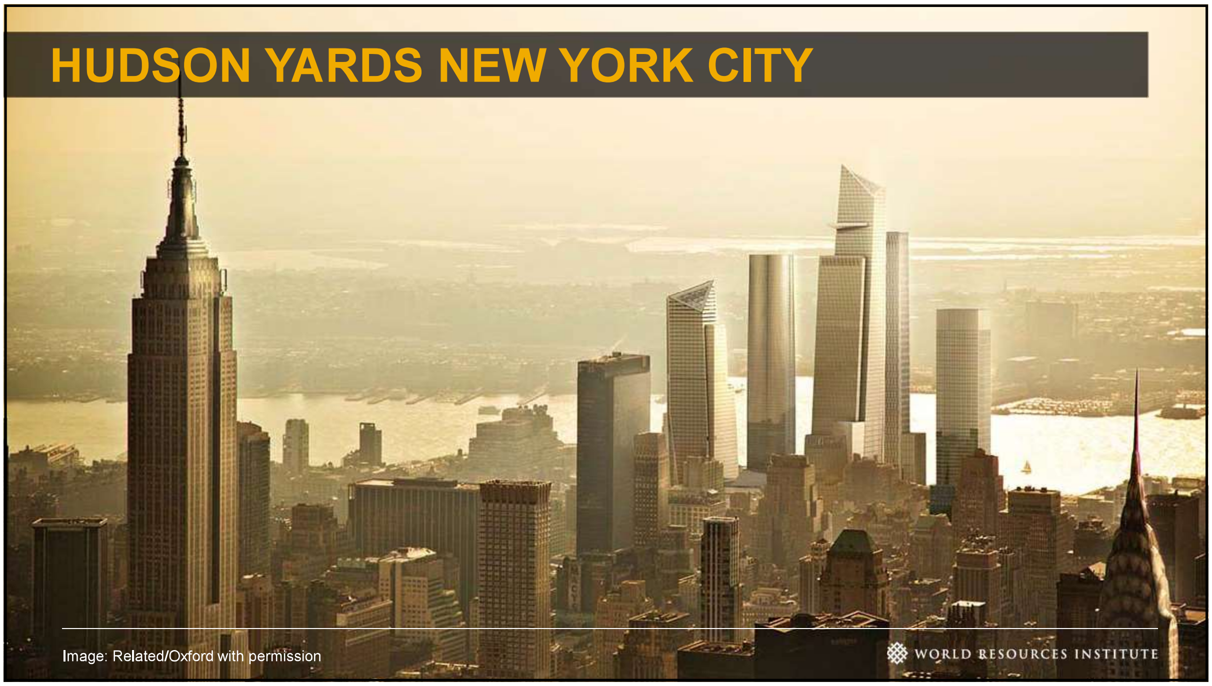
HUDSON YARDS NEW YORK CITY
Image: Related/Oxford with permission
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WHAT WE NEED
All new buildings net zero by
2030
Global building sector must achieve net zero emissions by
2050
Photo: Flickr/Sean Davis
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New mobility services that can make public transportation more attractive and competitive

COALITION FOR URBAN TRANSITIONS
A New Climate Economy Special Initiative

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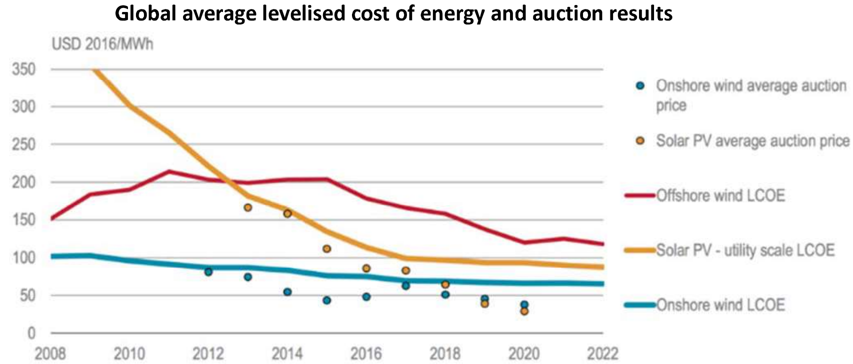
THE COST OF WIND AND SOLAR ARE CONTINUING TO DECREASE

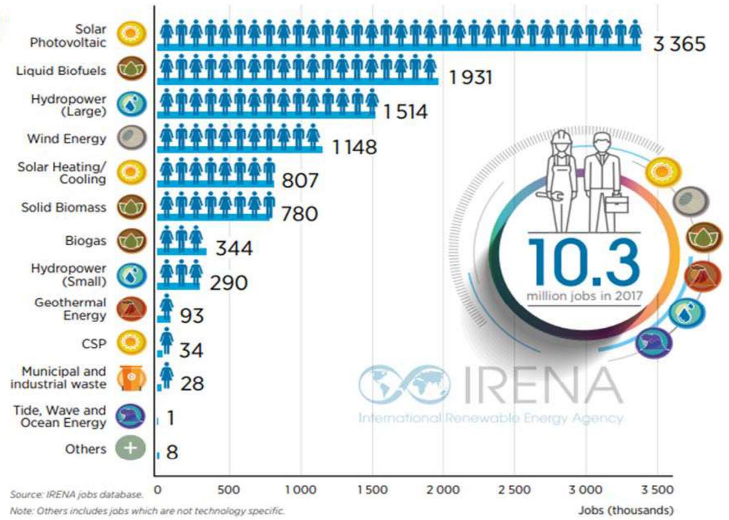
Global average levelised cost of energy and auction results



THE NEW CLIMATE ECONOMY
The Global Commission on the Economy and Climate

Source: IEA, 2017. Renewables 2017.

MILLIONS OF PEOPLE ARE EMPLOYED IN CLEAN ENERGY



THE NEW CLIMATE ECONOMY
The Global Commission on the Economy and Climate

Source: IRENA, 2018. Renewable Energy and Jobs.

GROWING DEMAND FROM THE PRIVATE SECTOR

Source: http://sciencebasedtargets.org/

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WORLD
RESOURCES
INSTITUTE
THANK YOU!

Wuppertal Institut

The cities of tomorrow
Sharing low carbon experience for green, competitive, resilient and inclusive cities

Presentation:

Prof. Dr. Manfred Fischedick
Vice President
Wuppertal Institute

December 2018

Overview of central thesis

- Shaping cities of tomorrow – SDGs provide an orientation for a multi-target challenge
- Cities are major actor for change and at the same time themselves vulnerable to unintended changes (e.g. shocks and stresses caused by climate change) – as consequence urban resilience concept has gained increased attention.
- Exchange knowledge and ideas – make use of good practice examples and experience e.g. through transnational city networks and partnerships)
- Existing examples provide different success stories, but also show that there is no „one-size-fits-all measure/approach“
- Each (city) example provides a different story, but none of cities discussed claim to provide a comprehensive and sufficient solu-tion to address all dimensions of the sustainability target system
- For city planning structure, culture and history matters
  “Eigenart” describes the diversity of cities in terms of well-being, social cohesion, creativity and innovation and should be respected

Shaping cities of tomorrow – a multi-target challenge

Sustainable Development Goals (SDGs) provide orientation not only with regard to specific area (SDG 11: sustainable cities and communities)

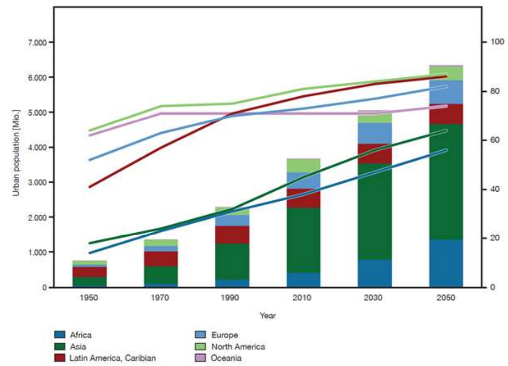
Cities are major actor for change and at the same time themselves vulnerable to unintended changes

- Urban resilience concept as a consequence of various threats gains momentum
- Following OECD definition …a resilient city has the ability to absorb, recover and prepare for future shocks (economic, environmental, social and institutional)
- In addition resilient cities respect sustainable development goals, well-being and inclusive growth

http://alphachimp.com/weblog/2013/6/28 /poptech-the-city-resilient.html

Why cities are so important for the solution of the global climate change challenge

- In early 2000 over 50% of the world’s population had concentrated in urban environment for the first time – the proportion is very likely to grow significantly in the future
- In 2015 approx. 3.9 billion people (54%) lived in cities and generated about 85% of global GDP and 70% of global GHG emissions



Source: WBGIU 2016

Why cities are so important for the solution of the global climate change challenge

- In early 2000 over 50% of the world’s population had concentrated in urban environment for the first time – the proportion is very likely to grow significantly in the future
- In 2015 approx. 3.9 billion people (54%) lived in cities and generated about 85% of global GDP and 70% of global GHG emissions
- Cities as creative centres have the power (and as many say the responsibility) to act as forerunner for change and to trigger necessary transformation processes at national and global level
- As they are themselves vulnerable to unintended changes (e.g. shocks and stresses caused by climate change) the willingness (and the pressure) to act is very often higher as at the national level (where the direct consequences are somehow virtual – not directly visible)
- In addition to GHG mitigation concepts as a pro-active contribution to fight against the global threats and broader (very often not very specific) smart city concepts the urban resilience concept have gained increased attention.

Why cities are so important for the solution of the global climate change challenge

- Illustrative challenges for 2050 related to environmental impacts and resource demand
  - The additional infrastructure needs is projected to be as big as the building ups between 1850 and today
  - New constructions with conventional technologies and Materials would generate 350Gt CO_2 between 2008 and 2050 *(remaining budget 2011: 400 Gt for 1.5° C, 800 Gt for 2°)*
  - China alone consumed between 2008–2010 more cement, than the USA throughout the 20th century

→ Smart decision making in cities around the world is crucial for global low carbon agenda

For city planning city structure, culture and history matters

"Eigenart" (peculiarity) that describes the diversity of cities in terms of well-being, social cohesion, creativity, innovation should be respected

- Cities...
  - ➢ are located in different climate zones and cultural areas

Oval Maidan Park: Mumbai, India

Library: Copenhagen, Denmark

Traffic conditions: New Dehli, India

Space & well-being
Public space, green space, aesthetics

Urban form & social cohesion
Identity, social networks, neighborhood, security, trust

Creativity & people
density of communication, connectivity, unique networks, innovation

For city planning city structure, culture and history matters

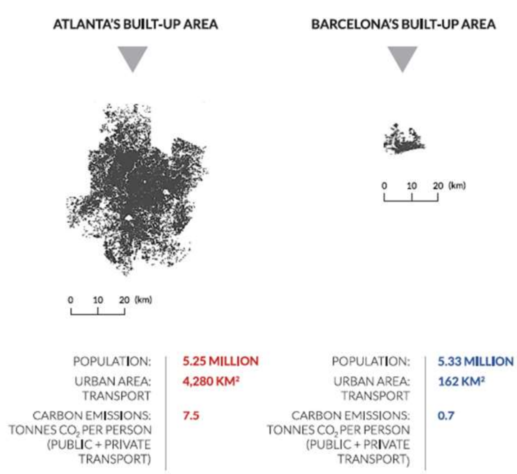
"Eigenart" describes the diversity of cities in terms of well-being, social cohesion, creativity and innovation and should be respected

- Cities...
  - ➢ are located in different climate zones and cultural areas
  - ➢ are different in size (although having often mega cities in mind – highest share of global population lives in cities with less than 750.000 inhabitants)
  - ➢ are growing or shrinking
  - ➢ do have already mature infrastructure or are still in the phase of creation
    - ➢ 50% of cities of 2050 are not existing yet, still to be built or transforming to dense agglomeration areas: sophisticated planning needed to avoid lock in effects
    - ➢ 50% of cities of 2050 – today's existing infrastructural backbones determine to a large extent the future energy demand: complex system transformation required to contribute to GHG mitigation (e.g. deep retrofit strategies, mobility system transformation)
  - ➢ do have different transformation experiences
  - ➢ etc.

If planning cities city structure matters

Amongst others city structure and population density plays major role as driver for energy consumption and GHG emissions

Energy and emissions vary widely even between cities with similar income level, depending on infrastructure decisions (avoid lock-in effects and path dependencies)



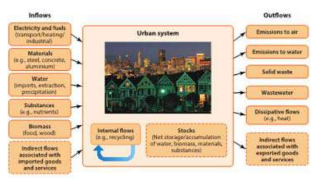
Source: UN 2014

How to go forward with implementation of low carbon cities

Major building blocks for resilient cities – no standard solution (one-size fits all solution) available

- Energy concepts (particularly energy efficient buildings)
- Transport and mobility concepts
- Water supply and waste water treatment concepts
- Integrative urban planning approach (including transport, buildings and infrastructures to supply sustainable energy and water)
- Active involvement of civil society in the planning process (co-creation of knowledge)
- Consideration of the specific conditions and particularities of each city

Transport is the largest GHG source in some cities such as New Delhi, India, Photo: ENERGIES 2050



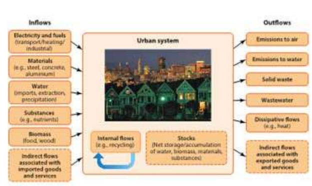
City rooftops in Cuba, Photo: ENERGIES 2050

Selection of appropriate mitigation measures requires systematic approach

Proper (multi-criteria) assessment of options necessary

- Improving energy efficiency in buildings (e.g. insulation, low-energy lighting)
- Improving the efficiency of domestic energy use (e.g. for cooking, cooling, ICT)
- Switching to renewable energy (e.g. installing solar water heating to replace fossil fuel alternatives)
- Optimize modal split (e.g. improvement of public transportation, cycling and pedestrian infrastructure) and switch to low emissions vehicles
- Reducing GHG emissions from landfill sites (e.g. by composting organic waste; capturing methane for generating power).
- Sustainable consumer behaviour (improved awareness with respect to energy consumption)
- Reduction of embedded emissions via thoroughly decisions with regard to product/material input (take care of value chain)
- etc.

Transport is the largest GHG source in some cities such as New Delhi, India, Photo: ENERGIES 2050

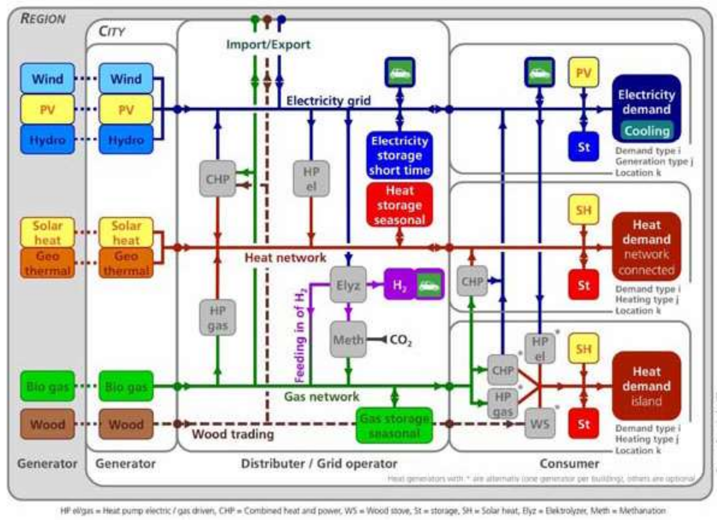


City rooftops in Cuba, Photo: ENERGIES 2050

December 2018 Source: UNEP 2014, own additions

Scenario analysis and urban system modelling can help to find a proper combination of given opportunities

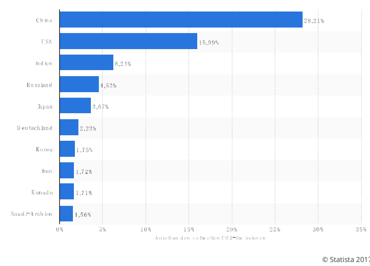
Neighborhood / City / Regional Energy System based on Renewable Energies



Concluding remark - why cities matter in the global climate policy arena

Climate policy requires consistent long-term strategy and has to overcome challenges

How to overcome problems within the climate diplomacy

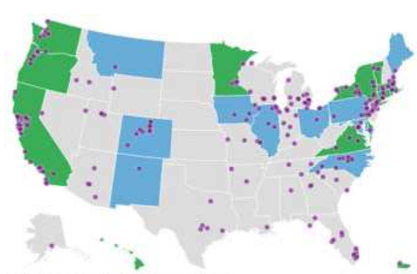


Climate policy requires consistent long-term strategy and has to overcome challenges

Sub-national and non-state institutions in the US are willing and able to fill the national climate protection action gap

WE ARE STILL IN

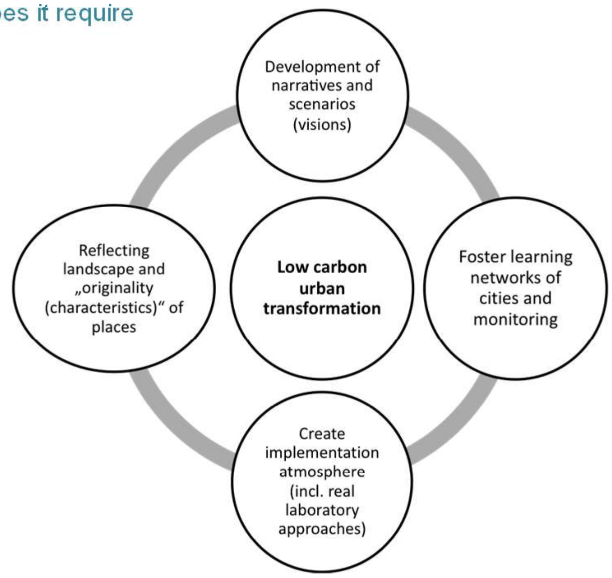
- **Initiative comprises more than 3.600 governors, mayors, companies, investors who mutally declared their willingness to keep momentum and to support fight against climate change.**
- **The alliance represents more than 154 million Americans as well as a GDP of $9,46 trillions**
- **Additional initiatives (e.g. US Climate Alliance) underline meaning of cities**



http://wearestillin.com/#press-release
http://news.nationalgeographic.com/2017/06/states-cities-usa-climate-policy-environment/

Conclusion

Shaping sustainable and resilient urban infrastructures (cities for tomorrow) – what does it require



Wuppertal Institut

Thank you for your attention!

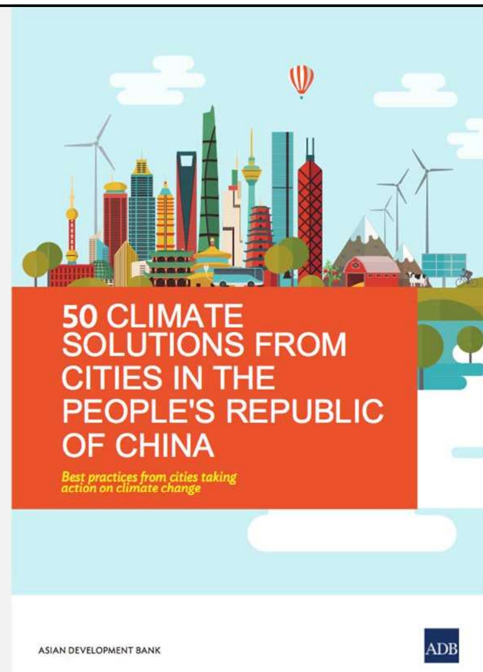
Book Launching Ceremony

BOOK LAUNCH

M Teresa Kho

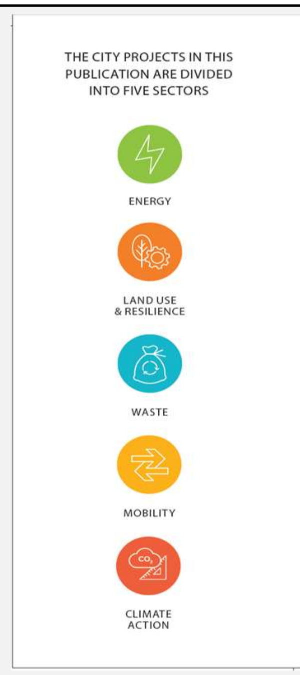
Deputy Director General

East Asia Regional Department, ADB



FIVE SECTORS

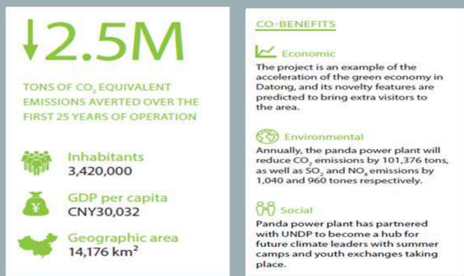
31 CITIES



CRITERIA FOR ASSESSMENT

- **Climate Action.** The expected or achieved CO_2 reduction and/or climate risk mitigation of the project.
- **Co-Benefits.** The extent to which the project has positive co-benefits (economic, environmental, health, and social benefits).
- **Innovation.** The extent to which the project takes an entirely new or ground breaking approach to address major environmental issues.
- **Governance.** How well the project collaborates with other entities in the city, engages citizen, and plans to scale the case.

ENERGY (13)

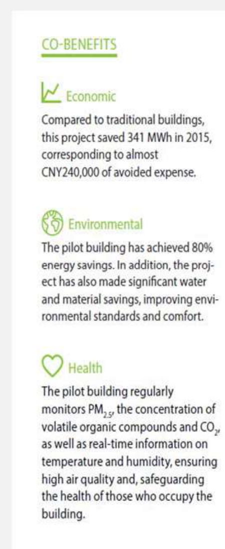


DATONG: PANDA POWER-TURNING THE SUN INTO FUN

- Panda Green Energy in Datong is building a panda-shaped solar power plant covering more than one million square meters.
- Development of 100 MW solar park in using 20% more efficient double sided solar panels.
- By completion, it will generate enough electricity for over 10,000 homes in Datong City, Shanxi.

BEIJING: INNOVATIVE TECHNOLOGY BRINGS NEAR-ZERO-ENERGY BUILDING

- Doing away with traditional heating and cooling systems, the latest renewable energy technology has been deployed in a 4,025 m² building in Beijing to achieve an 80% reduction in energy consumption and almost zero emissions.
- Innovative ground source heat pumps provide 65% of heating demand during winter. PV solar systems power the electrical heat pumps as well as supplying much of the power needs throughout the building.
- The pilot building shows how to achieve more than 50% emissions savings by implementing innovative technology and is a landmark building for future development.



RESILIENCE AND LAND USE (9)

↑350

KM OF CYCLEWAYS TO BE BUILT BY 2020

Inhabitants
2,300,000

GDP per capita
CNY49,400

Geographic area
7,649km²

Xinning Greenway in Qinghai is linking scenic spots in and around the city with designated cycle paths.

Along the banks of the Huangshui river and beyond, Xining city is planting trees and building 350 km of designated cycle lanes that link the city center with scenic spots in the surrounding mountains via green spaces.

By replacing car journeys with bike rides, the city hopes to reduced CO_2 emissions, by 12,000 tons annually by 2020, and improve local air quality.

CO-BENEFITS

Environmental
By encouraging a greater number of cycle journeys, Xining hopes to reduce carbon and particulate emissions in the city, and enhance greener lifestyles for its residents.

Health
Increased mobility has great impacts for public health and leads to a reduction in lifestyle diseases. The project's green infrastructure will also help to reduce the urban heat-island effect.

Social
Xining Greenway is becoming a new leisure and fitness space for citizens of all ages and backgrounds, with many new businesses opening along the cycle paths.

QINGHAI: LINKING GREEN SPACES FOR CYCLISTS

DIAXING'ANLING: REFORESTATION CAPTURES CARBON AND BOOSTS ECONOMY

- Diaxing'anling shifted from logging to forest tourism, improving both carbon sequestration and the local economy.
- Four forest farms are involved in this project. A total of 39,514 ha. of forest were planted between 2010 and 2014.
- Since 2012, reforestation has been eligible for China Certified Emission Reduction, meaning that forest carbon sequestration can be sold to offset greenhouse gas emissions and be traded under the emissions trading schemes in the PRC.

WASTE (6)

↑12M

VISITORS TO THE 2015 GARDEN EXPO ON THE OLD LANDFILL SITE

Inhabitants
10,600,000

GDP per capita
CNY111,469

Geographic area
8,494 km²

Wuhan transformed over 50 hectares of closed landfill into a garden.

Measures. Restoration process started in 2014. It introduced proper planting techniques, diverse plant species, and measures to improve the soil.

Landfill site hosted the International Garden Expo in 2015.

CO-BENEFITS

Economic
The project saved CNY829 million by using aerobic ecological restoration compared to conventional restoration methods.

Health
Restoring the landfill site ensures reduced air pollution for more than 100,000 people living in close proximity to the landfill.

Social
The new ecological park improves the quality of life for the citizens of Wuhan and promotes economic and social development in the surrounding areas.

WUHAN: RENEWAL OF LANDFILL SITE

WUHAI: SMART ROUTE PLANNING TOOL CUTS EMISSIONS

- Introducing an intelligence system into the sanitation process allows monitoring and optimization of the system which is reducing the carbon dioxide emissions, and improving the overall performance.
- Wuhai, has designed an environment sanitation cloud platform linking 194 vehicles to a centralized system. The smart system gives an overview of vehicle performance and automatically generates optimal route plans for the fleet's waste collection across the city. With optimized vehicle routes, workforce efficiency is improved, and the running time and distances of sanitation vehicles is reduced.

↓27K

LITERS OF FUEL SAVED ANNUALLY THANKS TO ROUTE OPTIMIZATION

Inhabitants
558,000

GDP per capita
CNY102,725

Geographic area
2,350 km²

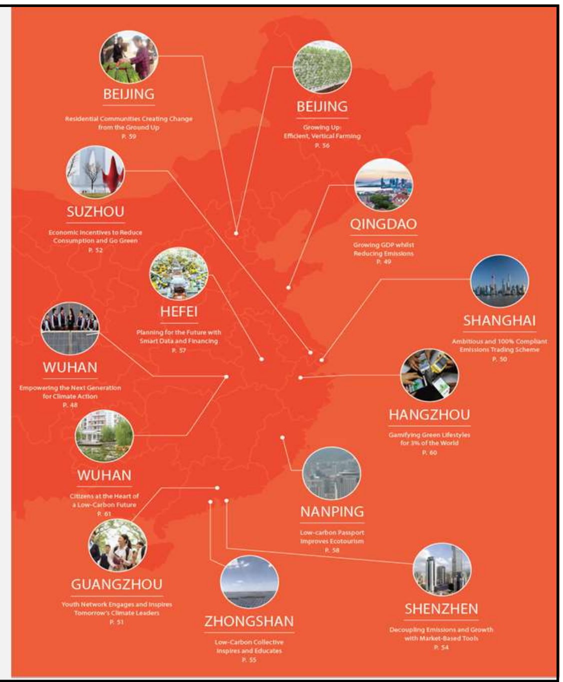
CO-BENEFITS

Economic
Each year, fuel consumption is reduced by 26,907 liters, saving the city CNY139,900 annually.

Environmental
More efficient fuel and resource use enabled through the cloud platform, reduces CO_2 and particulate emissions in the already polluted city of Wuhai.

Social
The project supports more than 1,200 jobs, and substantially improves the working conditions for Wuhai's sanitation workers.

CLIMATE ACTION (13)



↑1.7K

STUDENTS ATTRACTED TO INTERNATIONAL SUMMITS HELD BY CYCAN

Inhabitants
14,040,000

GDP per capita
CNY145,254

Geographic area
7,434 km²

Guangzhou has created an ambitious network of climate action youth leaders to re-shape the approach to climate action in the next generation.

The China Youth Climate Action Network, associated with the Climate Action Network, works to raise public awareness on climate change and transition to sustainable energy, while also engaging and inspiring youth communities in the PRC.

The network has a number of running projects. One such project is a low-carbon campus project, which aims to empower university students to take control of energy management on their campus and cut emissions from universities.

CO-BENEFITS

Economic
Inspiring future entrepreneurs to focus their innovative efforts on green and clean technology could have untold economic benefits for the world's second largest economy.

Environmental
Empowering a generation who have faced some of the worst environmental conditions ever is a potent accelerator of future change for the environment.

Social
Providing a platform for environmentally conscious youth to engage in climate action can open their eyes to future careers influencing PRC's green transition.

GUANGZHOU: YOUTH NETWORK ENGAGES AND INSPIRES TOMORROW'S CLIMATE LEADERS

SHANGHAI: EMISSIONS TRADING SCHEME

- One of the PRC's earliest market-based Emissions Trading Schemes (ETS) boasts impressive success metrics, and is also providing lessons for other PRC mitigation projects.
- The first ETS pilots was launched in 2013 in Shanghai. The scheme creates a carbon market where emitters can buy and sell credits that permit them to emit greenhouse gases.
- Around 60% of the city's total emissions are covered by the scheme, which uniquely includes the aviation sector. Since its creation, a total of 26.7 million emissions allowances have been traded, representing CNY414 million.

↑100%

COMPLIANCE OVER THE PAST FOUR YEARS

Inhabitants 24.190.000

GDP per capita CNY113,719

Geographic area 6,340 km²

CO-BENEFITS

Economic
Since the initiation of the ETS, a total of 26.7 million emissions allowances have been traded, representing CNY 414 million.

Environmental
The scheme is estimated to have saved around 300 million tons of CO_2 equivalent since its inception in 2013.

Health
Reducing emissions is also associated with improving air quality - one of Shanghai's greatest health-related problems.

MOBILITY (9)

Carpooling Tackles Congestion and Emissions BEIJING – P.64	Speedy and Comfortable Commute with Shared Bus Service BEIJING – P.67	Bus Rapid Transit Unlocks Urban Mobility YICHANG, Hubei – P.71
Electric Taxis Replace Traditional Fleet TAIYUAN, Shanxi – P.65	Cycling Scheme Incentivizes Carbon Reductions WUHAN, Hubei – P.68	Zero-emission Hydrogen Bus Fleet FOSHAN, Guangdong – P.72
Supercapacitor Technology Leading the Charge for Public Transport HUAI'AN, Jiangsu – P.66	Buses Go Truly Zero Emission with Solar Power SHANGHAI – P.70	Cleaner Mobility Through Car Sharing CHONGQING – P.73

↑90%

INCREASE IN BUS MODE SHARE DURING PEAK MORNING TRIPS

Inhabitants
4,130,000

GDP per capita
CNY89,978

Geographic area
21,227 km²

Yichang's new Bus Rapid Transit system is offering an efficient and accessible means of transport for citizens, improving urban mobility and air quality.

Providing citizens with a 24 km green public transport corridor offers a cheaper and more efficient means of urban mobility.

Over the 3 months following the BRT's opening, city car mode share dropped from 40% to 30% and bus mode share increased from 18% to 34% of morning peak trips. Bus waiting times have reduced from 13 minutes to 6 minutes in BRT locations.

CO-BENEFITS

Economic
The economic benefits of the BRT project include reduced congestion, improved commute times, fewer road accidents and savings to vehicle operating costs.

Health
Taking cars off the road contributes to reduced particulate and NOx emissions - the primary contributors to respiratory illnesses.

Social
Following consumer surveys, female passengers felt the BRT offered them additional security at the stations compared to previous bus stops and commuters rated the conditions inside the buses highly.

YICHANG: BUS RAPID TRANSIT UNLOCKS URBAN MOBILITY

SHANGHAI: BUSES GO TRULY ZERO EMISSION WITH SOLAR POWER

- Shanghai is the first city in the PRC to generate power for the city's electric buses using a rooftop PV system on the bus depot.
- The 195 kW rooftop PV system is providing enough energy to recharge 6 buses at the same time, and the expected annual power generation is up to 20 MWh. Each electric bus typically travels between 100 and 120 kilometers a day, consuming 220 to 230 kWh.
- The solar power installation will not only benefit the environment, but will also bring economic benefits for the bus company through reduced electricity costs.

↓150k

KILOMETERS OF BUS JOURNEYS PER YEAR POWERED BY THE SOLAR SYSTEM

Inhabitants
24,190,000

GDP per capita
CNY113,719

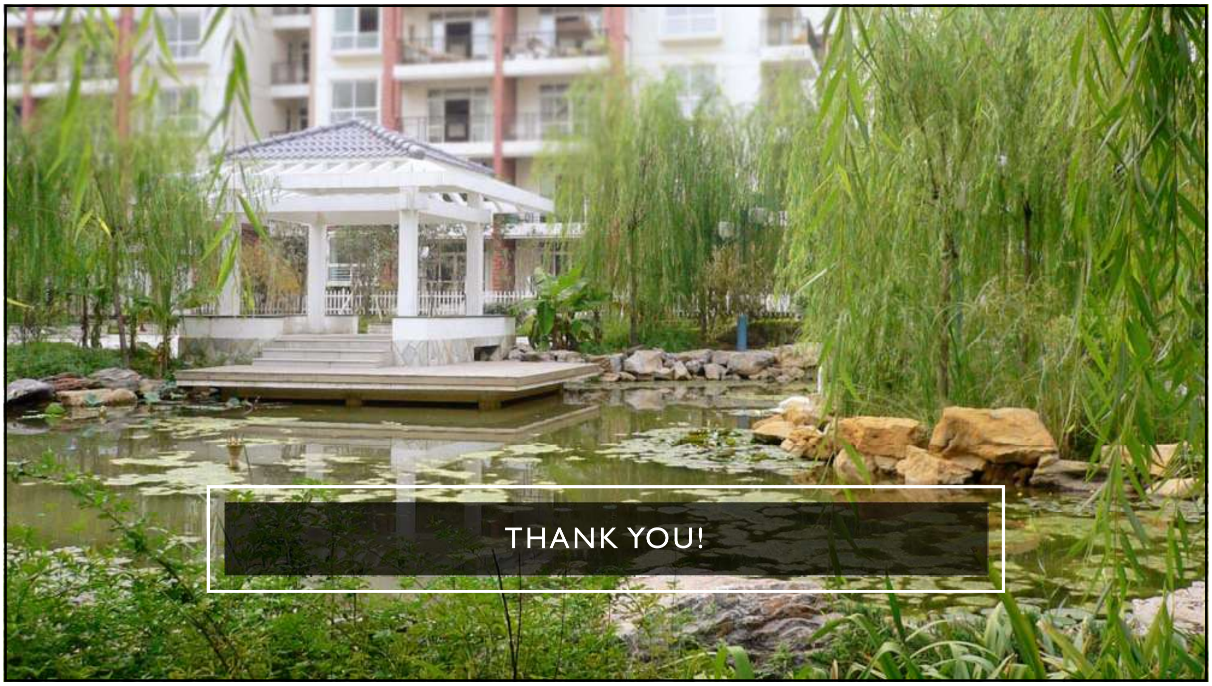
Geographic area
6,340 km²

CO-BENEFITS

Economic
Distributed PV generates 20 MWh of green power per year, which according to the current electricity tariff in Shanghai will save the bus company CNY 170,000 annually.

Environmental
Using solar power to generate energy, substituting fossil fuels, will reduce 6 tons of oxynitride and 160 carbon dioxide emissions.

Health
Using solar energy to power electric buses reduces vehicle emissions, urban haze, and air pollution, bringing many benefits to human health.


THANK YOU!

CAREC Climate Solutions 2019

Jack Robinson
Publication Editor, Sustainia

SUSTAINIA

About

Sustainia

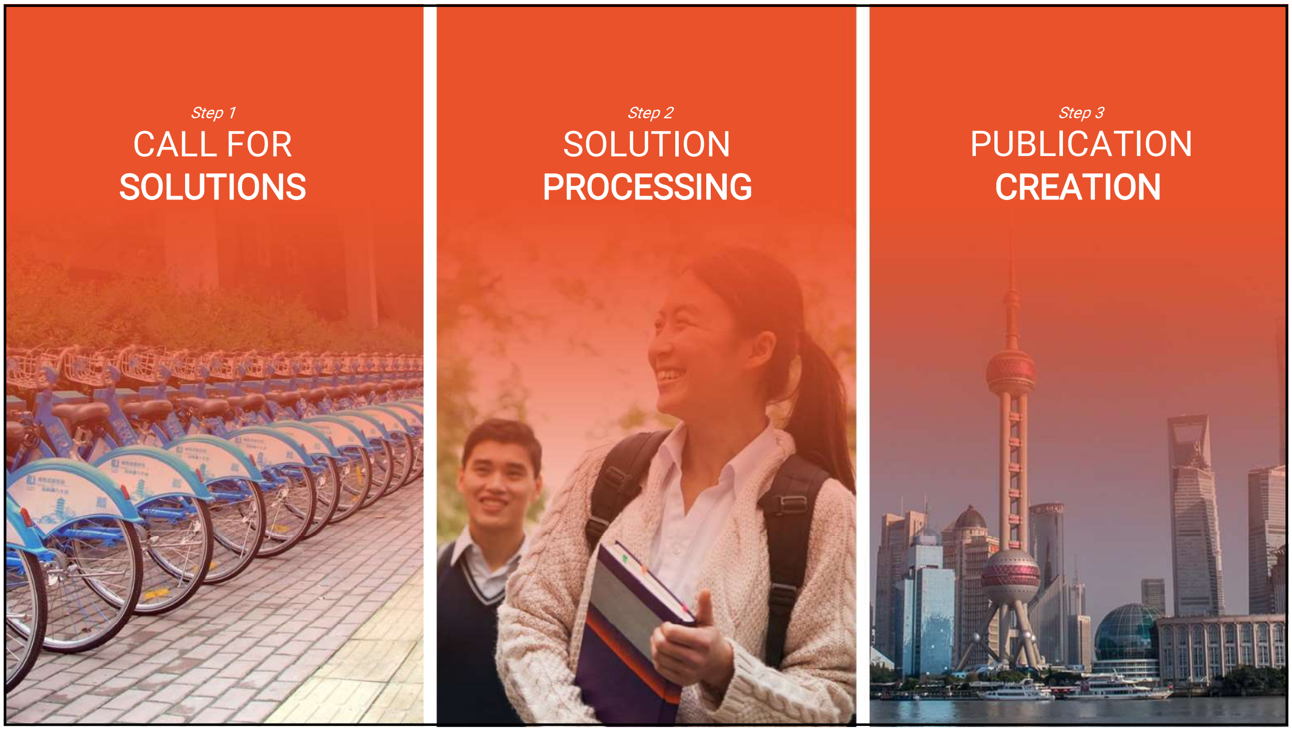
Sustainia is a sustainability think tank and advisory group.
Since 2009 we have helped clients transform their business by integrating sustainability into their core business and make their employees sustainability champions.

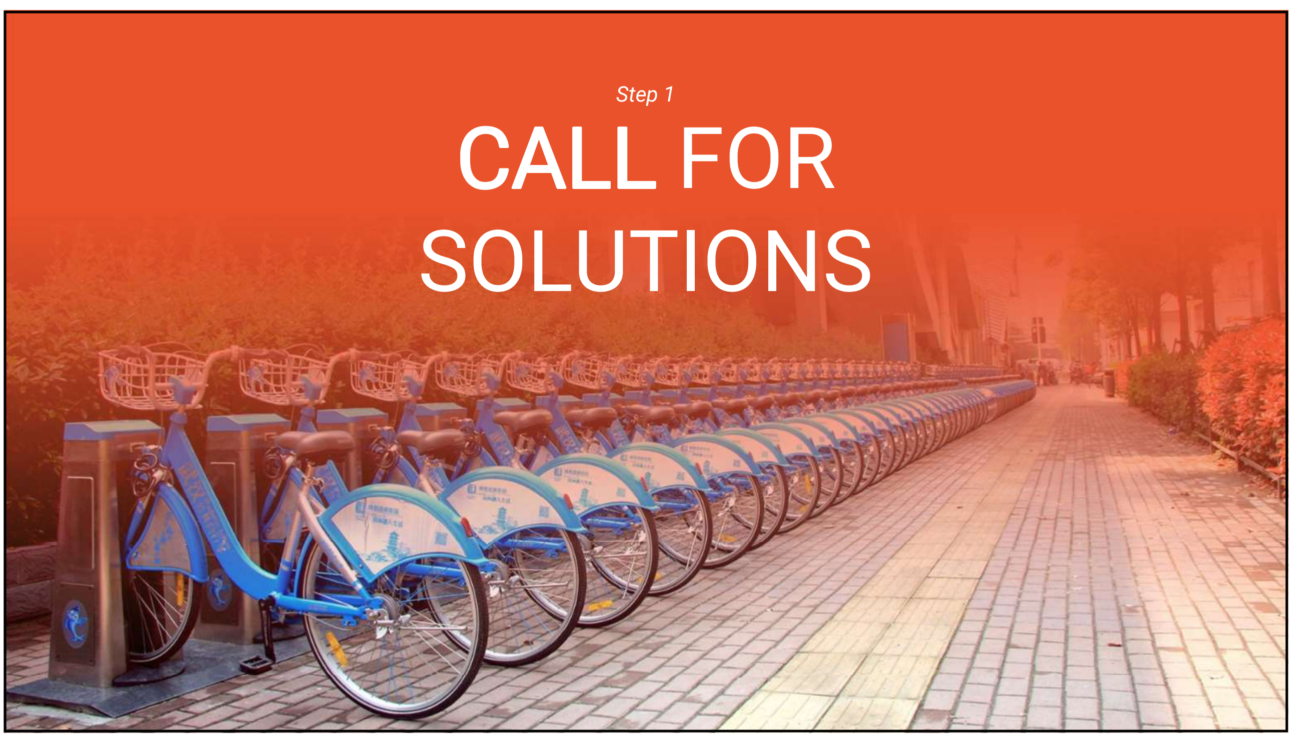
+1000
sustainable solutions, products and services we have vetted and communicated to the world

+50
major strategic studies we have published on sustainable business transformation

70,000
people who take part in our online community on social media

SUSTAINIA


Step 1
CALL FOR
SOLUTIONS
Step 2
SOLUTION
PROCESSING
Step 3
PUBLICATION
CREATION


Step 1
CALL FOR
SOLUTIONS

Step 1

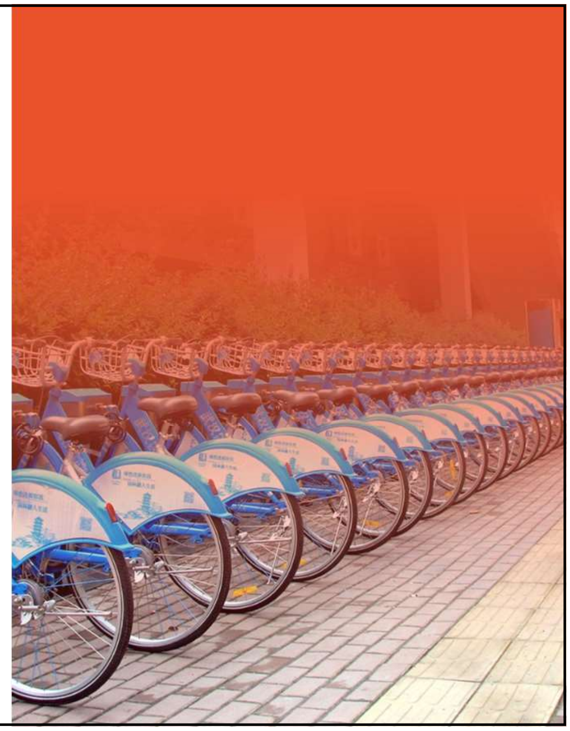
Call for
Solutions

Sustainia is now calling for sustainable urban solutions within the CAREC region.

All solutions are to be submitted by

April 1, 2019

SUSTAINIA

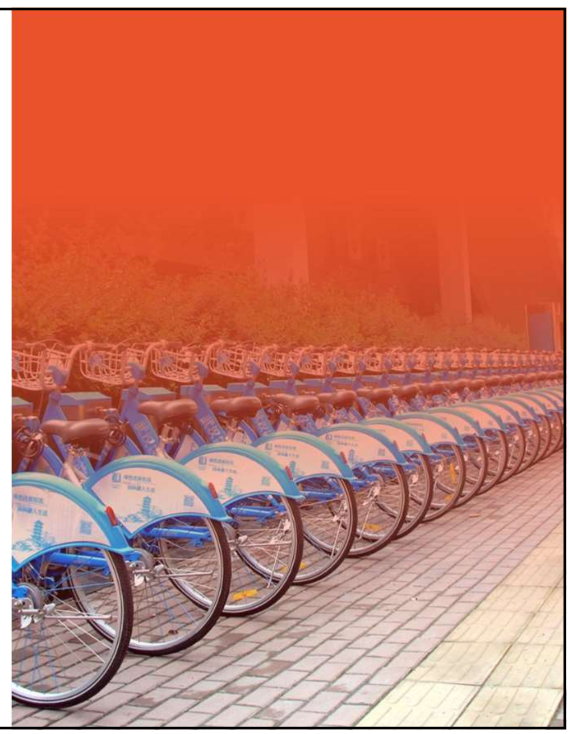


Step 1

Call for
Solutions

The five solution categories are

- **Clean and Renewable Energy**
- **Urban Transport and Mobility**
- **Building Energy Efficiency**
- **Solid Waste**
- **Smart City Solutions**
- **Climate Action Plans and Inventories**
- **Adaptation and Resilience Plans and Actions**
- **Carbon Finance and Partnership**
- **Sustainable and Low Carbon Communities**



Step 2

SOLUTION PROCESSING

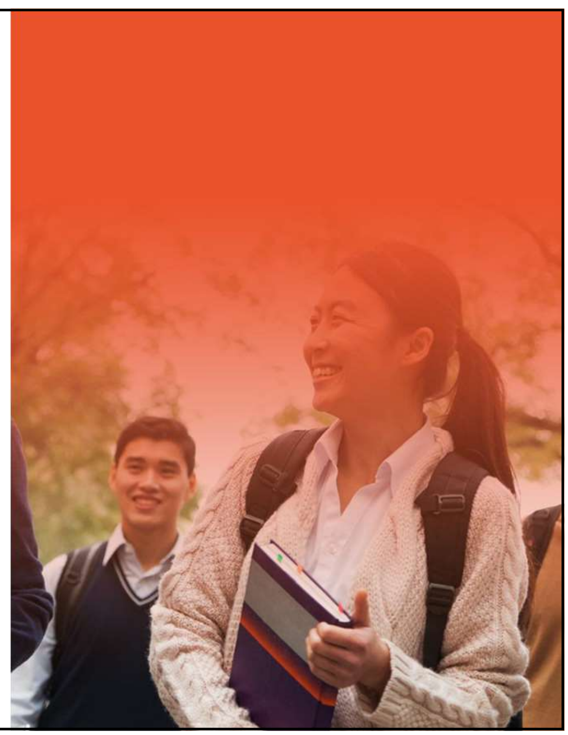
Step 2

Solution **Processing**

Sustainia processes and verifies solutions according to our robust selection criteria, developed and fine tuned over the past eight years.

The rigorous methodology used by Sustainia has been developed with the help of our international and highly experienced panel of experts, and has five main criteria.

SUSTAINIA

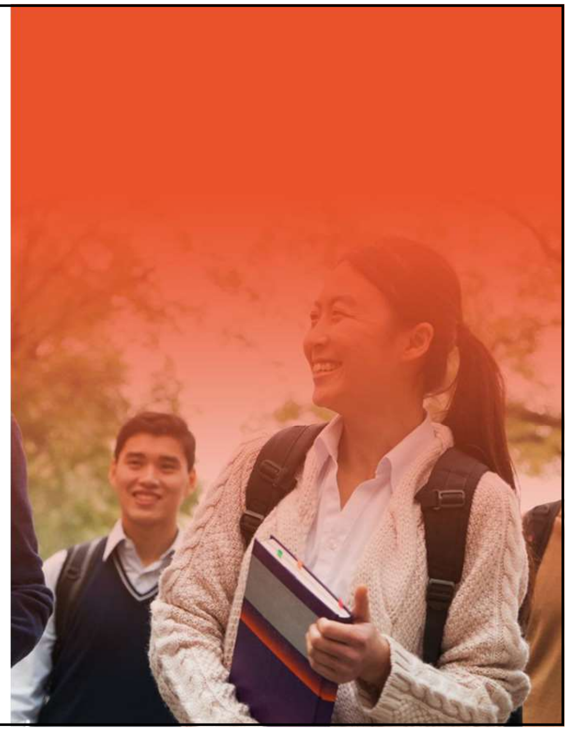


Step 2

Solution Processing

Solutions will be assessed against the following criteria

- **Climate Action:** The extent to which solutions address greenhouse gas emissions or contribute to climate resilience.
- **Co-benefits:** The extent to which solutions create additional benefits to society.
- **Innovation:** The extent to which solutions approach sustainability challenges in a ground-breaking way.
- **Governance:** The extent to which solutions are harmonized with urban sustainability strategies and communicate with citizens and stakeholders.
- **Sharing and Scaling:** The extent to which solutions are can be shared with or scaled to other cities.



Step 3

PUBLICATION CREATION

Step 3

Publication **Creation**

Having vetted and verified the climate solutions from across the region, Sustainia will create an engaging publication showcasing the very best examples of low-carbon development.

The final publication will include:

- A high level introduction
- A trend section analysing the most recent developments
- 100 solutions communicated simply
- A focus on how the solutions address the Sustainable Development Goals

SUSTAINIA

Get in touch

Jack Robinson
Editor and Project Manager, Sustainia
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SUSTAINIA

Wuppertal Institut

Low carbon urban transformation in the Ruhr region

Session: From dirt to smart, transforming cities through Low Carbon Development

Presentation:

Prof. Dr. Manfred Fischedick
Vice President
Wuppertal Institute

December 2018

Introductory remarks and background – GHG mitigation targets and why cities matter

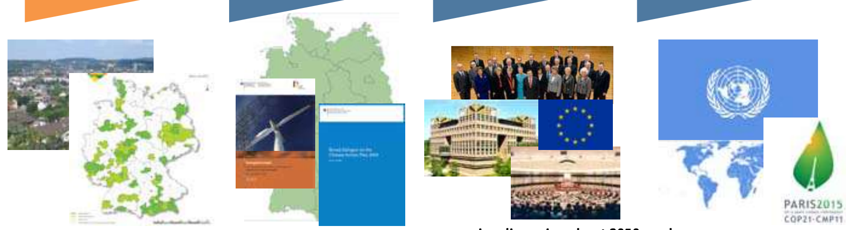
Fighting against climate change is a common challege

Local ad regional level as implementation oriented part of the multi-level policy (governance) system

The Multi-Level Approach – from framework setting to practical implementation

implementation | framework setting

local and regional level | national level | European Union level | supra-national level

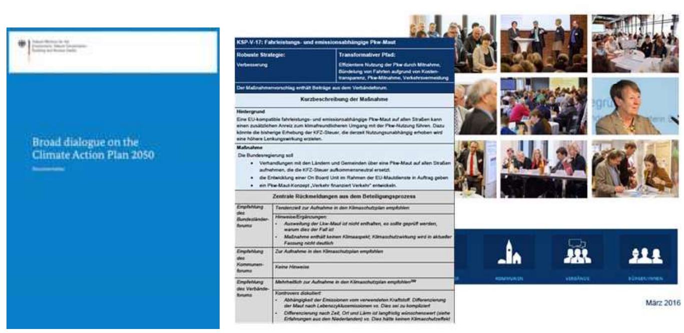


... ongoing discussion about 2050 roadmap

Central basis (framework) for the German climate related policy

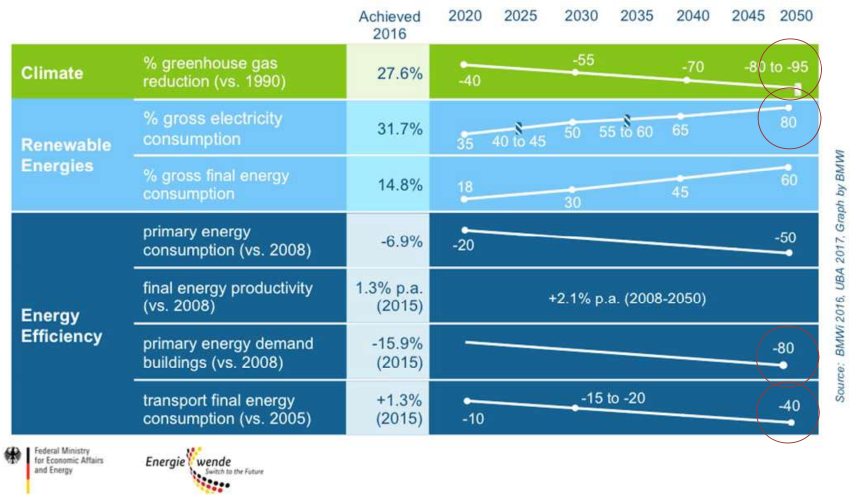
From energy concept (2010) and climate protection plan (2016) to intended climate protection law (2019)

German energy concept – launched in 2010 (adapted in 2011) formulates central energy and climate related targets



German Energy Concept basis for Energiewende targets

Central milestones and underlying sub-targets for German Energiewende



Why cities matter – relevant contribution to GHG mitigation has to come from sectors that are determined by the urban context

Sector specific GHG mitigation goals from the Climate Protection Plan

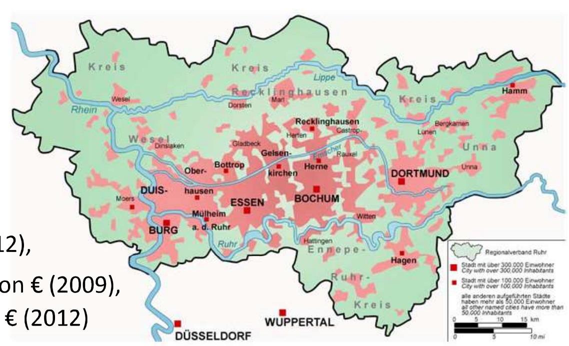
Area of action	1990 *(in million tonnes of CO_2 equivalent)*		2014 *(in million tonnes of CO_2 equivalent)*	2030 *(in million tonnes of CO_2 equivalent)*	2030 (reduction in % compared to 1990)
Energy sector	466		358	175 – 183	62 – 61 %
Buildings	209	-43%	119	70 – 72	67 – 66 %
Transport	163	-2%	160	95 – 98	42 – 40 %
Industry	283		181	140 – 143	51 – 49 %
Agriculture	88		72	58 – 61	34 – 31 %
Subtotal	1209		890	538 – 557	56 – 54 %
Other	39		12	5	87%
Total	**1248**	-27%	**902**	**543 – 562**	**56 – 55 %**

The Ruhr area – why particularly this region matters with regard to GHG mitigation

Ruhr area as the energy ad industry heart of Germany plays a major role for achievig GHG mitigation targets

Ruhr area – key figures

- The Ruhr Area is Germany’s largest urban metropolitan region, one of Europe’s largest industrial clusters



- Polycentric structure, covering 11 cities and 4 districts,
- Population of 5.2 mill.(2012),
- Regional GDP of €140 billion € (2009), labour force of 1.7 million € (2012)

Ruhr area as the energy and industry heart of Germany plays a major role for achievig GHG mitigation targets

Ruhr area – key challenges for the region

- Continuous decline of coal and steel production
- Loss of population, shrinking region
- De-industrialization and shrinking has continued for decades.

Structural change from industry to science, cultural and medical and logistic services

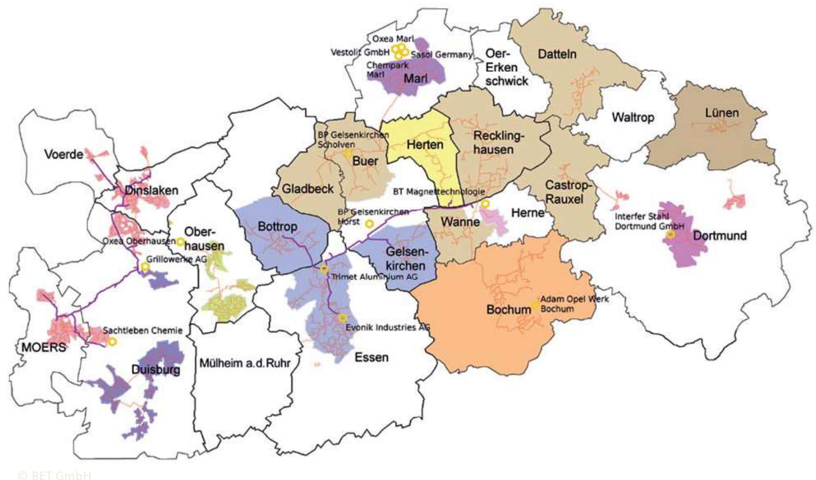
Ruhr area as the energy and industry heart of Germany plays a major role for achievig GHG mitigation targets

Ruhr area – selected key activities with regard to climate change

- Increase of energy efficiency (e.g. improvement of insulation of building stock)
- Transformation of electricity generation and construction of new CHP-power plants (expansion of district heating
- Increasing the share of renewable energies and system integration
- Implementation of new technologies (e.g. Storage technologies – PtX, smart grids
- Infrastructure planning (e.g. local climate protection plans, climate neutral city quarters, Innovation City Ruhr)
- Comprehensive R&D efforts

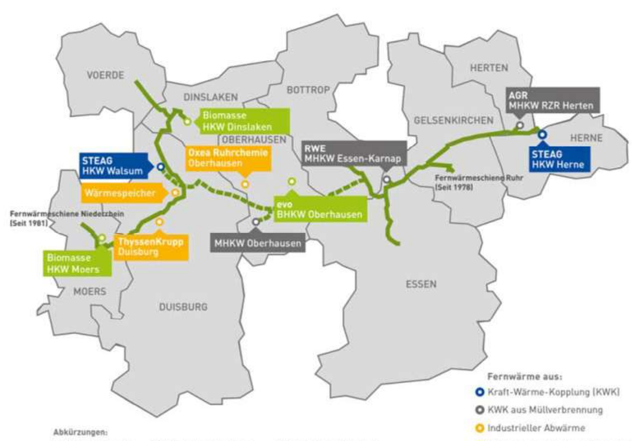
Ruhr area as the energy and industry heart of Germany plays a major role for achievig GHG mitigation targets

Ruhr area – broad areas with very well established district heating grid



Ruhr area as the energy and industry heart of Germany plays a major role for achievig GHG mitigation targets

Ruhr area – coupling of district heating grids as next step (incl. extension and diversification of heat sources)



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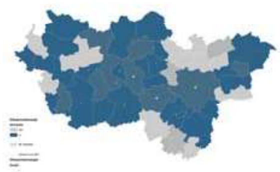
Ruhr area as the energy and industry heart of Germany plays a major role for achievig GHG mitigation targets

Ruhr area – selected key activities with regard to climate change

- Membership in the Covenant of Mayors

- Membership in Climate Alliance

- Climate Action Plans and sectoral concepts



- Implementation of Climate Action Managers

Local and regional strategies – important impulse function (driving forces) for bold national ambitions: cities as central place for implementation (illustrative examples from the Ruhr area)

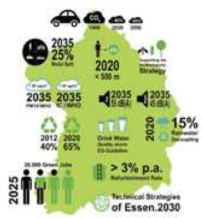
Cities and regions play a major role for the successful implemen-tation of global goals not at least in Ruhr area

Continuity matters – successful shaping of transformation

„The sky above the Ruhr Valley should becom blue again“

1961: Willy Brandt (former chancelor)

ESSEN Winner 2017 EUROPEAN GREEN CAPITAL

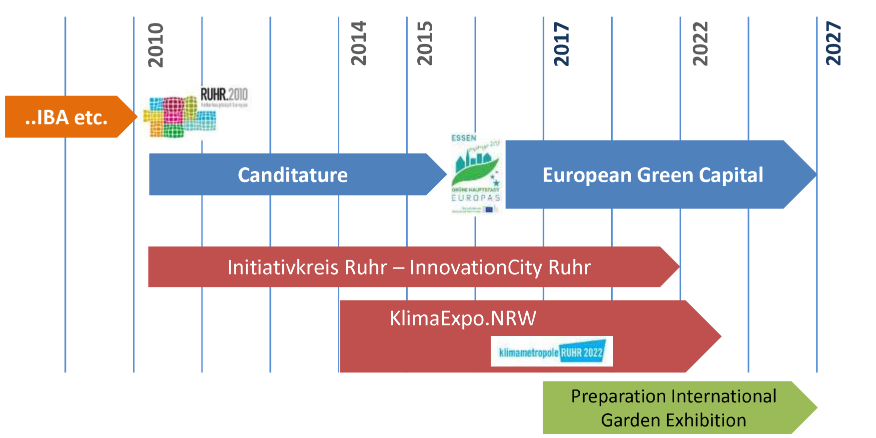


InnovationCity Ruhr Modellstadt Bottrop

„International Emscher Park Initiative " (1989 - 1999) renaturation of a heavily impacted region

Cities and regions play a major role for the successful implemen-tation of global goals not at least in Ruhr area

Continuity matters – regional projects of the current decade



Specific urban pioneers Innovation City Ruhr

Establishment of a real (urban) laboratory to realize ambitious GHG mitigation targets in the industry heart of Germany

Blue Sky

Green City

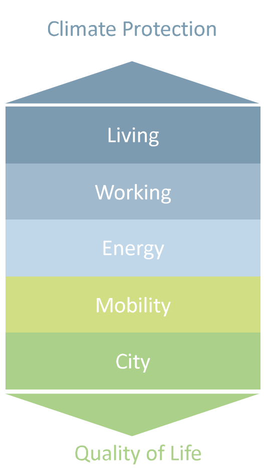
InnovationCity Ruhr Modellstadt Bottrop

Competition phase 1 Competition phase 2 Winning city

WE DO Climate Protection WWW.ICRUHR.DE

Specific urban pioneers Innovation City Ruhr

Innovation city addresses not only GHG mitigation as specific target but sets ambition in a broader context

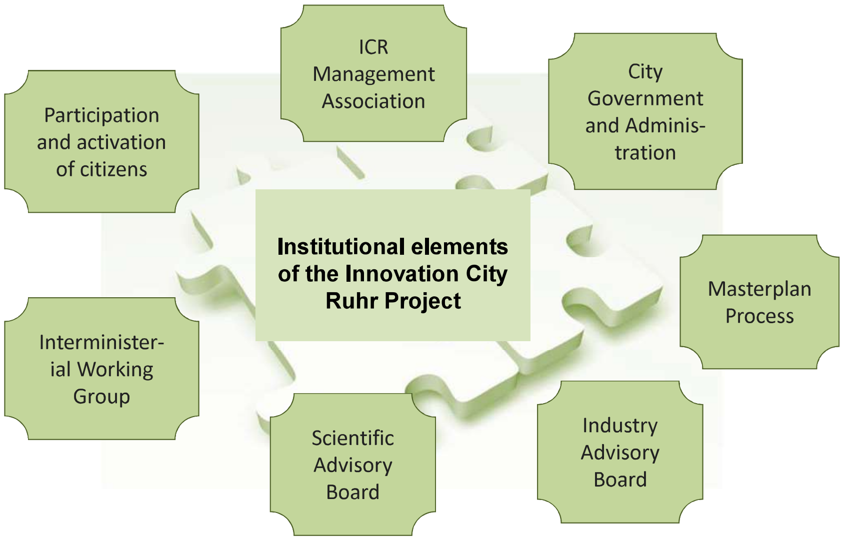


InnovationCity Ruhr Modellstadt Bottrop

Win–Win potential pursued:
Combining environmental goals with improved living standards and creation of regional economic impulses (new green jobs as substitute: last German coal mine will close 2018 in Bottrop – high symbolic meaning)

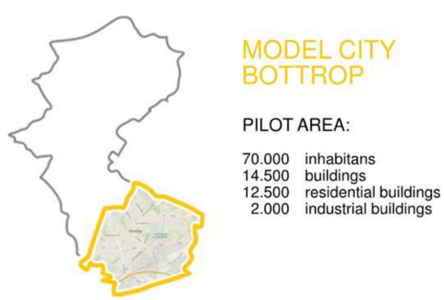
Specific urban pioneers Innovation City Ruhr

Smart urban governance (management) structures and masterplan as success factors for innovation and reduction of GHG emissions



Specific urban pioneers Innovation City Ruhr

Model City Bottrop follows a broad participatory approach (citizen involvement) and serves as real (urban) laboratory



Source: IC Ruhr

- **Already more than 300 projects realized**
  Fields of action: living, working, energy, mobility, city
- **Mobilization of citizen**
  Over 140 Events in Bottrop in 5 years:
  ¾ information + ¼ consultation events
- **Crucial role of scientific knowledge**
  Transformation process supported by scientific advisory council



Photos: Benjamin Best

Specific urban pioneers Innovation City Ruhr

More than 300 projects have been implemented

Retrofitting of Residential Areas

- PLUS-ENERGY-Model Houses:
- Detached House
- Apartment Building
- Commercial Building
- Social Housing
- Rheinbaben district
- Manual Consultation Process Rheinbaben
- Living at Ehrenpark
- Living at Trapez

Retrofitting of Companies

- Hochschule Ruhr West
- Low Energy Gas-Station
- Welding with Solar Power
- Industrial Estates Knippenburg/ Kruppwald
- Energy Supply Welheimer Mark
- Climate Neutral Retail Sale

Regenerative Energy

- CHP Pilot Project
- Application of 10 Mini-CHP
- Dual Demand Side Management
- Smart Grid
- Warmth on Wheels
- Mine Water Heat
- Use of Process Heat of the Coking Plant
- Masterplan Hydrogen

Electric Mobility

- E –Mobility in the context of energetic district retrofitting
- Electric Public Transport
- E-Vehicles
- E-Trucks
- Rental System
- City Compatible Truck Routing
- Car-Sharing
- Exchange of Charging Station at Main Station

Urban Development

- Masterplan InnovationCity Ruhr
- Integrated Urban Development Welheimer Mark
- Photovoltaics Noise Barrier at A 42 Highway
- LED-Street Lighting
- Rain Water Management at BEST Area
- Cultivation of Facade Surfaces

Selected success factors: Step by step motivation program

Retrofit rate could be tripled for more than 5 years now

27 Theme Evenings with 2.000 Participants
(Heating, Insulation, Solar, Financing, etc.)

InnovationCity Day with 500 Participants
(Information, Motivation)

Public Workshops in 5 Quarters
(> 300 Proposals)

8.995
House-by-House-Consultations =
89% of all Property Owners

1.300 Single Consultations =
13% of all Property Pwners

978 Buildings retrofitted =
7,82 % of all Residential Buildings

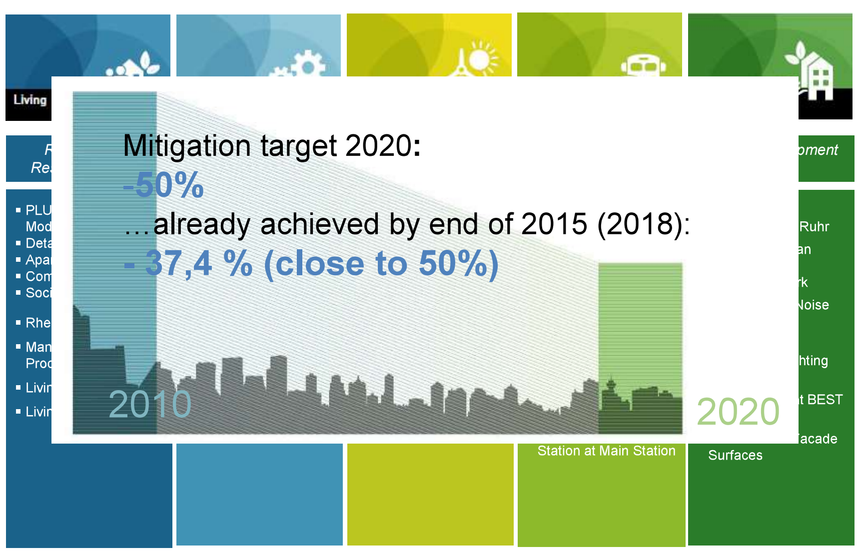
October 2011 to November 2013

Selected success factors: bottom up and top down driven participatory approach from the very beginning

Innovation City Bottrop started with 20.000 signatures by citizens in four weeks (ca. 1/3 of inhabitions of pilot area)

Specific urban pioneers Innovation City Ruhr

More than 300 projects have been implemented – a quite successful project



Specific urban pioneers Innovation City Ruhr

Masterplan process as systematic starting point for identification of options and relevant actors ad basis for successful role out

Albert Speer & Partner

Elaboration Phase
ca. 3 Months
Oct. – December 2012

Design Phase
ca. 6 Months
Jan.- July 2013

Innovation Phase
ca. 5 Months
July – Dec. 2013

Innovation Compendium
ca. 4 Months
Sep. 2013 – Feb. 2014

Target

InnovationCity Ruhr Manual

Blueprint for Urban Strategies

Roll out of a successful transformation pathway in more of 20 additional pilot districts across the whole Ruhr Area

Pilot City Bottrop

Roll out Region NRW (20 city quarters)

KfW 432 financed (3 city quarters)

Unterstützt durch:

Ministerium für Wirtschaft, Innovation, Digitalisierung und Energie des Landes Nordrhein-Westfalen

Translation of challenges into clear goals

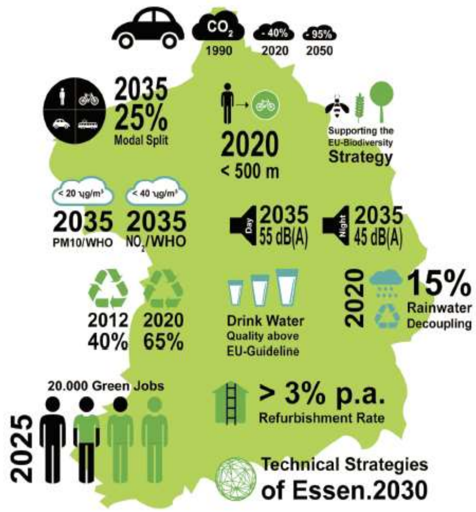
European Green Capital Essen

ESSEN

Winner 2017

EUROPEAN

GREEN CAPITAL



European Green Capital Essen – embedded in a long-term transformation process

Continuity matters

Reconstruction of the Emscher River

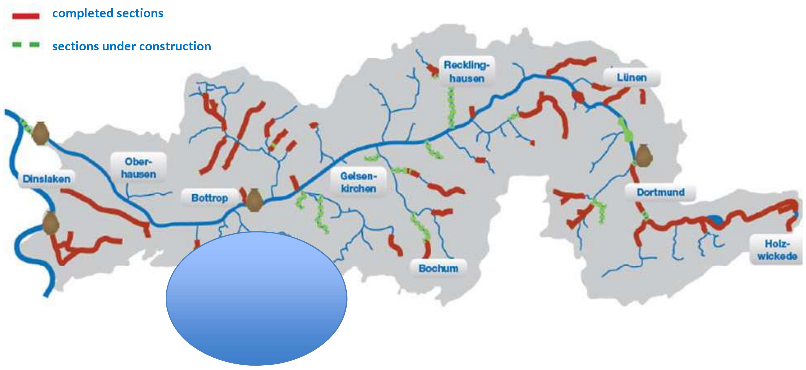
A 100-year long project in the Ruhr Area

Emscher has been one of the most poluted rivers in Europe

European Green Capital Essen – embedded in a long-term transformation process

Essen as part of the broader Emscher region

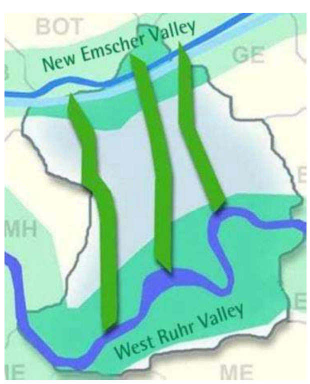
The Reconstruction of the Emscher River



European Green Capital Essen – embedded in a long-term transformation process

European Green Capital application as consequent follow up

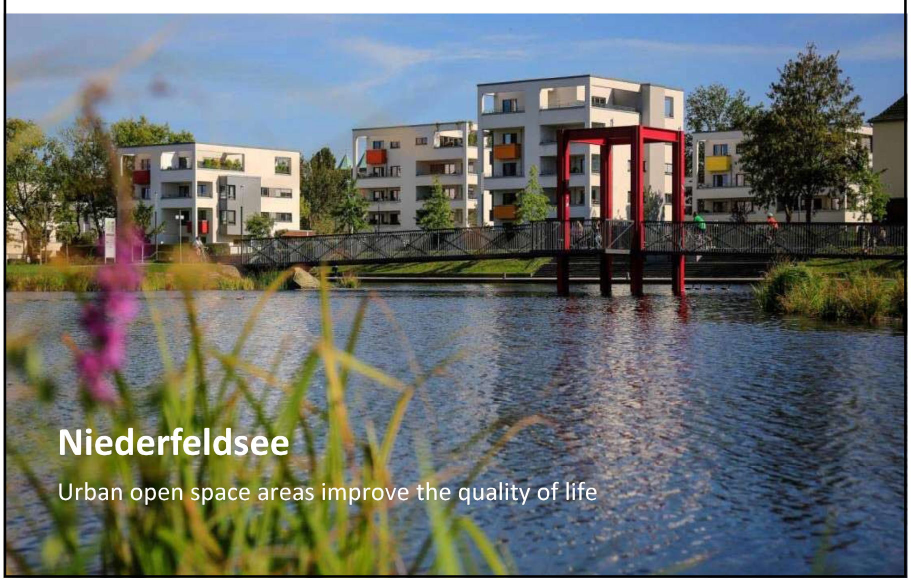
Programme “New ways to the water“



Urban open space areas improve the quality of life

European Green Capital Essen
Combining environmental driven projects with improving quality of life (comprehensive approach)

European Green Capital Essen
Combining environmental driven projects with improving quality of life (comprehensive approach)



European Green Capital Essen

Combining environmental driven projects with improving quality of life (comprehensive approach)

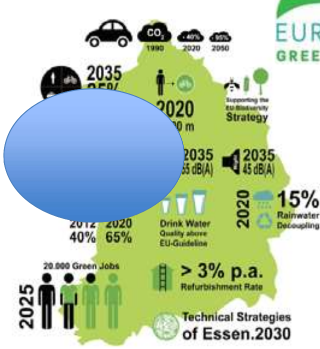
Bathing in the river Ruhr possible again

- Started in May 2017
- Official swimming-spot at Seaside Beach, Lake Baldeney
- Confirmation with european bathing water directive

European Green Capital Essen

An initiative to identify major weaknesses and start new activities – air quality ad congestion problems through former concentration on cars

ESSEN
Winner 2017
EUROPEAN
GREEN CAPITAL



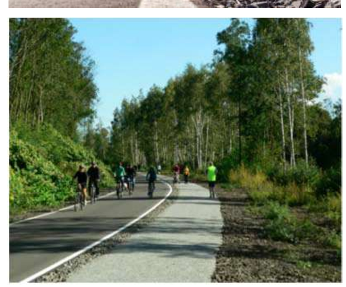
European Green Capital Essen – implementation of a new transport culture

RS 1 - Fast cross regional (along the whole Ruhr area) bicycle lane

RS1
DER SCHNELLSTE WEG
DURCHS REVIER

European Green Capital Essen – implementation of a new transport culture

RS1 Cycle-Highway - more than 100 km



European Green Capital Essen

Essen follwos good example of fromer EGCs - what modal shift is possible (comparison of EGCs targets)

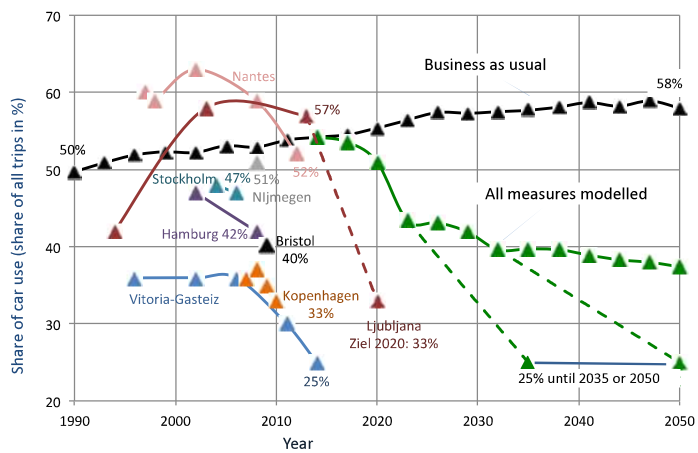


Figure: Wuppertal Institute; BAU and all measures scenarios: Spiekermann & Wegener 2016; data: EPOMM modal split tool; Application forms of the winners of the EU competition „European Green Capital“

EUROPEAN GREEN CAPITAL

- 2010 Stockholm (912,000 inh.)
- 2011 Hamburg (1.8 mn inh.)
- 2012 Vitoria-Gasteiz (242,000 inh.)
- 2013 Nantes (292,000 inh.)
- 2014 Copenhagen (580,000 inh.)
- 2015 Bristol (430,000 inh.)
- 2016 Ljubljana (278,000 inh.)
- 2017 Essen (581,000 inh.)
- 2018 Nijmegen (164,000 inh.)

European Green Capital Essen

Essen follwos good example of fromer EGCs - what modal shift is possible (good practice examples of former EGCs)

EUROPEAN GREEN CAPITAL

Bild 4

2010 Stockholm
912.000 inhabitants

Bild 1

- Urban congestion fee since 2006
- Introduced after a testing phase and a positive citizen referendum

2012 Vitoria-Gasteiz
242.000 inhabitants

Bild 2

- Transition to Spain's „cycling capital" within a few years (1% in 2002 → 13%-share in 2014)[1]
- Redistribution of road space
- Traffic calming
- „Imitate to Innovate"

2013 Nantes
292.000 inhabitants

Bild 3

- First city of France to reintroduce the city tram
- +22% PT-infrastructure (2000-2008)[2]

2014 Copenhagen
580.000 inhabitants

Bild 5

- 35% of the trips to work are done by bike (2010)[3]
- ‚Green wave' for cyclists for 20 km/h

2016 Ljubljana
278.000 inhabitants

Bild 6

- Ecological Zone: Extension of pedestrian area
- Redistribution of parts of a main road (Slovenska Straße)

.Pictures: Picture 1: Mats Halldin, Commonswiki, https://en.wikipedia.org/wiki/Congestion_pricing#/media/File:Betalstation_Liljeholmen.JPG, CC BY-SA 3.0; 2: Tom Payne (2015) auf This Big City, „Imitate to Innovate: Vitoria-Gasteiz Shows How Cities can Address 21st Century Challenges", http://thisbigcity.net/imitate-innovate-vitoria-gasteiz-shows-how-cities-address-21st-century-challenges/. 3: Kazunori Matsuo 2005, https://commons.wikimedia.org/wiki/File:Tramway_in_Nantes.jpg, 4: European Commission, http://ec.europa.eu/environment/europeangreencapital/index_en.htm, 5+6: Miriam Müller 2014/2015

European Green Capital Essen
Combining environmental driven projects with innovations for long-term needs (green fuel project)

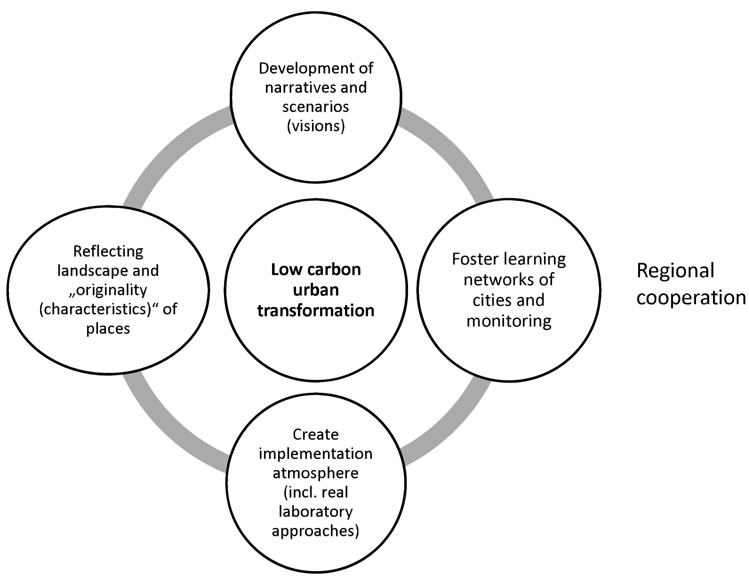
- Climate friendly touristic shipping travel on Baldeneysee
- Innovative fuel cell system in cooperation with innogy SE
- Fuel methanol is produced by water power on-site

European Green Capital Essen
Opening ceremony in the Gruga Park as starting point for massive citizen involvement

Conclusions

Conclusion

Shaping sustainable and resilient urban infrastructures – what does it require



Conclusion

Bundling regional forces helps to achieve ambitious goals (major regional player in the Ruhr area)

REGIONALVERBAND RUHR

METROPOLE RUHR BUSINESS

EMSCHER GENOSSENSCHAFT EGLV.DE LIPPE VERBAND

Initiativkreis Ruhr®

EnergieAgentur.NRW

e·on

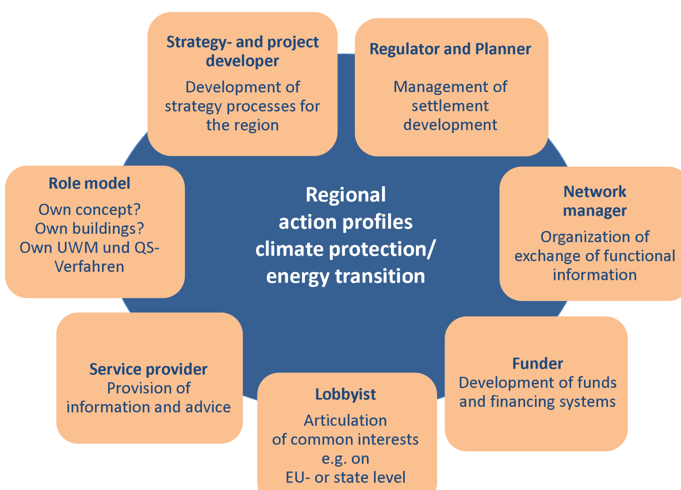
RWE

innogy

uniper

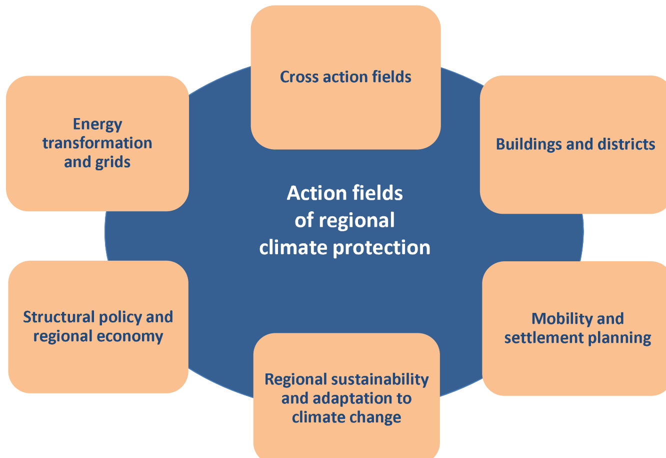
Conclusion

Bundling regional forces helps to achieve ambitious goals (regional action profiles)



Conclusion

Bundling regional forces helps to achieve ambitious goals (regional action fields and added value through cooperation)



…..one last word on transition dynamics

How long transition to a low carbon mobility system might take

Past experience makes hope – market deployment of alternative vehicles might go rather quickly under certain favourite conditions

The great horse manure crises 1894

New York 5th Avenue um 1900: Where is the car?

1913: Where is the horse?

Potential favourite conditions: shrinking cost of batteries, air quality obligations (e.g. NO_x) – integrative solutions necessary combining climate protection, air quality improvement and better quality of living in cities etc.

Wuppertal Institut

Thank you for your attention!

WORLD RESOURCES INSTITUTE

Will People First City Design Make Chinese Cities Thrive Again

Daizong Liu
Director of China Sustainable Cities Program,
World Resources Institute

05.12.2018 ADB, Beijing

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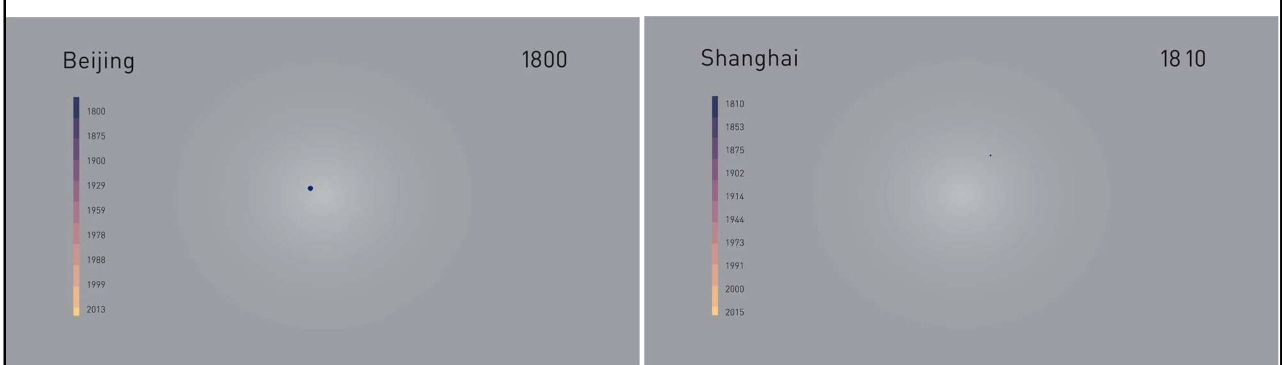
EMBARQ
TheCityFix

1 Challenges for Chinese Cities **Urban Sprawl**



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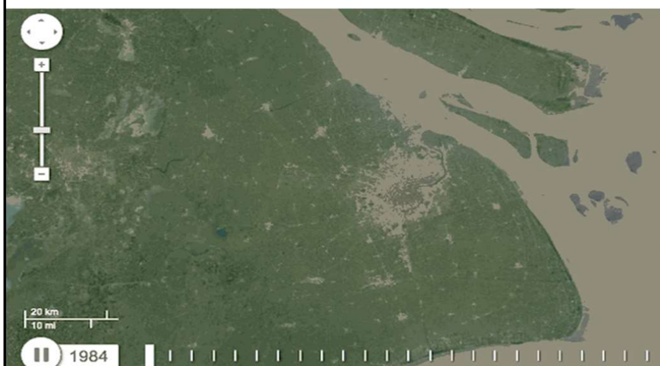
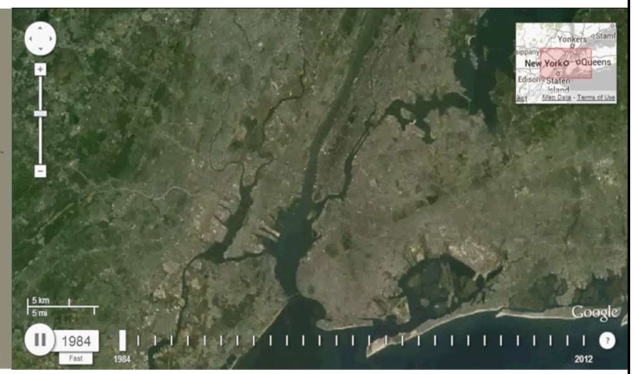
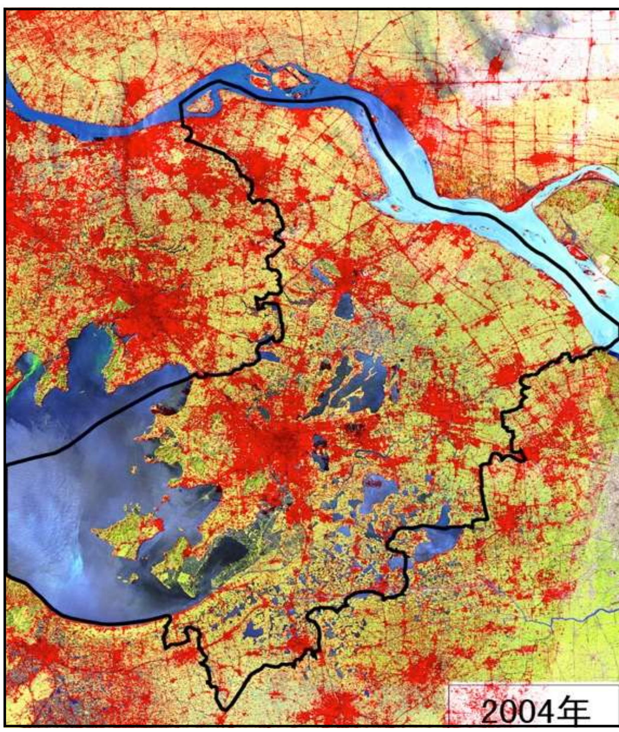
Challenges for Chinese Cities **Urban Sprawl**





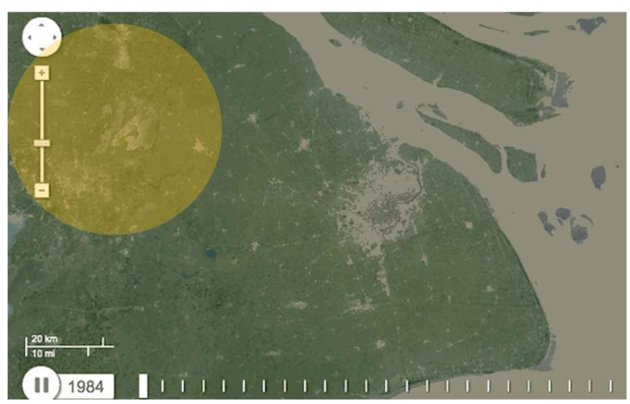
SHANGHAI

NEW YORK



What happened to Chinese Cities in last few decades?

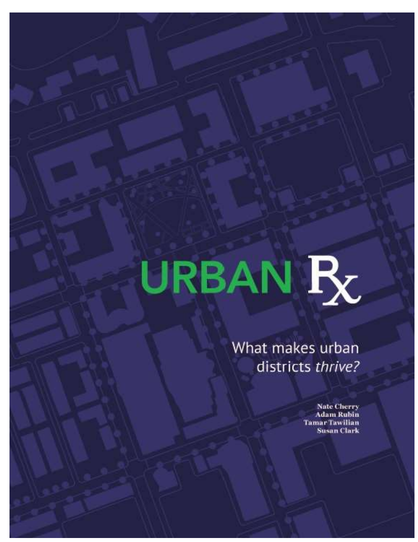
Suzhou Master Plans from 1986 – 2004




Suzhou
Before
After
Image © 2012 GeoEye
Image © 2012 GeoEye


Chengdu
Before
After
300 m
300 m
Image © 2012 GeoEye

1 What Makes Cities Thrive? Experience from US



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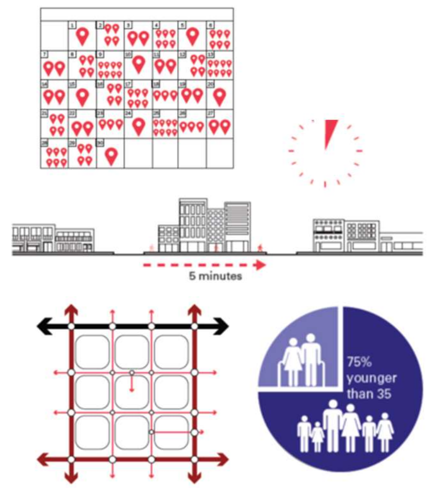
What Makes Cities Thrive? Experience from US

What make urban districts thrive

Twelve characteristics commonly found from 50 successful urban areas in U.S.

Principle 6: Multi-modes of Travel

Eighty percent of the districts studied provided four or more modes of movement. Multi-modes of travel are critical to improving mobility and accessibility. A rapid increase in bicycle usage is the most common recent trend.



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Multimodal Transport：Key to Thriving Cities

What makes urban districts thrive? Twelve Characteristics

1. Mixed-use environment and high floor area ratio

Where uses go from dedicated to stacked and / or horizontally and vertically integrated, the urban district boundary can be defined. The district needs to maintain a minimum gross density of 1 FAR to function effectively.

2. Support residents and local workers

Maintain a minimum density of 20k people per square mile, and support pedestrian activity of 1000 people passing minimum per peak hour within the core.

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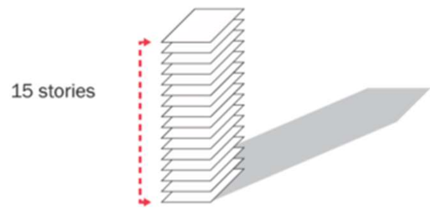
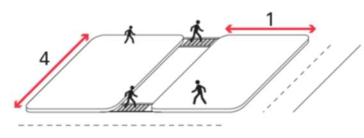
Multimodal Transport: Key to Thriving Cities

What makes urban districts thrive? Twelve Characteristics



3. Building heights within the district can vary, but should not exceed 15 stories

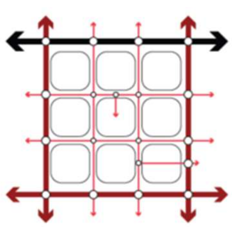
4. Blocks within the district must be of a walkable dimension;
Typically between 1-4 acres in size with a length to width ratio of no greater than 4:1.



Multimodal Transport: Key to Thriving Cities

What makes urban districts thrive? Twelve Characteristics

5. Districts should front arterial streets at their perimeter and be served internally by a network of collector streets, local streets, and alleys.



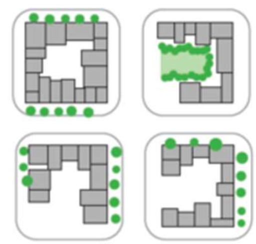
6. A minimum of 3 alternative modes to automobile access should be integrated, prioritized within all streets in the district (bike, pedestrian, bus, rail, etc.) "Complete Street" design guidelines should be followed.

Multimodal Transport: Key to Thriving Cities

What makes urban districts thrive? Twelve Characteristics

7. At least 4 land uses should be supported within the district, residential should be at least 25% of the overall mix, and roughly a 1/3 balance between office, retail, and residential is preferred.

8. Gross developable area within an urban district is roughly 50% maximum coverage of the available land. The tree canopy and general open space areas within the district need to remain at minimum 15% of the overall district area.



Multimodal Transport: Key to Thriving Cities

What makes urban districts thrive? Twelve Characteristics

9. The district must be defined by a walkable core of mixed use blocks that take at least 5 minutes to traverse, located roughly in the center of the district. This core should support a variety of day to day activities.

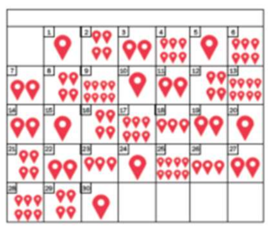
10. Quality of life amenities such as a major open space amenity (regional park, water body, trail) and educational facilities such as a major university or college should be located within walking or biking distance of the urban district。 These help to feed the diversity and exchange of ideas necessary to make an urban district function.

Multimodal Transport：Key to Thriving Cities

What makes urban districts thrive? Twelve Characteristics

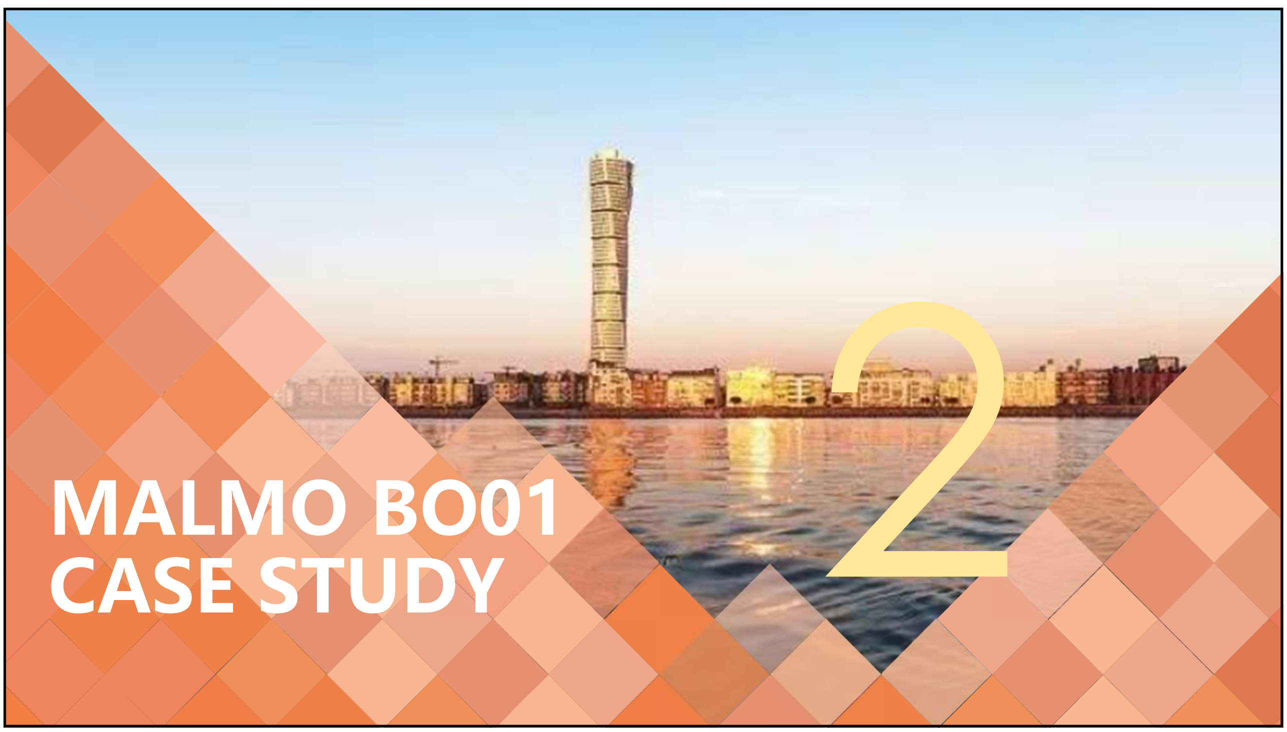
11. Attracting younger people is essential.

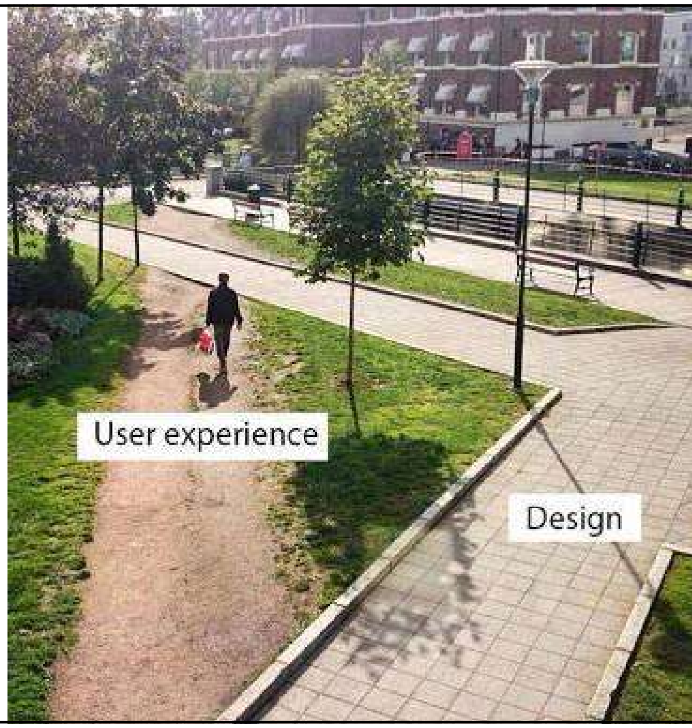
Although diversity in both class and ethnicity is important, attracting younger people is essential to making an urban district function. Over 75% of an urban districts constituency is generally younger than 35 years old.



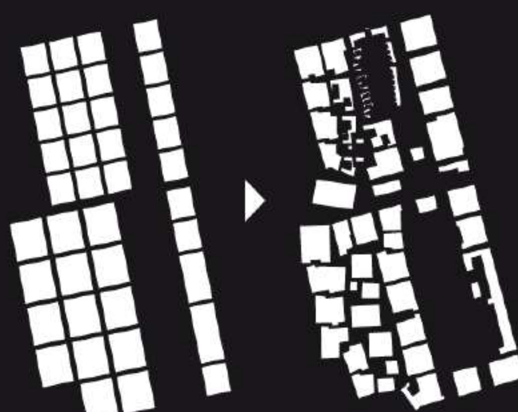
12. Social media and events drive buzz for a district.

As thresholds, 100 monthly check-ins per FAR and 100 events per year are minimum thresholds for success.



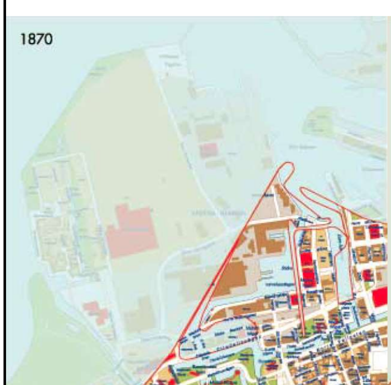


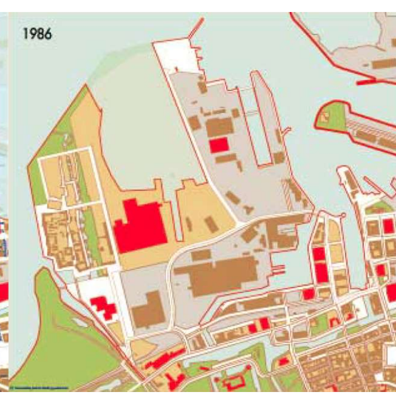
Malmo BO01



Modificeret grid Eks Bo01 i Malmø

Malmo BO01





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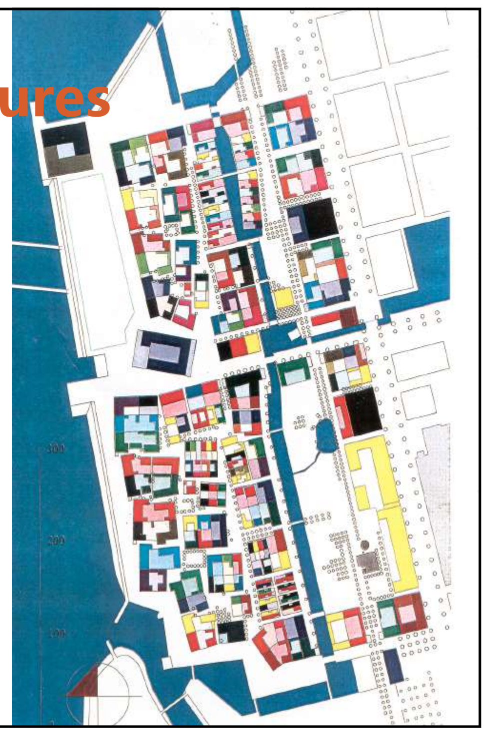
BO01Community Features

9 hectares, 600 apartments, 13 developers, starting from European Housing Expo in 2001. PPP modal among government, Expo Organizing Committee and developers

- ❑ Brownfield redevelopment
- ❑ Architecture and public space
- ❑ energy
- ❑ Garbage disposal
- ❑ Biodiversity
- ❑ Transport
- ❑ IT



100% Renewable Energy

- Sun, wind, water
- Heat pump
- Distributed energy balance
- Minimize management of energy demand

e.g. Wind energy of the community mainly produced by offshore wind power.

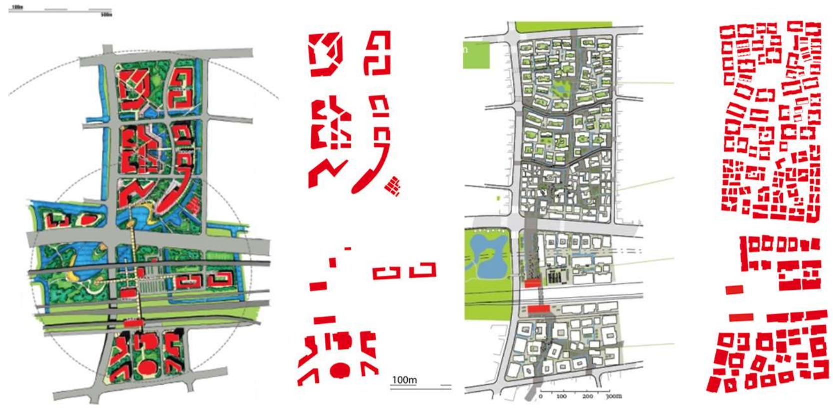

RESTAVFALL
RESTAVFALL
KOMPOST

Humanized Community

The humanized design of the neighborhood community can create a higher property value with the same floor area ratio but lower construction costs.

Application of BO01 in China-Kunshan

Fragmented plots help small developers participate in bidding and ensure full competition. And large developers can bid for multiple plots to guarantee the development amount.



Application of BO01 in China-Kunshan

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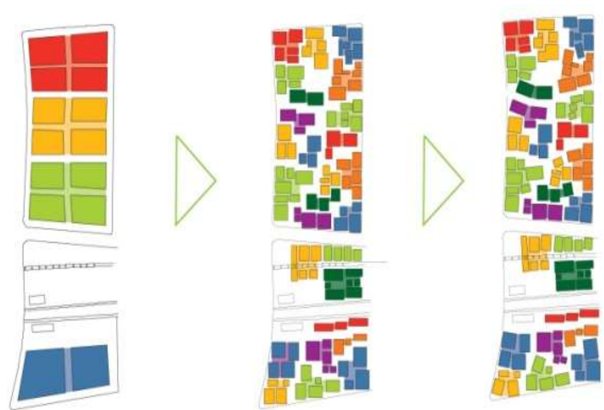

Thanks

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Yokohama's Unique Urban Development
and City to City Collaboration based on it

Toru Hashimoto
Executive Director on Development Cooperation,
City of Yokohama

Today's Topics

- ✓ ***Yokohama's Experience*** *in Urban development*

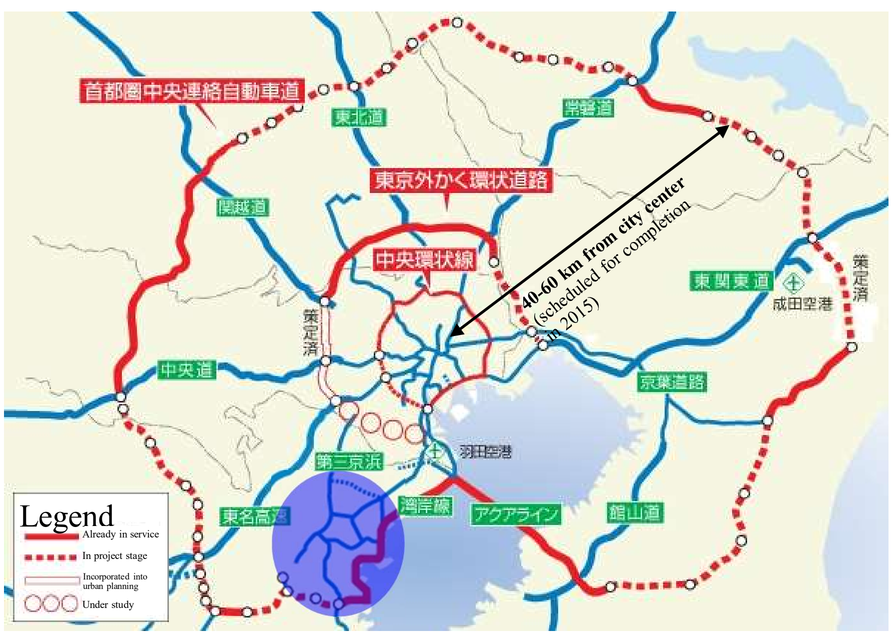
- ✓ ***Yokohama's City to City Collaboration***

City of Yokohama - outline -

Population	3,731,096
Area	435.29 km^2

(as of 1st January, 2017)

National Capital Region



City of Yokohama - Port opening in 1859 -

Yokohama has developed as Japan's gateway to the world, a door to new cultures and technologies.

A gateway to the western communities and beyond

1859

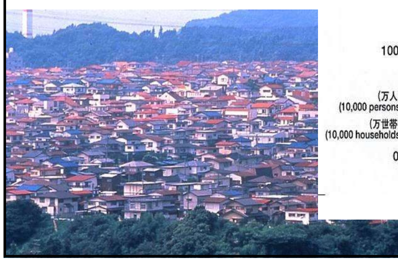
英国人技師
リチャード・ヘンリー・ブラントン氏

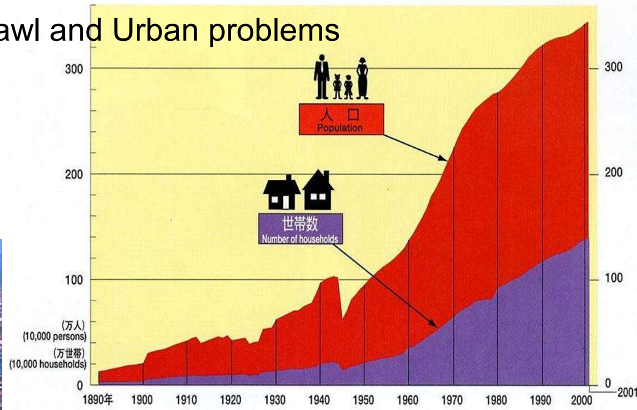
英国人技師　ヘンリー・スペンサー・パーマー氏

Emergence of urban problems caused by the rapid population growth

The population doubled in the 20-year period between 1960 and 1980 (from 1.37 million to 2.77 million)

Intensification of Sprawl and Urban problems





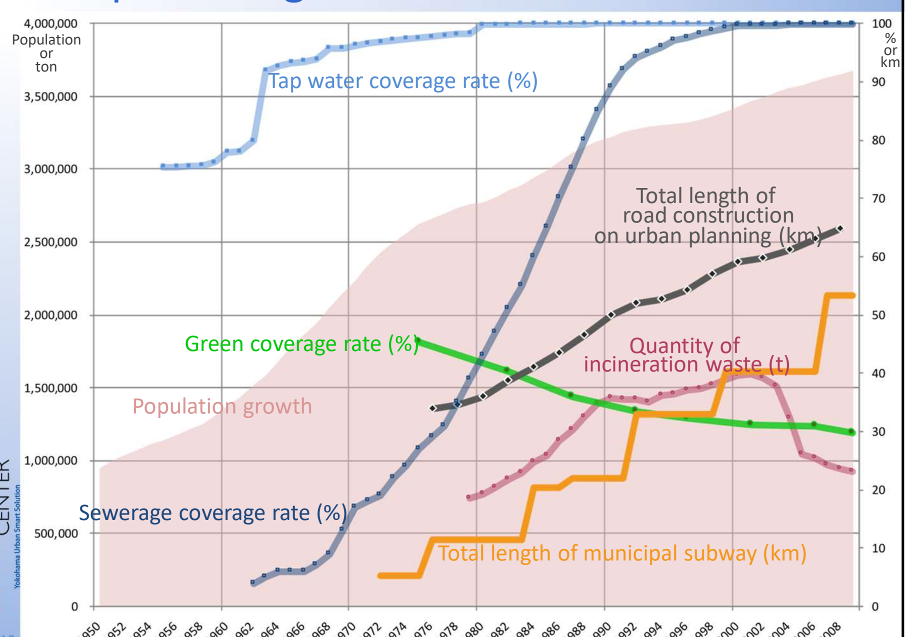
Urban Challenges: Rapid Urbanization and Pollution

Polluted airs and water, traffic jam・・

Urban Development in Yokohama City

Rapid population growth and urbanization caused…..

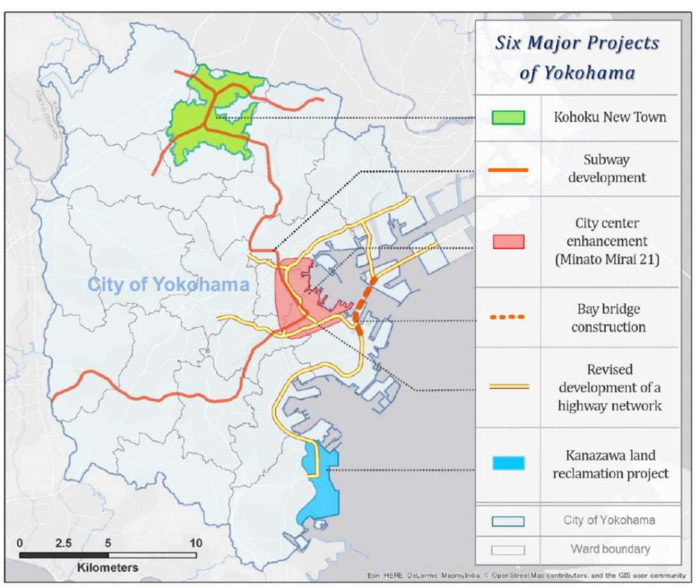
Population growth and infrastructure



Y-PORT CENTER
Yokohama Urban Smart Solution

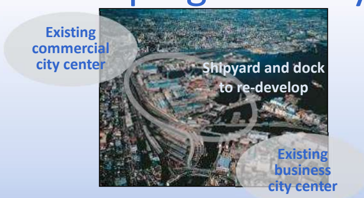
Urban Development in Yokohama City

Six Major City Wide Strategic Project



6 Major Projects in 1960s

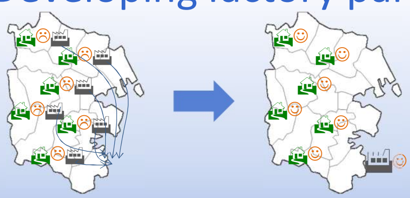
Developing new city center



- Combining two existing city centers
- Providing work places for citizens

1

Developing factory park



- Building factory park by land fill to relocate small or mid-size factories which were scattered in residential area
- Building public facilities such as fire stations and kindergarten in residential area after factories moved out

2

6 Major Projects in 1960s

Developing new residential district

- Preventing from disordered urban sprawl, ideal development with plenty of greenery
- Providing ideal housing complex for citizens connecting to the city center by subway

3

Developing municipal subway system

- Filling up public transportation service in the residential area without existing private train service, connecting to the city center
- Contributing to the "Within 15 minutes to the train station for everyone" policy
- Providing alternative transportation after closing streetcar service

4

6 Major Projects in 1960s

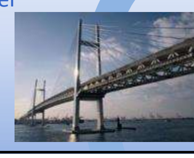
Developing express ways

- Easing serious traffic jam within the city center
- Better access to Tokyo
- Contributing to the “Within 30 minutes to the city center by car” policy

5

Building “Bay Bridge”

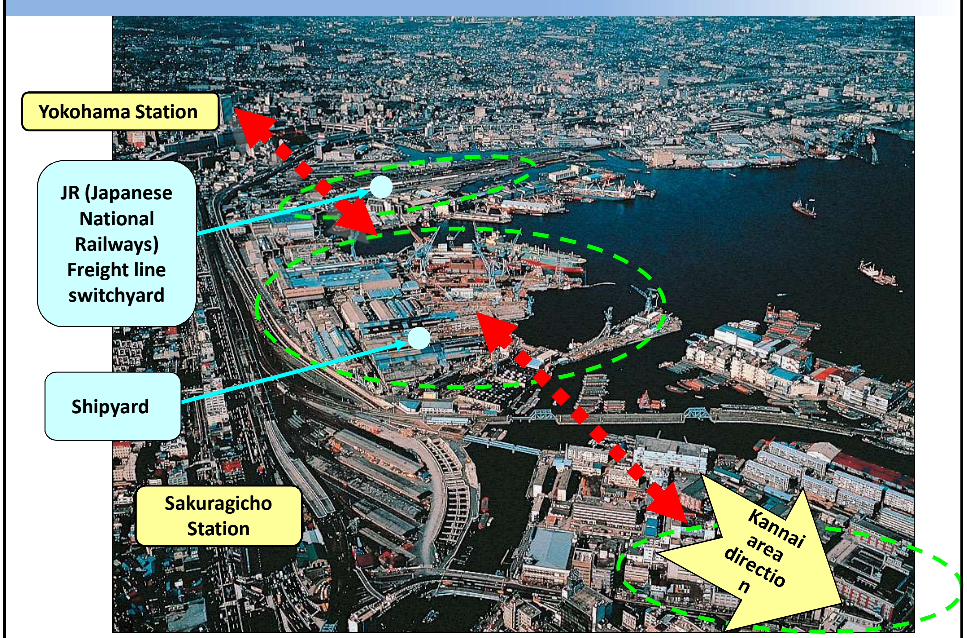
- Shifting distribution traffic such as heavy trucks and trailers from the city center to the port area
- Monumental icon for the waterfront city center



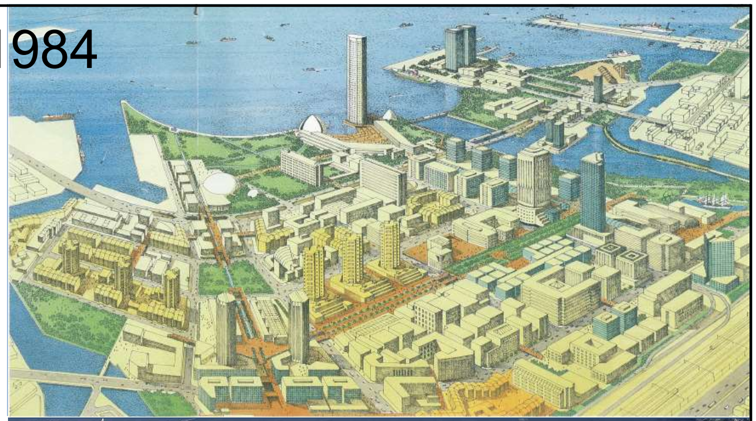
6

Y-PORT CENTER
Yokohama Urban Smart Solution

Minato Mirai 21 Area Before Start of Construction <1980>



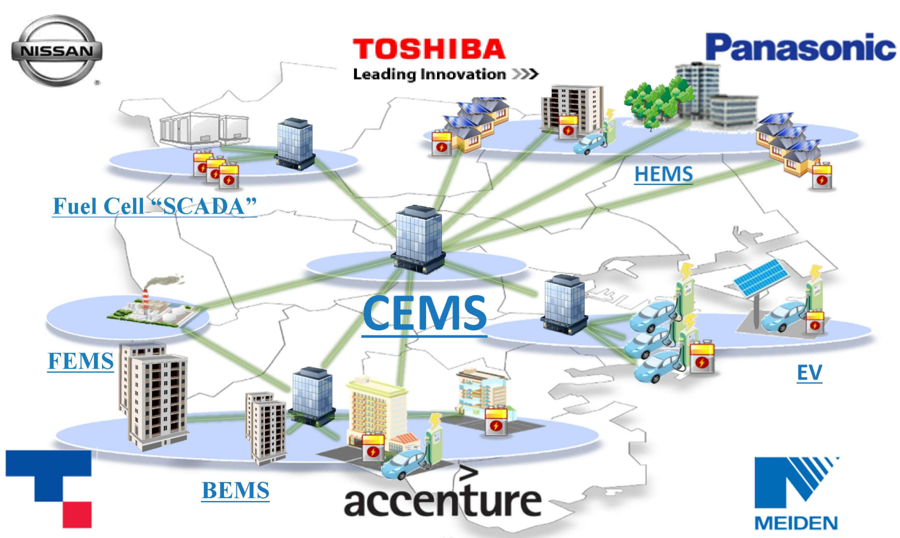
Plan in 1984



At Present

Yokohama Smart City Project

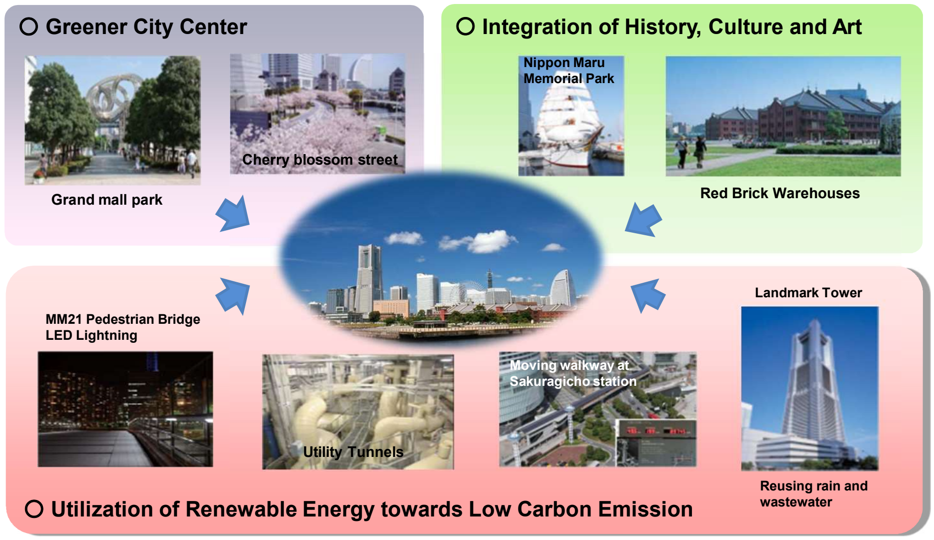
Making Yokohama the World Leading Smart City



Target by 2014: PV27MW, 4,000 HEMS, 2,000 Electric Vehicles

● Minato Mirai 21 District: Showcase of Yokohama's urban development

Urban Planning

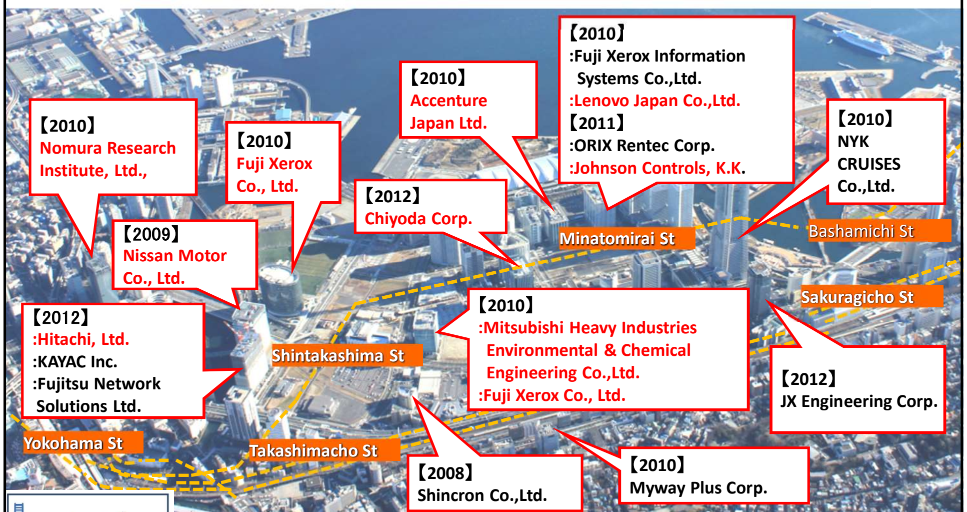


OPEN YOKOHAMA

Transformation of Urban Space

Last Two Decades

*Examples of the companies
which relocated to MINATOMIRAI21（2008～）



Enhanced Convention Facilities and Major International Events

Creative Cities and Cultural Interaction

YOKOHAMA OTOMATSURI 2013

YOKOHAMA TRIENNALE

DANCE DANCE DANCE YOKOHAMA 2012

External Recognition on Achievement by the City of Yokohama

LEE KUAN YEW WORLD CITY PRIZE

2014 SPECIAL MENTION: CITY OF YOKOHAMA

- The Lee Kuan Yew World City Prize is a biennial international award that honours outstanding achievements and contributions to the creation of liveable, vibrant and sustainable urban communities around the world.
- In 2014, Yokohama was selected for Special Mention, and will be awarded during the World Cities Summit in June.
- Yokohama was recognised for overcoming its urban challenges faced over the last 40 years through excellent partnership with its citizens and stakeholders. Also the Y-PORT programme was mentioned for its clever marriage of economic growth and international contribution by tying up with local businesses to export urban solutions to emerging cities.

URBAN REDEVELOPMENT AUTHORITY SINGAPORE

CENTRE for LiveableCities SINGAPORE

WORLD CITIES SUMMIT

Y-PORT

Yokohama's City to City Collaboration

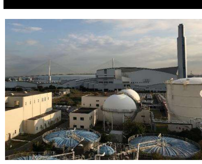
overview

Outline of Y-PORT program

Yokohama's Strength

Experiences in Urban Development

Technologies of Yokohama Based Companies



Y-PORT

Yokohama Partnership of Resources and Technologies

- ✓ Since 2011
- ✓ International Technical cooperation through PPP

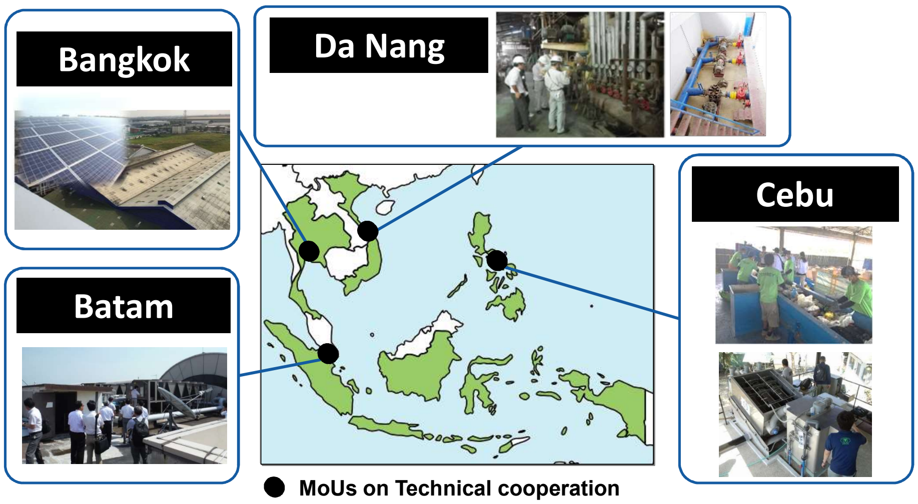
Objectives

International Contribution

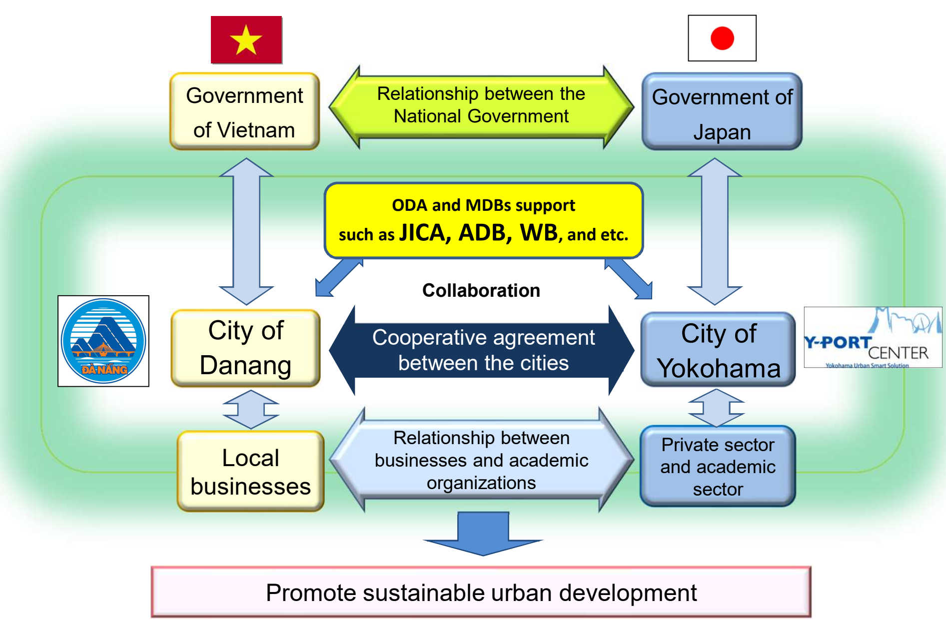
Expansion of Businesses of SMEs

Building a relationship between cities

More comprehensive Approach



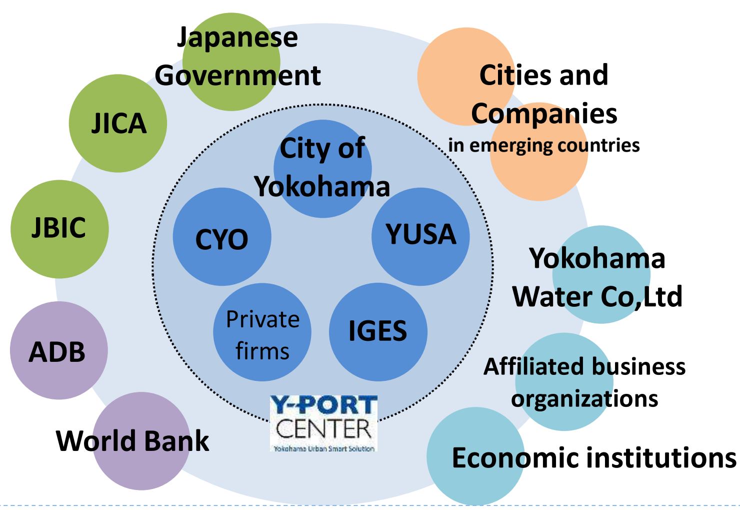
Framework of Cooperation between Da Nang and Yokohama



Creative Innovative Urban Solutions

29

Establishing a knowledge hub 《Y-PORT Center》



- providing best available urban solutions through dialogue
- gaining support from the government of Japan and donor agencies

30

Sharing know-hows for a Marketplace 《ASCC》

Asia Smart City Conference

7th Conference

【14-15 Nov. 2018】

- Asian cities
- International Organizations
- Japanese Government
- Private companies

A venue to create real projects through more practical discussions

Summary

- ✓ **Building a relationship between cities**
- ✓ **Identifying priority issues**
- ✓ **Working on projects step by step**

- ✓ **Establishing a knowledge hub (Y-PORT Center)**
- ✓ **Providing packaged technologies (YUSA)**
- ✓ **Sharing know-hows as a Marketplace (ASCC)**

Summary

1. Selective project-based approach is effective when resources are limited
2. Clear long-term vision with flexible approaches is critical to accomplish project-based development
3. Fostering an institutional framework to implement cross-sectoral coordination is a key element for holistic area-wide urban development
4. Presenting tangible short-term impacts is important for sustainable long-term urban development
5. Community-based movements and engaged stakeholders are essential factors in ongoing sustainable city development

Why Yokohama?

OPEN YOKOHAMA

- **Leadership and Full Collaboration by Stakeholders**:
  Direction from Mayor and People-centered approach
- **Continuous Social Innovation**:
  Human resources and institutional development is the key
- **Holistic Approach**:
  Livable, Sustainable, Vibrant, and Culturally Rich City Development
- **Yokohama is not Tokyo, London, Paris, Singapore nor New York**:
  Secondary and Edge City


Get the things done
©Hideo MORI
Thank you for your attention.

中亚区域经济合作计划--低碳城市发展国际论坛

Actively participate in global climate change mitigation

Pragmatically promote urban adaptation to climate change

——Action & innovation in transforming slums into culturally sensitive and climate-adapted communities in Changde, China

Lecturer: LI Yuan'guo
Location: Beijing
Dec. 4 2018

中国·常
Changde,
China

Keypoints

1 *Action overview*

2 *Detailed cases*

3 *Development Vision*

Prologue

中国·常德
Changde, China

各位行政长官、各位行业专家、女士们、先生们：

大家好！我来自桃花源里的城市——中国常德，非常荣幸应邀参加中亚区域经济合作计划--低碳城市发展国际论坛，并安排在会中发言。由衷感谢大会组委会长官们、专家们对常德市城市规划、建设、运营、维护、管理业绩的高度认可，并提供如此高规格的平台展示常德的形象。在此，我作为与会成员，谨代表常德市政府和人民表示诚挚的感谢！并以“积极参与减缓全球气候变化，示范务实推进城市适应气候变化——中国常德将贫民区改造成文化敏感和气候适应型社区的行动与创新”为题，与大家共同分享响应联合国人居署的号台，成功践行推进减缓、适应气候变化的喜悦。

中国・常德

Actively participate in global climate change mitigation

Pragmatically promote urban adaptation to climate change

——Action & innovation in transforming slums into culturally sensitive and climate-adapted communities in Changde, China

01

Action overview

Action overview

中国·常德
Changde,
China

Changde has a long history and is the sub-center city of Hunan Province and the central city of northwestern Hunan.

Changde is located on the southern edge of the northern subtropical zone and on the migration route of East Asia and Australia. The climate is warm, the four seasons are distinct, There are risks of meteorological disasters such as heavy rain, thunderstorms, squally winds, haze, dust.

Changde has a city area of 18,200 square kilometers and a population of 6.23 million. The built-up area of the central city area is over 90 square kilometers and the population is 900,000.

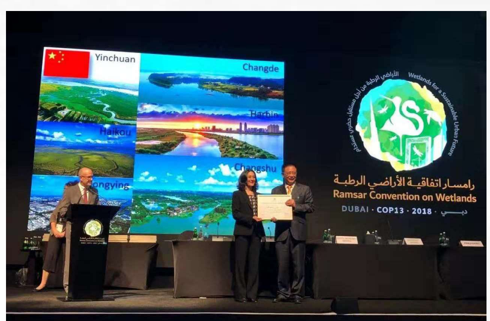
A. Location of Hunan in China　　B. Location of Changde in Hunan　　C. Map of Changde

Maps of Changde

Action Overview

中国·常德
Changde,
China

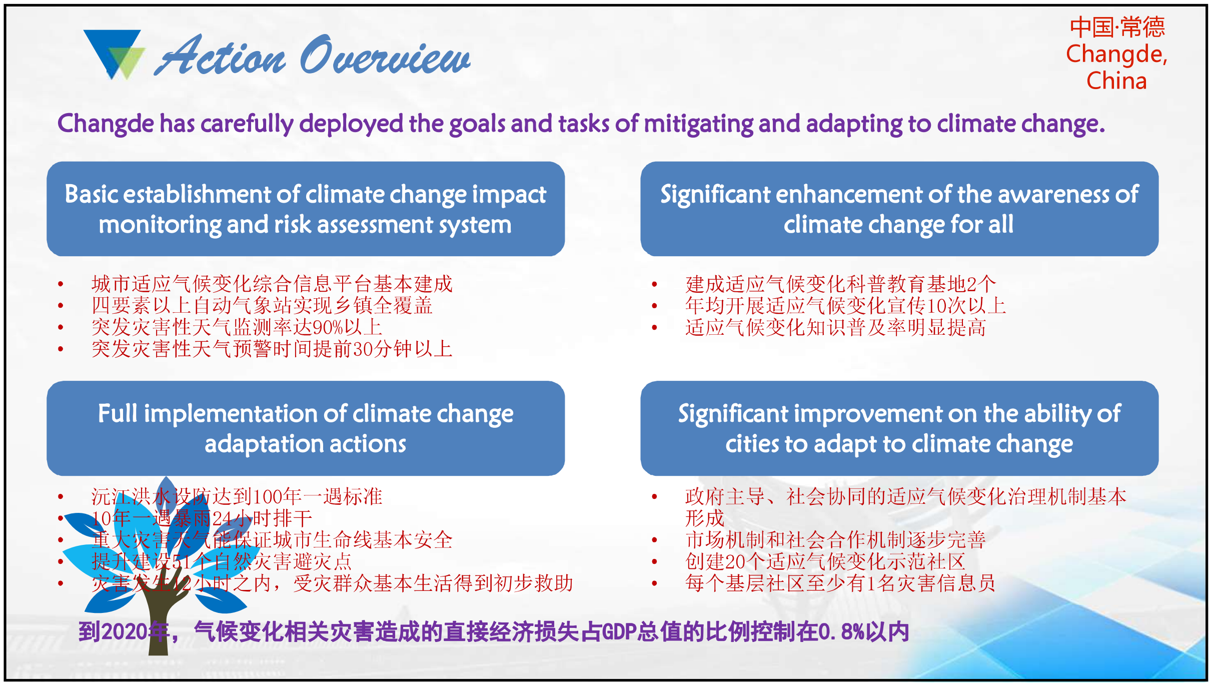
Changde is one of the first 16 pilot cities in China to build sponge cities. It is one of the first 28 pilot cities for climate-adapted cities in China and one of the first 18 international wetland cities in the world.



Ramsar Convention of Wetlands

The starting meeting of first pilots of sponge city construction in China was held in Changde

The starting meeting of first pilots for the construction of climate-adapted cities in China was held in Changde

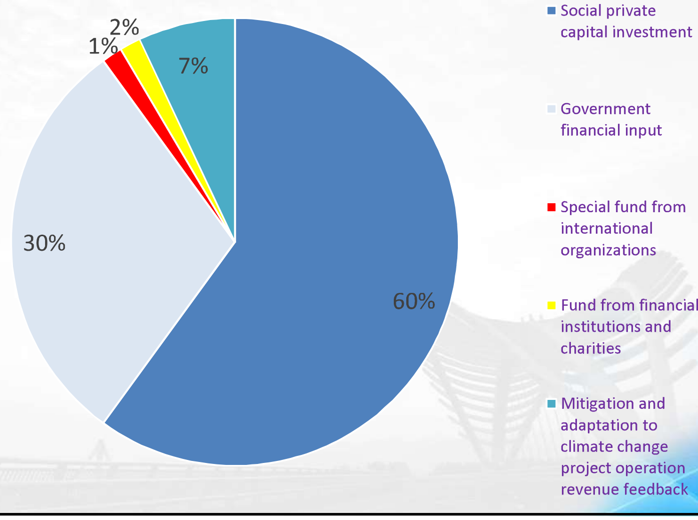

中国·常德
Changde,
China
Action Overview
Changde has carefully deployed the goals and tasks of mitigating and adapting to climate change.
Basic establishment of climate change impact monitoring and risk assessment system
• 城市适应气候变化综合信息平台基本建成
• 四要素以上自动气象站实现乡镇全覆盖
• 突发灾害性天气监测率达90%以上
• 突发灾害性天气预警时间提前30分钟以上
Significant enhancement of the awareness of climate change for all
• 建成适应气候变化科普教育基地2个
• 年均开展适应气候变化宣传10次以上
• 适应气候变化知识普及率明显提高
Full implementation of climate change adaptation actions
• 沅江洪水设防达到100年一遇标准
• 10年一遇暴雨24小时排干
• 重大灾害天气能保证城市生命线基本安全
• 提升建设51个自然灾害避灾点
• 灾害发生12小时之内，受灾群众基本生活得到初步救助
Significant improvement on the ability of cities to adapt to climate change
• 政府主导、社会协同的适应气候变化治理机制基本形成
• 市场机制和社会合作机制逐步完善
• 创建20个适应气候变化示范社区
• 每个基层社区至少有1名灾害信息员
到2020年，气候变化相关灾害造成的直接经济损失占GDP总值的比例控制在0.8%以内


中国·常德
Changde,
China
Action Overview
Changde has planned and launched a series of projects to mitigate and adapt to climate. include:
1 体制机制适应工程
2 法律规范适应工程
3 人口素质适应工程
4 文化传承适应工程
5 资源能源适应工程
6 生态环境适应工程
7 基础设施适应工程
8 房屋建筑适应工程
9 城市交通适应工程
10 产业结构适应工程

中国·常德
Changde,
China

Action Overview

常德，已为减缓和适应气候变化工程实施设计资金保障渠道。包括：



中国·常德
Changde,
China

Action Overview

Changde has extensive international cooperation in mitigating and adapting to climate change with ASEAN,EU, EU water platform, Germany.

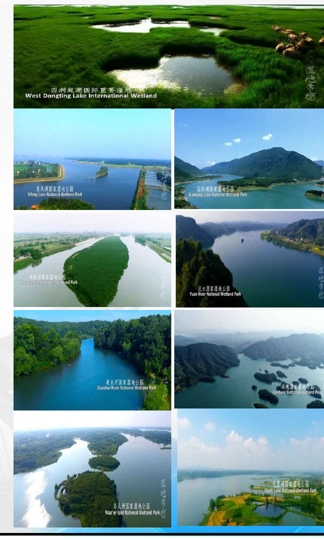
Action Overview

中国·常德
Changde, China

Changde has made siginificant progress in "water, energy, land and material saving", reducing carbon emissions, protecting wetlands, developing and utilizing new energy, and effectively responding to floods, thunderstorms, freezing, high temperatures, droughts, squalls, haze, etc. and eliminating of black and odorous water bodies.

已经并将持续影响城市生命线系统运行、人居环境质量、居民生命财产安全和生态安全，影响城市规划、建设和经济、社会的可持续发展。

气候变化对城市的影响日趋凸显



中国 · 常德

Actively participate in global climate change mitigation

Pragmatically promote urban adaptation to climate change

——Action & innovation in transforming slums into culturally sensitive and climate-adapted communities in Changde, China

02

Detailed cases

Detailed Cases

(Adapting to climate change - building a sponge city)

中国·常德
Changde, China

常德，曾因工业化、城镇化速度加快，也带来了“城市病”。常德的水文条件具有峰高量大，水旱夹击的特点，雨水调蓄渗滞能力减弱、水体污染严重、内涝灾害频发并有热岛效应等问题，成为常德的“城市之殇”，城市居民的“心头之患”，为常德的经济社会发展带来了新的挑战。

2013 年常德城曾多处“看海”

Black and odorous water bodies 建设前的护城河

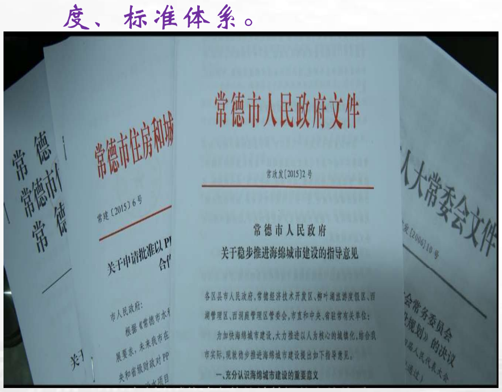
Detailed Cases

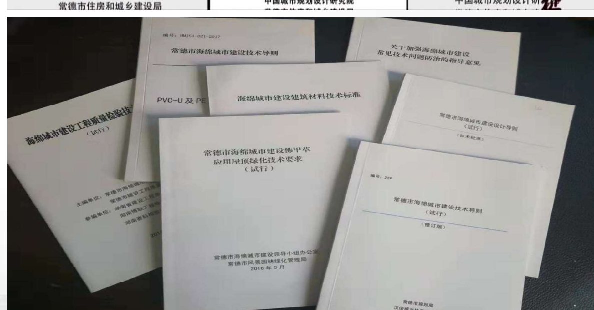
(Adapting to climate change - building a sponge city)

中国·常德
Changde, China

(1) Adhere to leading by planning

常德，海绵城市建设坚持规划引领，出台执行了一套系统的地方法规、政策、制度、标准体系。





Detailed Cases

（Adapting to climate change - building a sponge city ）

(2) Adhere to people's livelihood first

坚持民生优先，项目建设践行“海绵+”，减免了内涝灾害，洁净了水环境，解决了路不平、水不通、灯不亮、景不美、停车难、消防通道不畅等民生问题。

Successful cases of sponge-type courtyard renovation in residential areas

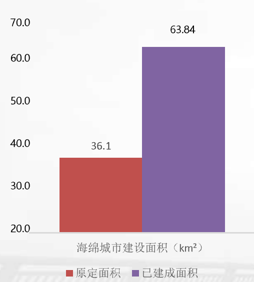
中国·常德
Changde,
China

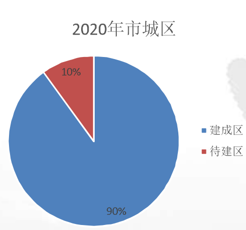
Detailed Cases

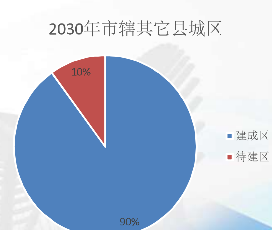
（Adapting to climate change - building a sponge city ）

(3) Adhere to full coverage

坚持全面覆盖，不仅试点区全面建设海绵工程，而且非试点区和各区县市也在逐步推行建设海绵工程，市中心城区海绵城市建设达标面积已有63.84平方公里。





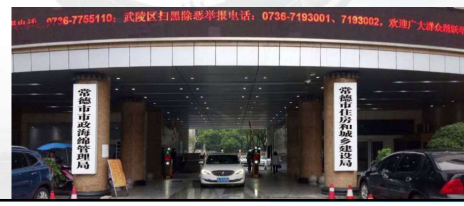


Detailed Cases

中国·常德
Changde, China

（4） Adhere to coordination and linkage

坚持协调联动，市成立了海绵城市建设领导小组，确立市海绵办为协调机构，市市政海绵管理局为常设行政主管部门，其他行政主管部门明确职责分工，有效保障了工作效率和决策效力。



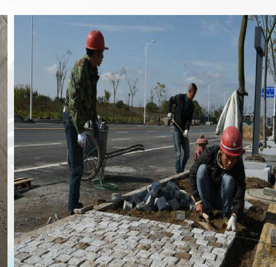
Detailed Cases

中国·常德
Changde, China

（Adapting to climate change - building a sponge city）

（5） Adhere to persistence

坚持延续深化，早在2004年，常德就与德国汉诺威政府、德国汉诺威水协、荷兰乌得勒支政府、湖南建设厅合作向欧盟申请并实施了城市河流污染治理环境对话项目；近几年又积极借鉴美国、新加坡的先进治水理念，广泛构建LID雨水管控系统和中水、雨水处理利用系统；2013年，常德还大力推进了以路改、水改、棚改、绿化、美化、亮化、数字化为主要内容的城市建设“三改四化”。这些工作都为常德建设海绵城市打下了坚实基础。同时，海绵城市建设也对这些已有成果的巩固和深化起到了有力的促进提升作用。



Detailed Cases

中国·常德
Changde, China

(Adapting to climate change - building a sponge city)

常德，为实现源头消减雨水径流量和污染物，系统谋划和统筹建设7类工程148个项目。在项目建设中甘愿把政绩埋在地下，建设面积不留盲区，建设目标不离需求，建设成果不吃老本，建设项目量大质优。截至2018年10月，建成项目137个，在建项目11个，完工率达92.6%，开工率100%；计划投资78.15亿元，其中中央投资12亿元，地方政府配套投资48.38亿元，吸纳社会投资17.77亿元，实际完成投资79.66亿元，投资完成率达101.9%。

Detailed Cases

中国·常德
Changde, China

(Adapting to climate change - building a sponge city)

1. Significant improvement in water environment

大力开展黑臭水体专项治理行动，通过控源截污、内源治理、生态修复等技术措施，完成了335公里污水输送管网的新建改造和7座污水提升泵站、1座污水处理厂的新建与扩建，启动了市污水净化中心的改造，护城河、穿紫河、新河渠、柳叶湖、阳明湖等水系综合治理全面完成，市城区主要黑臭水体基本消除，城内各水体水质达到地表水标准IV类超优。2016年10月17日，穿紫河、白马湖、丁玲公园、柳叶湖开通了水上巴士。

Detailed Cases

（Adapting to climate change - building a sponge city ）

中国·常德
Changde,
China

2.Dramatic increase in water environment

综合考虑本地水文、地质、现场环境、社会影响等因素，通过加强源头控制、恢复和拓展城市水系空间、完善市政排水系统、加强内涝点排查整治等措施，将海绵城市建设项目按照相同流域及汇水分区进行整合，在试点区域划分出了17个排水分区，先后完成了部分防洪大堤、重点闸的项目建设，累计完成419公里雨水排放管网和20座雨水泵站的新建与改造，极大提高了对雨水径流的渗透、调蓄和排放能力，市城区防洪排涝能力大大增强。积极采用雨污分流的处理方式，利用CCTV检测管网建立管网模型和管网数据库，在管网终端对初期雨水和非降雨期不明来水进行有效处理，稳步推进海绵型院落

建设和老城区雨污分流管网改造，有效解决了管网堵塞、破裂、渗漏等问题。特别是经受住了2016年7月上旬和2017年7月上旬两轮强降雨的严峻考验，在每次24小时累计降雨都大于177.8毫米的情况下，市城区没有出现大面积积水，没有人员伤亡，没有造成经济
损失。

Detailed Cases

（Adapting to climate change - building a sponge city ）

中国·常德
Changde,
China

3. Continuous optimization of water ecology

通过启动花山生态湿地和内河水系驳岸景观绿地建设，完成了相关重点河湖周边生态驳岸的重建与修复，新建改造了一批城市公园，自然生态岸线全面重塑，动植物多样性生存环境得到有效保护，形成了更加良性的水文生态。经过提质改造后公园和内河内湖沿岸，植物生长茂盛，鲜花四季盛开，成为了城区一道道靓丽的自然风景线。

Detailed Cases

（Adapting to climate change - building a sponge city）

中国·常德
Changde,
China

4. Steady progress of water research

已相继进行余下课题研究：1.海绵城市建设水质保护及修复水生植被群落构建技术研究。

2.人工湿地垂直流生态池构建优化技术研究。

3.黑臭水体修复及富营养化应急微生态制剂研发技术。

4.围绕海绵城市几十年“渗、滞、蓄、净、用、排”理念研究相关应用产品。

Detailed Cases

（Adapting to climate change - building a sponge city）

中国·常德
Changde,
China

5. Orderly development of aquaculture

海绵城市建设带来了人才培训、规划与设计、智慧平台的开发与建设、雨水系统构件制造、水生动植物繁育与供给、海绵城市新技术新材料的研发制造及运行维护等诸多产业发展机会。市委市政府借此良机，新建云计算中心，城市防涝排水、城市污水处理和海绵城市项目建设绩效数字化管理平台，成立海绵公司、中翰水务公司等专业海绵公司，积极与华东师范大学、中南大学等7所院校联合组建常德海绵城市工程技术研究中心、海绵城市生物与湿地研究院，目前已拥有国家专利10多项，不仅催生了一批新型技术和材料企业，还带动了一批传统企业的转型升级。同时，注重在海绵城市建设中融入大量旅游元素，赋予其城市景观、生态廊道、旅游休闲等新功能，凸显生态、休闲、健康、美丽、文化五大元素，先后打造了常德诗墙、常德画壁、华侨城欢乐水世界、柳叶湖环湖景观带、穿紫河水上风光带、沙滩公园、武陵阁步行城、德国风情街、常德河街、老西门历史文化街等一批城市名片，取得了丰富的旅游收益，将海绵城市建设成果转化为了实实在在的“美丽经济”。随着海绵城市建设的深入实施，产业链条越拉越长，土地不断升值，产生了“虹吸效应”，先后吸引了保利、恒大、万达、碧桂园、华侨城、友阿、绿地、同元、景域、禾田居等战略投资者的强势进驻，也进一步繁荣了旅游、商贸、体育、房地产等相关产业发展。

Detailed Cases

(Adapting to climate change - building a sponge city)

中国·常德
Changde, China

6. Widespread in water culture

通过修复重建老常德时期的麻阳街、大小河街、老西门、窨子屋、白鹤山古镇等历史记忆，挖掘整合常德丝弦、花鼓戏两项非物质文化遗产，新建德国风情街、婚庆产业园、金银街等特色商业街，使老常德的内河码头文化、商业文明得到传承。特别是窨子屋，作为老常德典型的民居建筑形式，汇聚了传统的海绵城市建设理念。重建后的窨子屋，融入了更多传统和现代的海绵元素，承载起了城市建设传统与现代的对话交流。

Detailed Cases

(Adapting to climate change - building a sponge city)

中国·常德
Changde, China

7. Water management is becoming more intelligent

通过建成污水处理、给排水、海绵城市项目建管绩效数字化管理平台和云计算中心，智慧水务系统基本形成，信息通讯技术和网络空间虚拟技术得到广泛应用，传统的水务管理正在逐步向智能化转型。比如，采用CCTV检测管网，能够及时准确发现和排除管网错接、断接和堵塞等故障，为尽可能实现雨污分流、保障管网畅通提供了有力的技术支撑。

Detailed Cases

（Adapting to climate change - building a sponge city ）

中国·常德
Changde,
China

在项目建设质量管理方面已产生既要“面子”，更要“里子”的常德模式。

改造棚户区

检测地下管网

更新地下管网

Detailed Cases

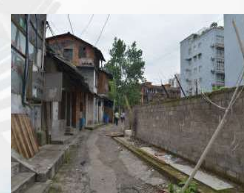
（Adapting to climate change - building a sponge city ）

中国·常德
Changde,
China

Renovation of the old Ximen shantytown —— Changde transformed the slum into a culturally sensitive and climate-adapted community.

改造前，老西门经评估，适应气候变化能力极端脆弱。每逢恶劣天气，该街区灾情环生。一遇强降雨天气，内涝点众多，生活污水满街横溢，臭不可闻。一遇雷暴、高温天气，火灾肆虐，且因消防道不畅无法施救。一遇冰冻、大雪或干旱天气，供水管道断流，饮用水供给紧缺。老西门街区范围为中国明、清以来常德武陵城内大、小西门所在，长期以来破、烂、脏、差是老西门的真实写照，成为被人们遗忘的角落，实际就成了一个典型的贫民窟。老西门的棚户区改造是城市发展趋势的需求，也是民心所向。

护城河已被地上建筑物全覆盖



老西门棚户区改造前

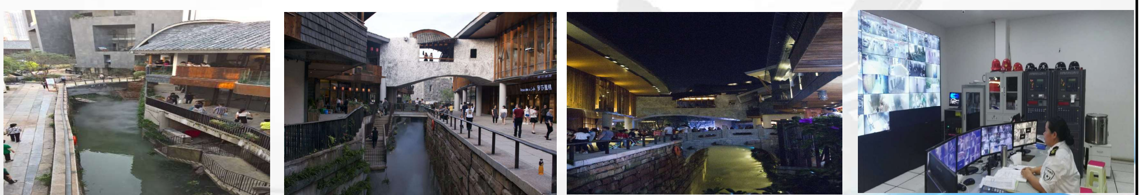
Detailed Cases

（Adapting to climate change - building a sponge city ）

中国·常德
Changde, China

Renovation of the old Ximen shantytown —— Changde transformed the slum into a culturally sensitive and climate-adapted community.

改造后的老西门街区，从单一的居住及商业功能，推演出更多的城市文化复合功能。对于老西门及周边社群的居民休闲生活产生积极的意义，带有强烈的公共分享意识及文化传播属性，成为常德老城区新城市文化的诠释者与朗读者。



老西门棚户区改造后

中国·常德
Changde, China

Actively participate in global climate change mitigation

Pragmatically promote urban adaptation to climate change

——Action & innovation in transforming slums into culturally sensitive and climate-adapted communities in Changde, China

03

Development Vision

中国·常德
Changde, China

Development vision

Vision of development goals

Changde is determined to become a city with high level of public safety, environmental grace, resource carrying capacity, economic affluence, life convenienve, and high social civilization. The city ‘s comprehensive livability index should be above 80 and there should be no negative condition.

Sponge City

海绵城市是指城市能够像海绵一样，在适应环境变化和应对自然灾害等方面具有良好的『弹性』、下雨时吸水、蓄水、渗水、净水、需要时将蓄存的水『释放』并加以利用

Climate-adapted city

『气候适应型城市』，是指通过城市规划、建设、管理，能够有效应对暴雨、雷暴、冰雹、冰冻、大雪、高温、干旱、狂风、雾霾等恶劣气候，能够保障城市生命线系统正常运行、居民生命财产安全和城市生态安全相对可靠的城市。

Livable City

宜居城市是指具有良好的居住与空间环境、人文与社会环境、生态与自然环境和清洁高效的生产环境的居住地。表现为环境优美、社会安全、文明进步、生活舒适、经济和谐、美誉度高。

中国·常德
Changde, China

Development Vision

Vision of international cooperation

—— Key Points in Cooperation

- Compile laws, regulations, policies and technical standards
- Implement climate change risk assessment and continuously improve monitoring and early warning capabilities
- Optimize urban infrastructure and continuously improve its ability to withstand meteorological disasters
- Explore and summarize successful methods and experiences, and continuously improve emergency support capabilities


桃花源里的城市、历史文化名城——常德欢迎您！
常来常德，常来常得！
Thank you!

CECA
CHINA ECO-CITY ACADEMY
中国生态城市研究院

Practice and Exploration of Sino-German Eco-city Cooperation in China

July, 2018

Jiangning Sun

Eco-city has become one of the core issues of China's urban construction

Organizing international communication and cooperation, and promoting construction of eco-city pilots.

International Cooperation

Cooperation Country	Eco-city Project
Sino-France	Wuhan caidian Eco-city
Sino-Finland	Beijing Mentougou Sino-Finland Eco Valley
	Sino-Finland Gongqing Digital Eco-City
	Zhungeer high-tech Eco-city
Sino-German	Qingdao Sino-German Eco-park
Sino-Singapore	Sino-Singapore Tianjin Eco-City
	Suzhou Sino-Singapore Eco-technology city
	Sino-Singapore Nanjing Eco Island
Sino-Sweden	Sino-Sweden Tangshan Bay Eco-City
	Wuxi Sino-Sweden Low-carbon Eco-city

Official Documents issued by national governments regarding international cooperation on eco-city program

中华人民共和国住房和城乡建设部办公厅

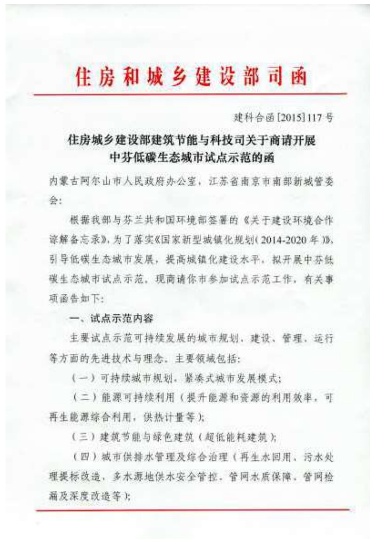
建办科函〔2014〕646号

住房城乡建设部办公厅关于做好
中德低碳生态城市试点示范工作的通知

河北、山东、江苏省、新疆维吾尔自治区住房城乡建设厅：

根据我部与德国联邦交通、建设和城市发展部签署的《关于建筑节能与低碳生态城市建设技术合作谅解备忘录》及《住房城乡建设部办公厅关于商请开展中德低碳生态城市试点示范的函》（建办科函〔2013〕777号），经中德双方联合评审，同意将河北省张家口市（含怀来县新兴产业示范区）、山东省烟台市（高新技术产业开发区）、江苏省宜兴市和海门市（新城区）、新疆维吾尔自治区乌鲁木齐市（高铁片区）作为第一批中德低碳生态试点示范城市。为做好试点示范工作，现将有关事项通知如下：

一、开展中德低碳生态城市试点示范工作，对于落实新型城镇化规划、引导低碳生态城市发展、促进节能减排和应对气候变化、推进生态文明建设具有十分重要的现实意义。试点城市要以与德国开展低碳生态城市建设合作为契机，全面深入学习借鉴国外低碳生态城市规划、建设、管理的先进理念、技术和经验，提



住房和城乡建设部司函

建科合函[2015]117号

住房城乡建设部建筑节能与科技司关于商请开展
中芬低碳生态城市试点示范的函

内蒙古阿尔山市人民政府办公室，江苏省南京市南部新城管委会：

根据我部与芬兰共和国环境部签署的《关于建设环境合作谅解备忘录》，为了落实《国家新型城镇化规划（2014-2020年）》，引导低碳生态城市发展，提高城镇化建设水平，拟开展中芬低碳生态城市试点示范，现商请你市参加试点示范工作，有关事项函告如下：

一、试点示范内容

主要试点示范可持续发展的城市规划、建设、管理、运行等方面的先进技术与理念，主要领域包括：

（一）可持续城市规划，紧凑式城市发展模式；

（二）能源可持续利用（提升能源和资源的利用效率，可再生能源综合利用，供热计量等）；

（三）建筑节能与绿色建筑（超低能耗建筑）；

（四）城市供排水管理及综合治理（再生水回用，污水处理提标改造，多水源地供水安全管控，管网水质保障，管网检漏及深度改造等）；

特 急

国家发展和改革委员会办公厅
财 政 部 办 公 厅 文件

发改办外资〔2015〕2592号

国家发展改革委办公厅 财政部办公厅关于
申报2015年外国政府贷款备选项目的通知

各省、自治区、直辖市及计划单列市、新疆生产建设兵团发展改革委、财政厅（局）：

根据《国家发展改革委财政部关于国际金融组织和外国政府贷款管理改革有关问题的通知》（发改外资〔2015〕440号）要求，为充分发挥外国政府贷款在促投资、稳增长、调结构、惠民生中的积极作用，更加突出重点，系统支持改革试点和创新，统筹做好2015年外国政府贷款备选项目规划编制工作，现就有关事项通知如下：

— 1 —

Introduction of Sino-Germany Eco-cities

In October 2014, China and Germany had agreed to implement their urbanization partnership.

On Nov. 10th, 2015, Federal Environment Ministry and Chinese Housing and Urban Development Ministry signed a joint declaration on the Sino-German Urbanization Partnership.

In December 2014, CSUS participated in Sino-Germany Low-Carbon Eco-city international cooperation projects.

CSUS participated in Sino-Germany Low-carbon Eco-city Pilot projects

简介：
中德生态城市国际合作项目是由德国联邦环保部、中国住房和城乡建设部共同签订的，旨在加强国内生态城市中借鉴德国低碳生态先进理念和技术，应用节能和环保产品，共同打造一流绿色生态城市。

德方：

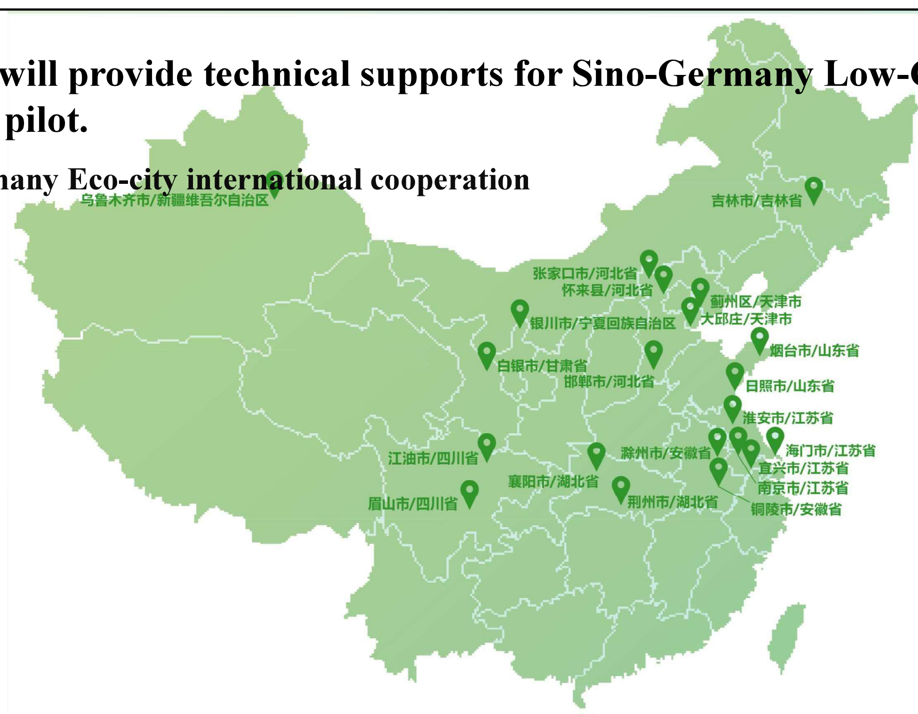
德国能源署技术支持
德方企业合作
德国复兴银行低息贷款

中方：

提供项目专家团队
地方城市技术服务

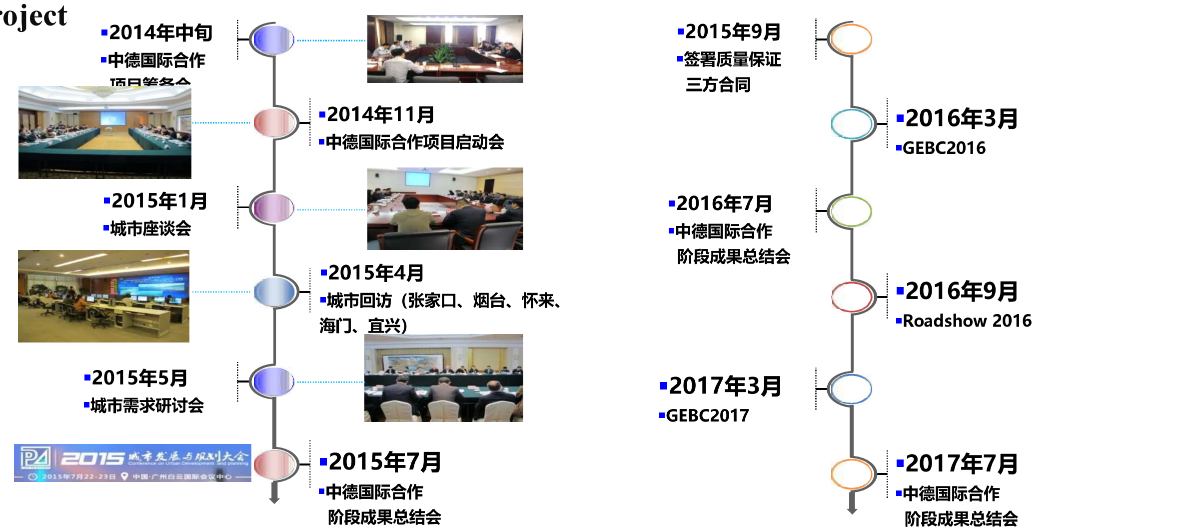
Experts will provide technical supports for Sino-Germany Low-Carbon Eco-city pilot.

Sino-Germany Eco-city international cooperation



Working together with dena, CSUS sets three years as duty cycle and promotes domestic Eco-city development.

Three-year project-Schedule of Sino-Germany Eco-city international cooperation project



What can we learn from the urbanization of Germany?

WASTE DISPOSAL

The whole process of garbage disposal

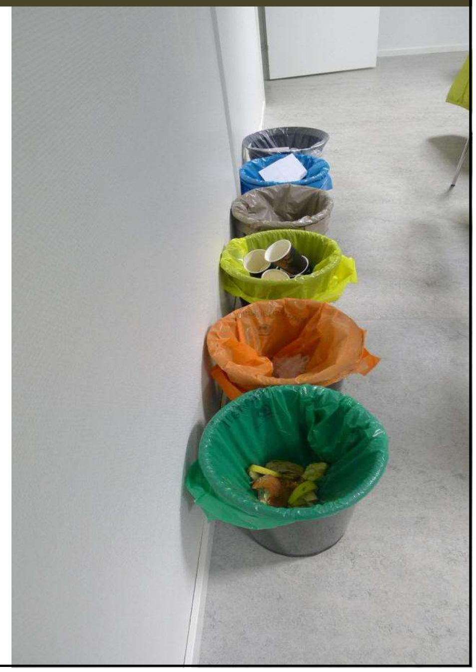
- Classification - Recycling - processing - Utilization

The biggest problem of waste disposal in china：

- Faulty classification ,
- water content of Kitchen waste is up to 80%

Garbage classification in ESKILSTUNA

Food waste:
Metal packaging :
Plastic packaging :
Paper packaging :
Newspaper:
Other household waste:



WASTE DISPOSAL

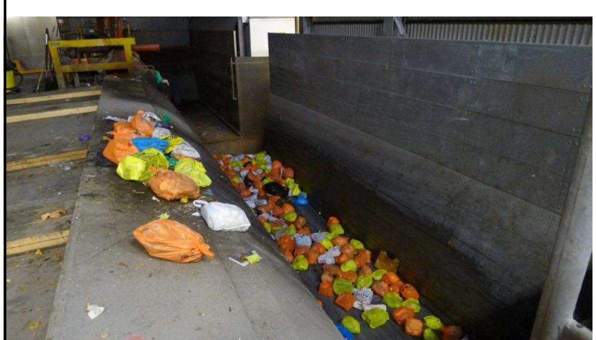
Household waste classification system

WASTE DISPOSAL

Garbage vehicle collecting different—colored garbage bags

WASTE DISPOSAL

Garbage on conveyor in waste disposal plant



WASTE DISPOSAL

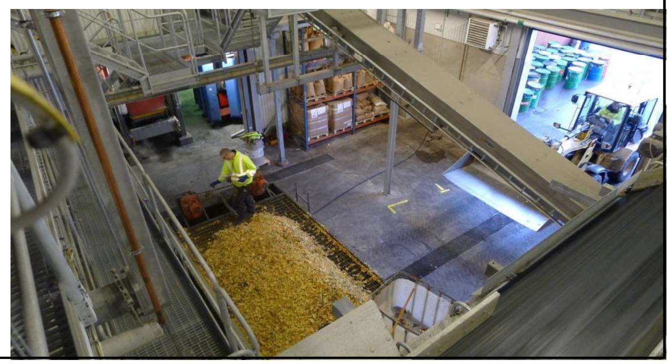
Garbage sorting device

WASTE DISPOSAL

Different–colored bags to different conveyors, sorted by photoreceptor

WASTE DISPOSAL

Different types of waste sorted by different process

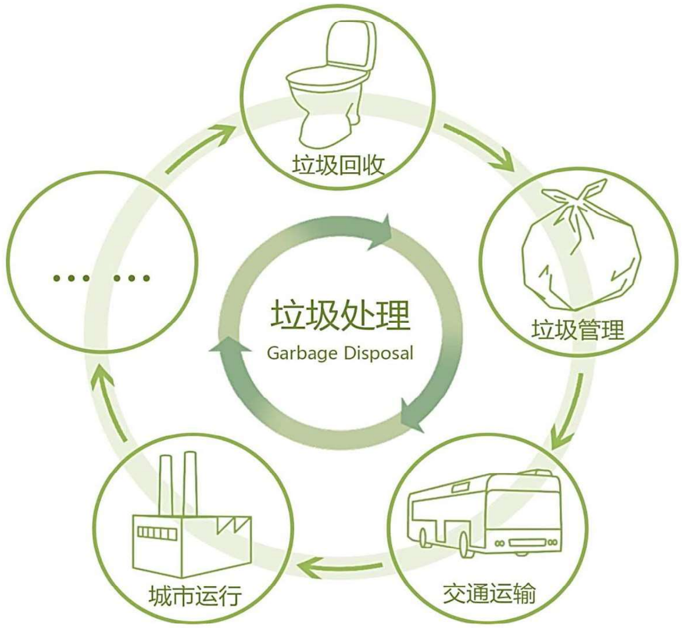


WASTE DISPOSAL

Resource utilization stage . fermented biogas for the city's energy networks

WASTE DISPOSAL

Circle of community , public transportation system and heating system established by waste disposal plant ,minimizes energy consumption.

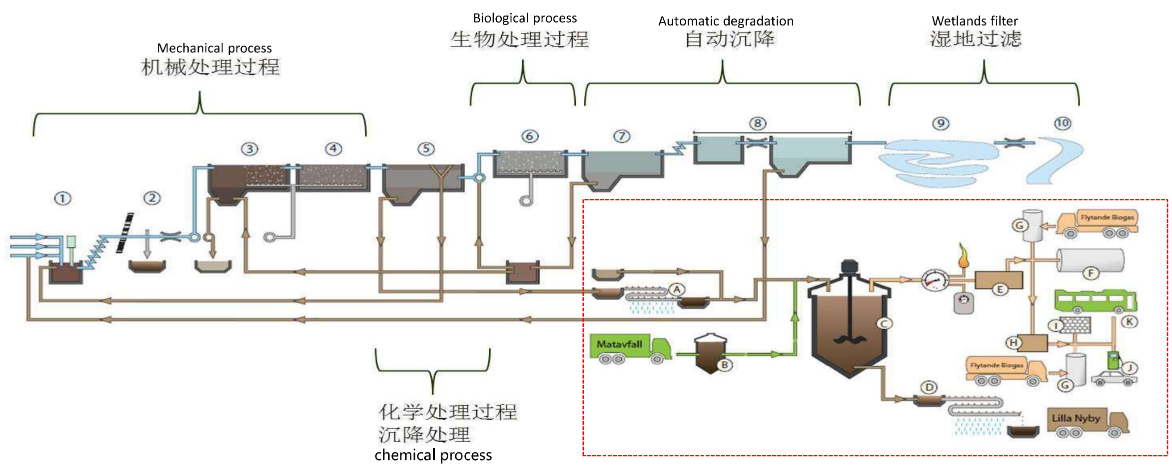


Eco-city case I: Ekeby Sewage Plant and Wetland.

Ekeby Sewage Plant covers an area of about 60 hectares, 20 hectares of disposal plants and 40 hectares of wetlands

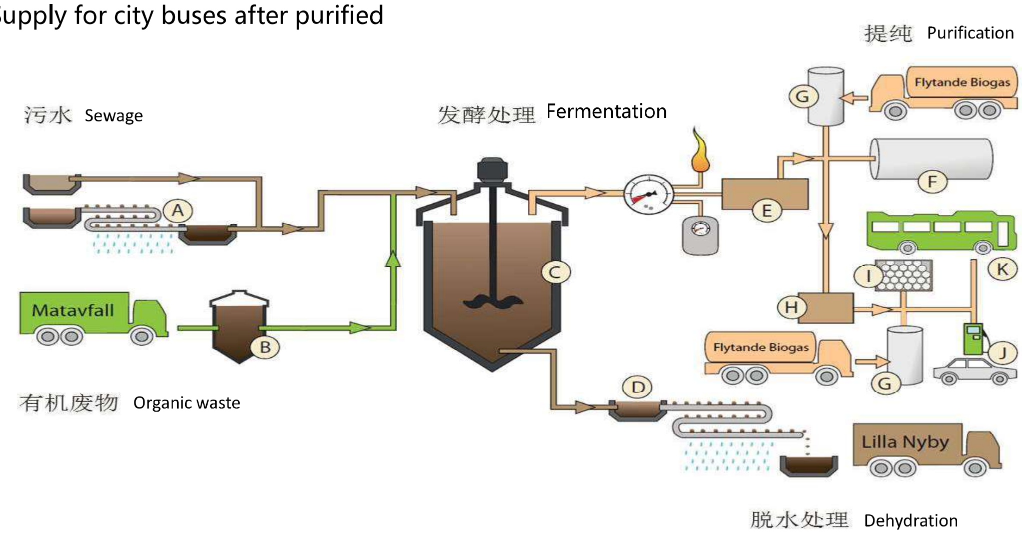
Eco-city case I: Ekeby Sewage Plant and Wetland.

- Waste disposal system brings Ekeby sewage plant 9500 tons of biogas per year, supports energy for 50 city buses running all year round.
- Introducing chemical processing system to sewage disposal for the fermentation stage.



Eco-city case I: Ekeby Sewage Plant and Wetland.

- Fermentation generates lower purity methane
- Supply for city buses after purified



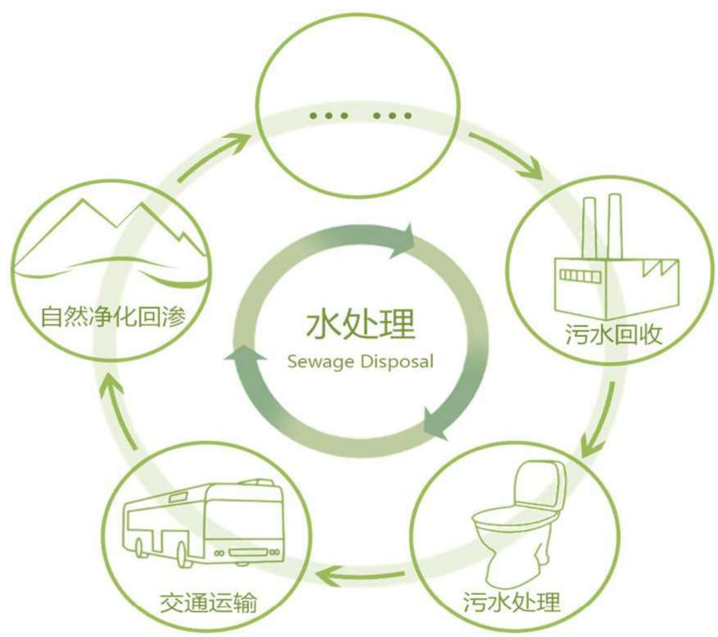
Eco-city case I: Ekeby Sewage Plant and Wetland.

Sewage disposal plant sets up a biogas storage device for the surrounding gas stations

Cars using biogas enjoy preferential parking fee in downtown

WATER DISPOSAL

- Circle of community , green transportation system and Wetlands



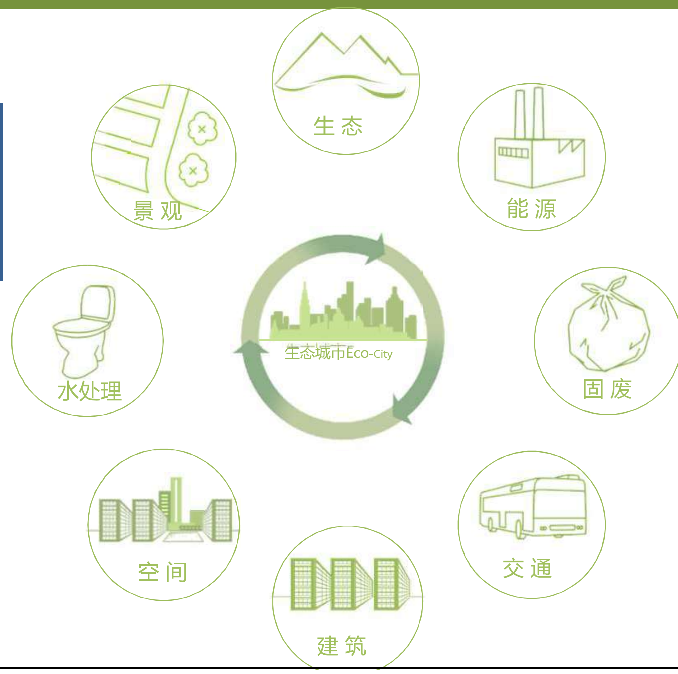
SUMMARY

Q：德国哪里做的好

借鉴德国经验开展生态城市建设

生态城市系统性

- 生态城市涉及多个系统，一个领域做得好不代表生态城市做得好，中德生态城市极其重视系统的构建



SUMMARY

Q：德国哪里做的好

借鉴德国经验开展生态城市建设

系统间的内循环

Overlapping areas between professional fields link circles in Symbio-City

规划路径：以生态系统为基础，打造重点生态项目

- Compact Development
- Ecological Environment Protection
- Green transportation
- Water Protection & Management
- Clean Energy Utilization
- Solid Waste Recycling
- Promotion of Green building

Conservation and Restoration of Zhoujiaba Wetland

What did we do for eco-city corporations?

指导方：中国住建部、德国联邦环境部、法国生态可持续和能源部、德国能源署

参与方：中国生态城市研究院、法国威立雅集团、德国复兴信贷银行

实施方：四川省德阳市人民政府

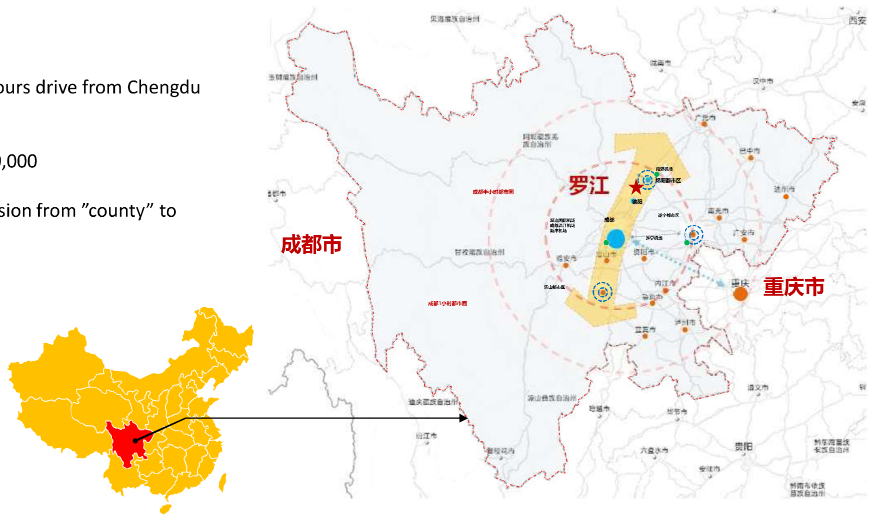
Domestic practice: Sichuan Luojiang Zhoujiaba ecological demonstration project

County profile

Luojiang County location

Luojiang County

- Belonging to Deyang City, 1.5 hours drive from Chengdu City
- Area：448km², population: 250,000
- Adjusting its administrative division from ”county” to “district”



Project Overview

Site situation

Landscape

- Mostly farmland
- Kai river and Huangshui river join together
- Terrain land; river bank elevation is about 495-502m

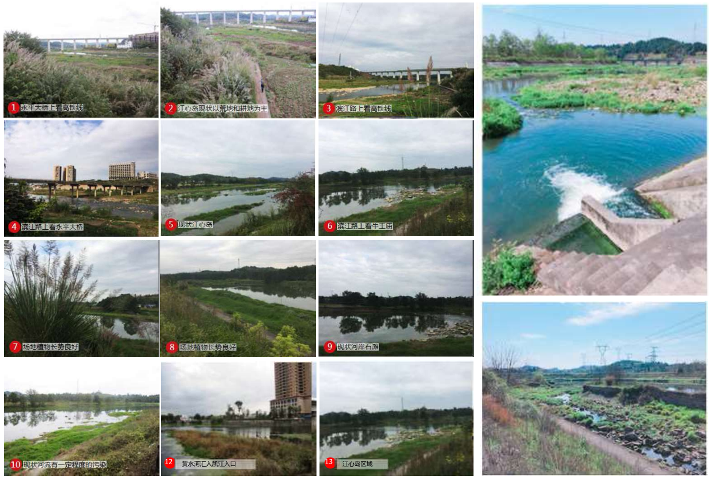
Water quality

- Kai river: mainstream, water quality reaches class Ⅲ; cannot meet ecological water demand during dry season.

周家坝生态湿地现状及用地范围

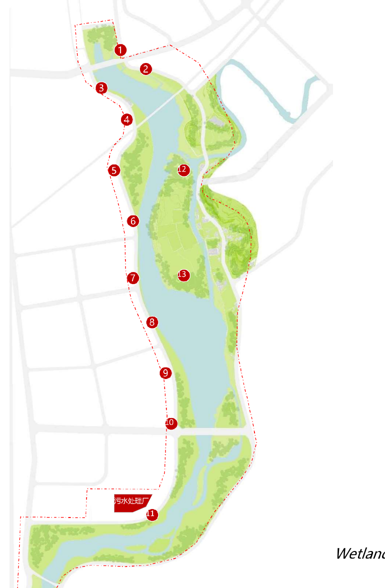
Wetland boundary

Project Overview



- Zhoujiaba sewage treatment plant is located on the south of the site, design scale: $2.0 \times 10^4 m^3$ / d, actual scale: $(1.6\text{-}1.9) \times 10^4 m^3$ / d.

Site situation



Wetland

Content

Conservation and Restoration of Zhoujiaba Wetland

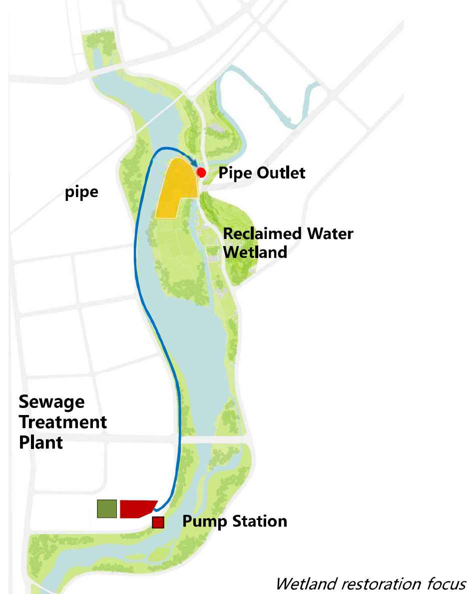
01 Restoration of Wetland

Replenishment：Techinical Upgrade of Zhoujiaba Wastewater Plant

- Use tail water from Wastewater plant as unconventional water supply
- Water quality: 1^{st} level A

Water Purification：Reclaimed Water Wetland

- Purify the water by pond-bed system into IV-level

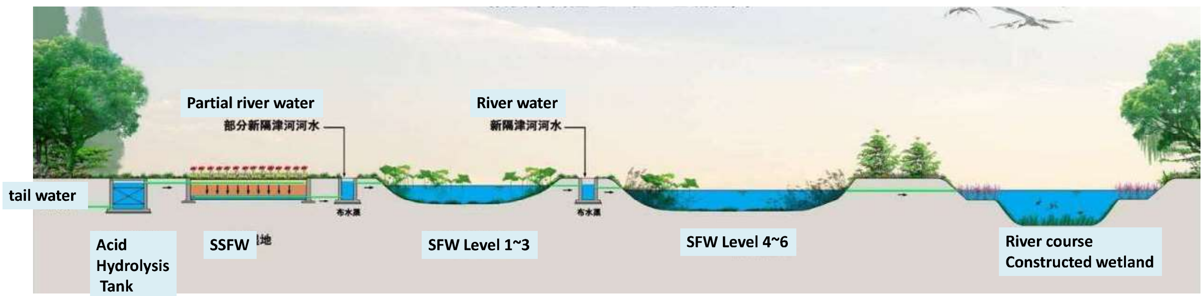


Wetland restoration focus

Content

01 Self-purification Wetland

- Maximize the use of natural terrain
- Fully exploit and utilize the potential of local biota
- Construct imitation ecological pond system
- Achieve the regeneration of water resources and regional water environment natural ecological restoration
- Improve water quality from first A to IV



Content

Restore the wetland in ecological way and Resource utilize the wastewater to supply electricity.

Three components, total land: 172.5ha

1) Conservation and Restoration of Zhoujiaba Wetland

- Land area: 166ha (including land: 108ha, water area: 58ha)

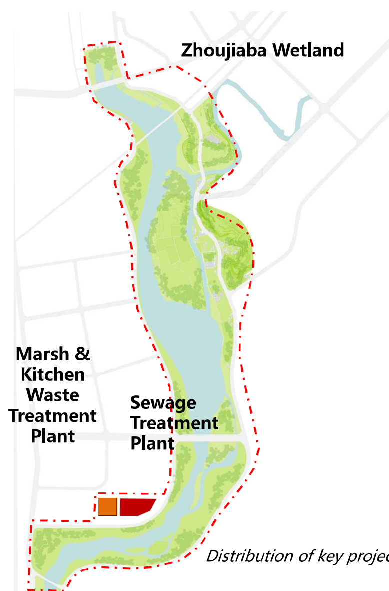
2) Wastewater Cycle Utilization

- Land area: 4ha, floor area of equipment: 2.33ha

3) Comprehensive Management of Waste and Resource Utilization

- Land area: 2.5ha, floor area of equipment: 0.7ha

Main Components



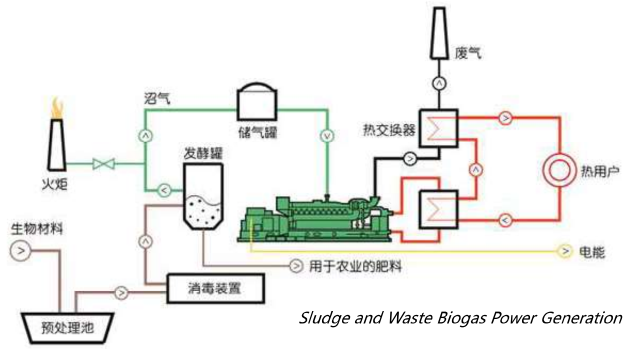
Distribution of key projects

Content

02 Sludge and Waste Biogas Power Generation

- Combined treatment of sewage treatment plant sludge and food waste
- Bring high biogas production in the realization of garbage harmless and reduced
- Use biogas power generation to provide clean energy for wetland park matching
- Use biogas to make fertilizer for wetland parks and other municipal greening

——Establishing interdependent cycle between urban life and ecological wetlands



Sludge and Waste Biogas Power Generation

Biogas power generation facilities

The use of biogas residue

Content

Conservation and Restoration of Zhoujiaba Wetland

03 Renewable Energy

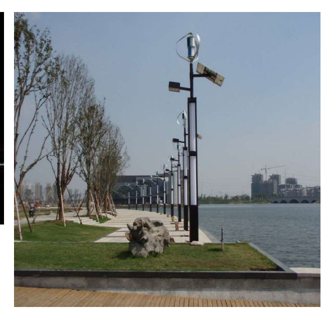
Low-carbon street lighting

- Sludge gas supplies electricity for street lump
- Wind-solar street lump

Solar bicycle lane system

- Photovoltaic power generation for cycle lane

Wind-solar street lump



Solar cycle lane

Content

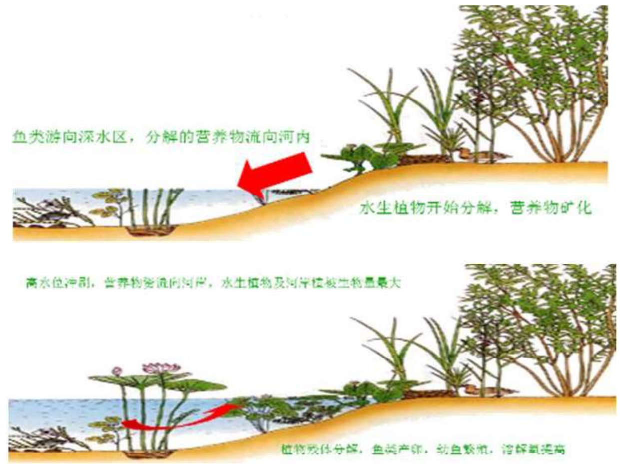
04 Biodiversity Protection

Habitat Restoration

- Good habitat environment offered by aquatic plant

Biodiversity Protection

- Optimize Ecological Chain， control the zone of human activities, reduce the interference



Aquatic Plant System

Content

05 Smart Wetland Management Platform

- Including： Water quality monitoring station, weather monitoring station， video surveillance, voice broadcast and consulting system
- To realize the river on-line management with hydrology, water quality, video and pictures etc.

智慧湿地管理平台
Smart Wetland Management Platform

Content

06 Science Education and Capacity Building

- Ecological wetland demonstration park
- Environmental science education & capacity building center

生态湿地示范公园 Ecological wetland demonstration park

生态科普体验 Environmental science experience

Implementation Plan

- The construction time is one year, divided into two phases.

phase	Construction area and main focus	Construction content
first stage	North wetland construction, sewage treatment plant upgrade.	North wetland river environmental remediation; Ecological and species diversity restoration and facility construction; Sewage treatment plant transformation; The introduction of biomass extraction and purification technology.
second stage	South wetland construction	South wetland river environmental remediation; Tail water purification wetland system construction; Ecological and species diversity restoration and facilities construction.

Phasing

项目建设分期示意图

Implementation Plan

Loans selection

- Comparison on the 3 relevant foreign financial institutions that would support this project according to Ministry of Finance’s documents


国家发展和改革委员会办公厅 财政部办公厅 文件

发改办外资〔2017〕442号

国家发展改革委办公厅 财政部办公厅关于做好2017年国外贷款备选项目有关工作的通知

贷款国别 country	年度额度 amount	限制性条件 restrictive conditions	贷款领域 loan areas
德国促进贷款 KfW	4.5亿欧元 450 million euros	土建比例最高不超过50%（森林资源可持续管理等领域除外）；单个项目贷款额不低于2500万欧元	职业教育；医疗卫生；环境友好型交通；**能效和可再生能源(Energy efficiency and renewable energy)**；城区发展(城区交通、集中供热、污水处理、垃圾焚烧等)；气候保护和环境有积极影响的领域
法国开发署 AFD	2-3亿欧元 2-3 million euros	土建比例一般占贷款额30%以内，单个项目贷款额不低于2000万欧元	支持城市可持续发展；清洁能源、**可再生能源和能效(Energy efficiency and renewable energy)**；**水处理(Water treatment)**；**自然资源可持续管理(natural resources Sustainable management)和 (Biodiversity Conservation)**等
欧洲投资银行 EIB	2018-2019每年 5亿欧元 500 million euros	国际竞争性招标（ICB）为主；贷款期限不超过25年，（含宽限期5年）	建筑节能、区域供暖、绿色城市交通、燃煤改用天然气、林业发展、**水环境治理(Water Environment Management)**等

Implementation Plan

Funds sources

- Project funding sources are divided into two parts:

1. the Luojiang county government raised 147.8703 million, accounting for 33.16% of the total investment
2. 40 million euros (about 298 million RMB) from AFD loan, accounting for 66.84% of the total investment.

费用类型	投资金额（万元）	占投资比例	主要用途
罗江县政府筹集 Luojiang county government	14787.03	33.16%	• 项目前期的研究准备工作费用支出 • 项目工程规划设计、勘察等及招投标费用支出 • 建设地基础土工作业工程费用支出 • 部分基础设施建设工程费用支出
申请德国复兴信贷银行贷款 KFW loan	29800.00	66.84%	• 基础设施完善建设费用支出 • 设备采购及安装费用支出 • 偿还贷款建设期利息 • 为保证运营的铺底流动资金

Implementation Plan

资金使用计划及预期收益

total investment : 445,870,300 RMB
annual operating cost : 5,755,000 RMB

annual operating income : 9,393,100 RMB
annual income: 5,182,600 RMB

序号 No.	项目 project	合计 total	建设期 construction	运营期 Operation	
			1	2	3
1	**总投资 total investment**	44587.03	14787.03	29600.00	200.00
1.1	建设投资	44089.03	14787.03	29302.00	
1.2	建设期利息	298.00		298.00	
1.3	流动资金	200.00			200.00
2	**资金筹措 Financing**	44587.03			200.00
2.1	项目资本金	14787.03	14787.03		
2.1.1	用于建设投资	14587.03	14787.03		
2.1.2	用于流动资金	200.00			200.00
2.2	贷款	29800.00		29800.00	
2.2.1	用于建设投资	29502.00		29502.00	
2.2.2	用于建设期利息	298.00		298.00	
2.2.3	用于流动资金				

Loan transfer, guarantee and repayment

1 Loan Category

The loan for the project is a guarantee loan, applied by the People's Government of Luojiang County, guaranteed by the Ministry of Finance

Apply fixed rate types AFD loans (interest rate : 1%) for a term of 20 years.

2 Repayment organization

- Repayment: Sichuan Tongrong Urban and Rural Construction Investment Co., Ltd.; guaranteed by Luojiang County People's Government

3 Repayment sources

- The total loan amount of the project is 40 million euros (equivalent to RMB 298 million)
- The first interest2.98 million yuan, from the project construction funds.
- The second year: the principal and interest are repaid annually by equal principal repayment.

Scheme 1

Term : 15 years,
Interest rate : 1%

还款压力：较高
最高当期还本付息总额2426.57万元
- **Repayment pressure : High**

付息总额：较低
付息总额2533万元
- **Total interest payment : Low**

Scheme 2

Term : 20 years
Interest rate : 1%

还款压力：较低
最高当期还本付息总额1866.42万元
- **Repayment pressure : Low**

付息总额：较高
付息总额3278万元
- **Total interest payment : High**

Scheme 2 is proposed

Form a replicable and promotable model and contribute to Sino-French cooperation

From Europe to China French experts and scholars, enterprises go to Chinese cities for exchanges of ideas and cooperation.

From China to Europe Governors from Chinese cities go to France for study, and jointly promote cooperation on the government level, enterprise level and technical level.

Thank you for your attention!

中国生态城市研究院
CHINA ECO-CITY ACADEMY

Low Carbon City Project in Shanghai: Changning District

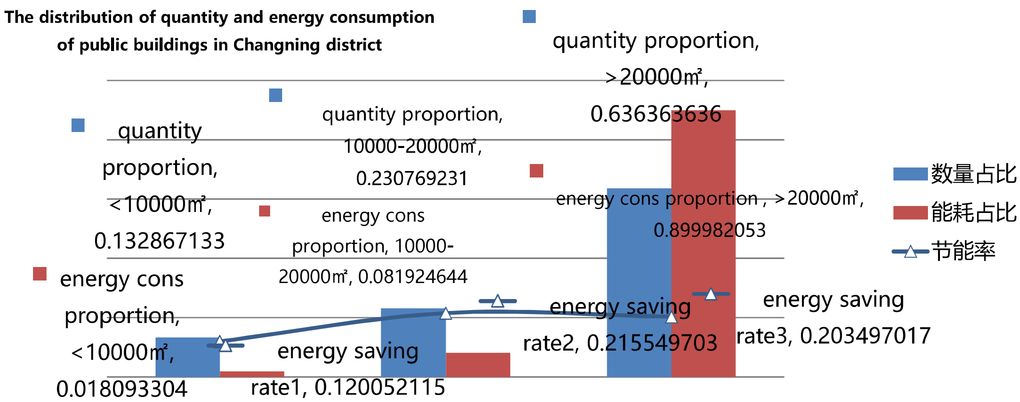
Shanghai Changning District Urban Renewal and Low Carbon Project Management Center

Nov, 2018

Contents

Background

Large public construction is an important consumer of regional energy



Large public buildings in Changning district account for about 64%, while building energy consumption accounts for about 90%

Goal

General Goal

A low-carbon development zone with demonstrative significance, high energy-efficient buildings, optimized energy structure, smooth green transportation, sound institution and mechanism and innovative operation mode will be built

Indicators

Saving 76,000 tons of standard coal,
Reducing 165,000 tons of CO2 emission

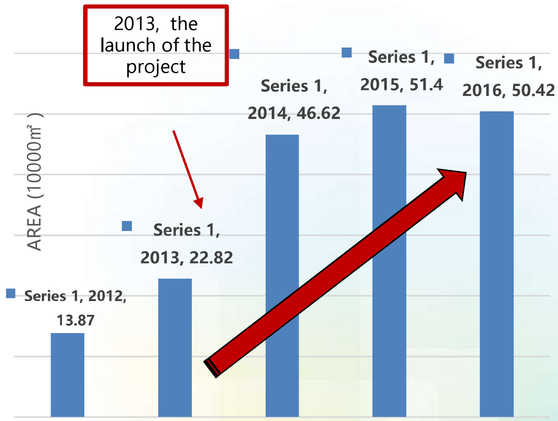
Carbon intensity in 2015 was about 17% lower than in 2010, and 23% lower in 2018

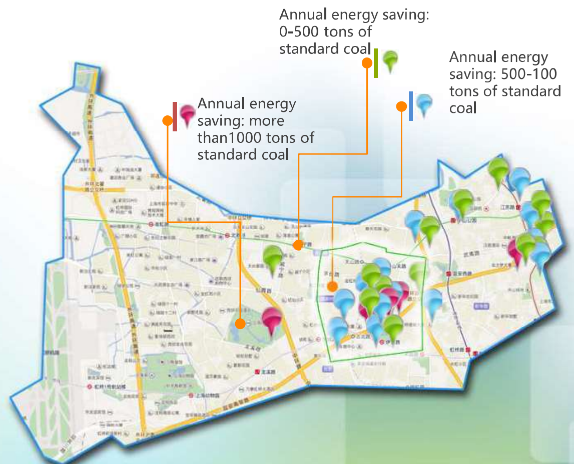
Outcomes: Renovation of Existing Public Buildings

Outcomes Index at PDO level	Unit of Measurement	Cumulative target value and actual completion	Notes
		FY2013-2018	
Cumulative carbon intensity per unit GDP of Changning district	%	By the end of the project, carbon intensity was 31% lower than in 2010	According to the current energy structure of Shanghai, the goal of energy consuming intensity is converted according to the weighted emission factor, 2.166 tons of carbon dioxide/ton coal . Box A1 is a description of the conversion method.
Energy savings from project investment	Tons of standard coal	76000/84000	Assume that the average investment cost of construction sub-projects is 20,000 yuan per ton of standard coal or 3,175 dollars per ton of standard coal
CO2 emission reduction from project investment	Tons of carbon dioxide	176000/202949	According to the current energy structure in Shanghai, it is assumed that the conversion index is 2.166 tons of carbon dioxide per ton of standard coal. This assumption does not take into account the expected changes in future emission factors.
Total project investment	10 thousand dollars	25600/29850	—

GEF outcomes index	Unit of Measurement	Target value and actual completion	Notes
		FY2013-2018	
Low Carbon Investment Supported by Projects	Ten thousand dollars	435.5	—
Innovation and Reform Policy of Pilot Project	—	Publishing Energy Efficiency Comparison System and Innovation Restriction Policy	—
On-line Energy Monitoring Platform for 160 Buildings in Changning District	—	On-line energy monitoring platforms for 187 public buildings	—
A Near Zero Emission Building	—	Complete two near-zero projects: No.9 Building of Hong Qiao State Guest Hotel and No.191 Neijiang Road	—
Building at least one distributed energy supply center	—	The loan supports three distributed energy supply centers, completes the construction of intelligent energy system in Tongren Hospital, and initiates the construction of air-related energy internet	—
Non-motor Vehicle System in Changning	—	Complete the planning and construction of Hongqiao non-motor Road System and Changning non-motor Road System	—

Outcomes: Renovation of Existing Public Buildings





the energy-saving transformation area of existing public buildings year by year

Outcomes: Renovation of Existing Public Buildings

Since the launch of the World Bank project, the speed of energy-saving renovation of existing public buildings in Changning District has been accelerated. 37 energy-saving renovation projects for existing buildings have been completed, with an area of 2.4 million square meters and an annual energy-saving rate of 21,000 tons of standard coal per year; average energy-saving rate is 18%.

Outcomes: Case of Renovation of Existing Public Buildings

High energy consumption of central air conditioning

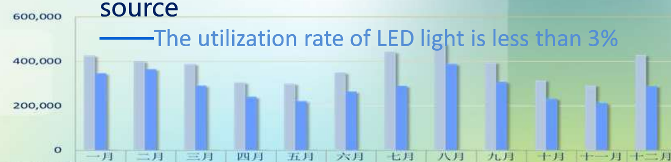
——Waste in transitional season and special period

Lack of Safe Operation Guarantee

——No backup for cold and heat sources of air conditioning and water pumps

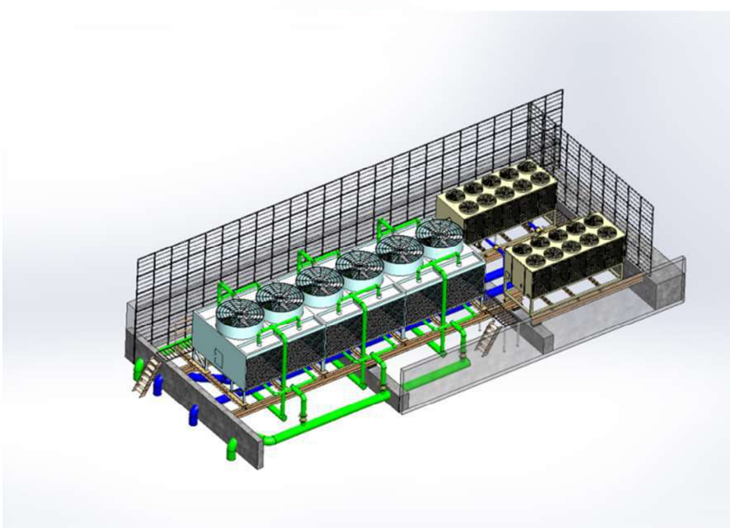
Low utilization rate of energy-saving light source

——The utilization rate of LED light is less than 3%



	一月	二月	三月	四月	五月	六月	七月	八月	九月	十月	十一月	十二月
2013-2015年	426,465	401,434	388,817	306,531	299,927	351,044	443,267	480,988	395,809	315,981	294,048	429,608
2017年	348,080	365,557	291,899	240,472	221,717	264,924	291,182	389,848	309,270	232,197	212,922	289,450
节能率	18.38%	8.94%	24.93%	21.55%	26.08%	24.53%	34.31%	18.95%	21.86%	26.52%	27.59%	32.62%

Outcomes: Case of Renovation of Existing Public Buildings



Preassembled system design

BIM Technology

More centralized and accurate management

Institution and Mechanism: Mechanism+Finance+Policy

1 One department

Integration:

1. Horizontal integration within the government;
2. Focus on market integration

2 A special fund

Special fund 23.19 million Yuan

Market input 141 million Yuan

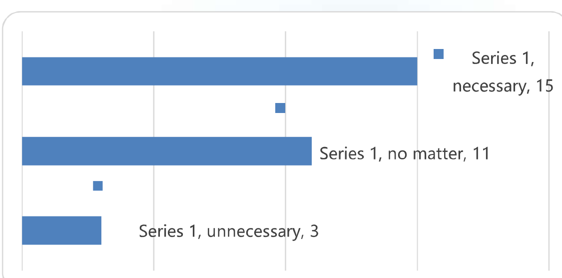
1 : 6.1

3 A set of policies

Three changes:

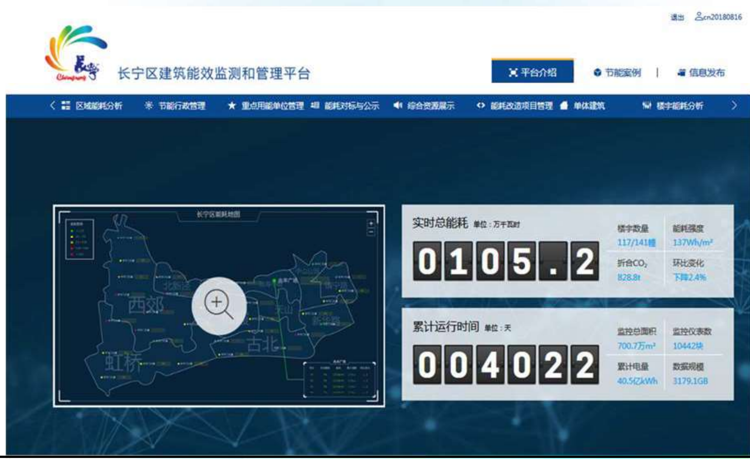
1. The direction of subsidies changed.
2. Decrease in subsidies;
3. Subsidies are highly targeted

Institution and Mechanism: Comparison of Energy Efficiency



Institution and Mechanism: Online Monitoring Platform

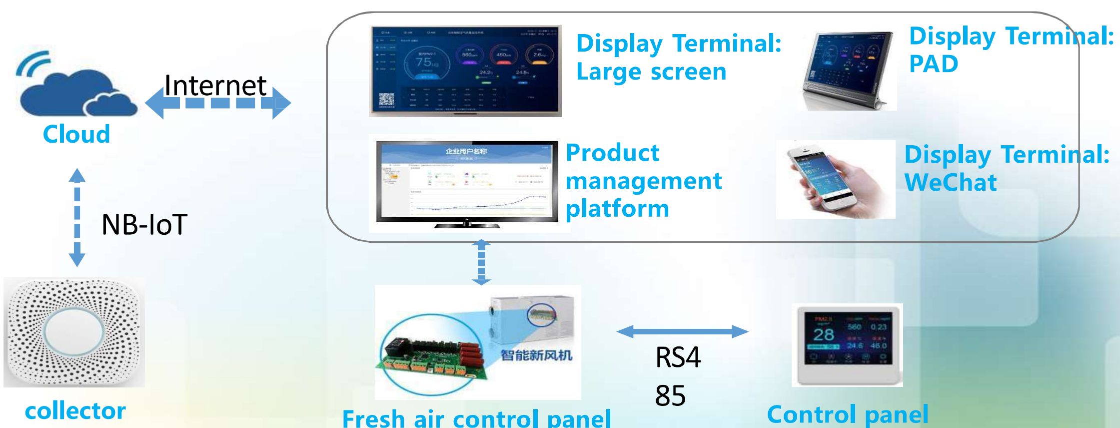
Connect 187 public buildings and participate in 610 million kw·h power management; more than 99% coverage rate of existing public buildings in Changning District.



Functional expansion:

1. Focus on the function of government management;
2. Services of marketization function

Technical Pattern: Energy Entrustment



The Background of the Third Party Energy Entrustment System

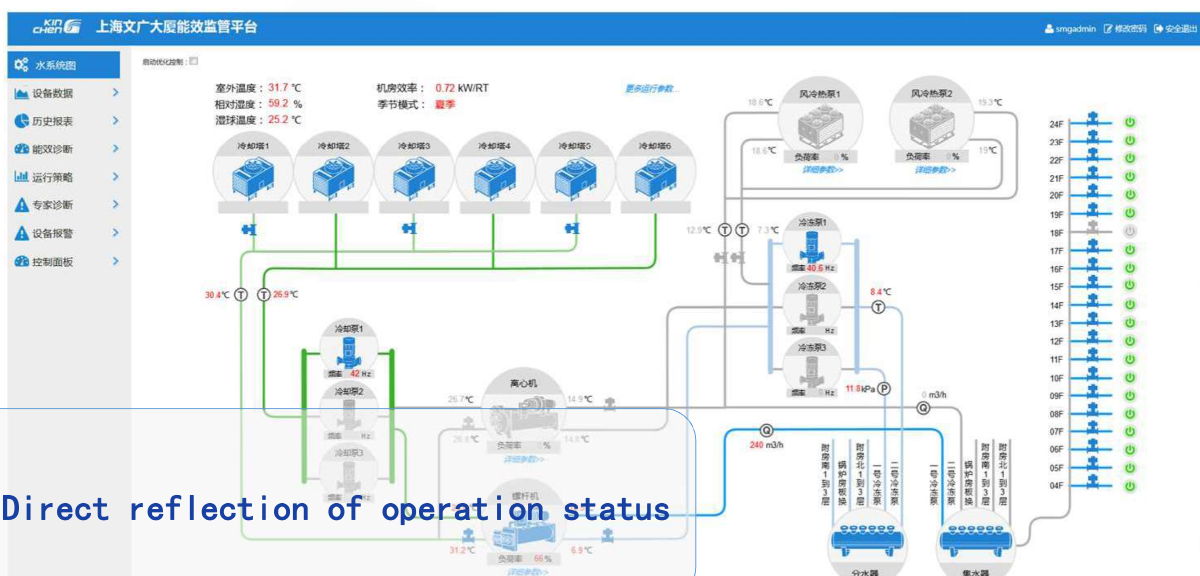
1. Requirements for energy-saving; 2. The emergence of new technologies such as NB-IOT

Technical Pattern: Energy Entrustment

Advantage

1. Reduction of field operators;
2. The system is more stable and energy-saving.
3. Long service life of equipment

Technical Pattern: Energy Entrustment



Direct reflection of operation status

Technical Pattern: Energy Entrustment

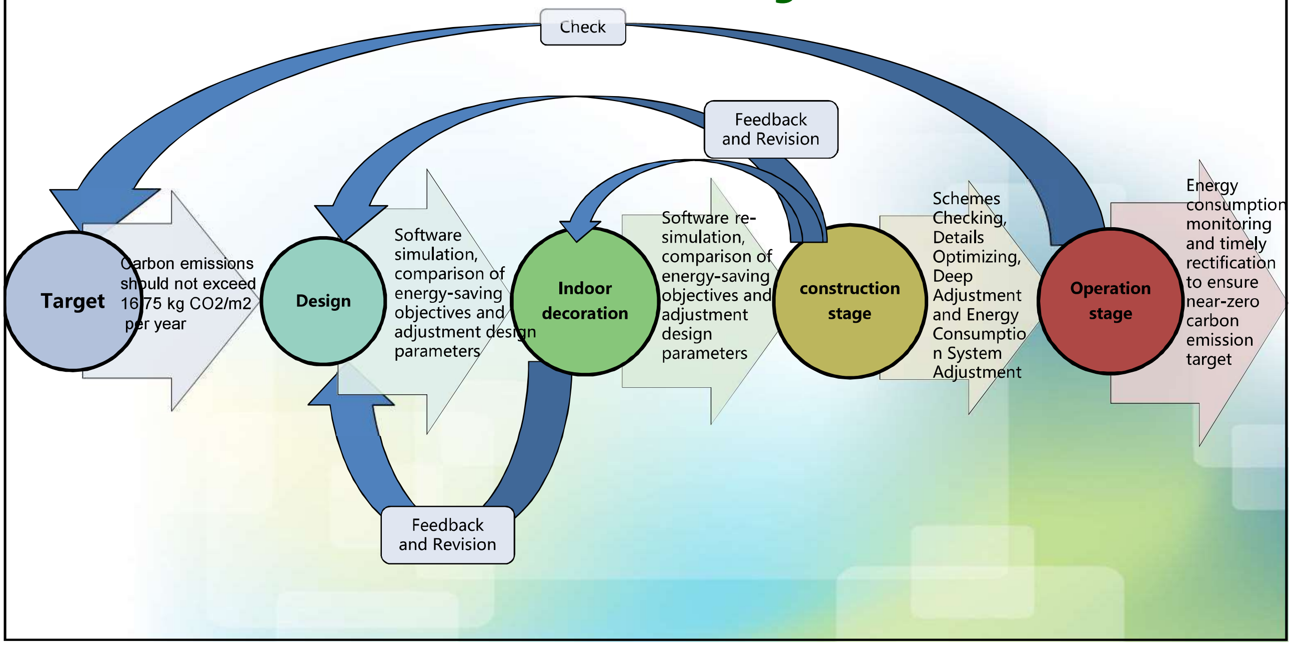
Technical Pattern: Whole Process Management Mode

The whole process energy-saving management mode ensures the implementation of green building technology

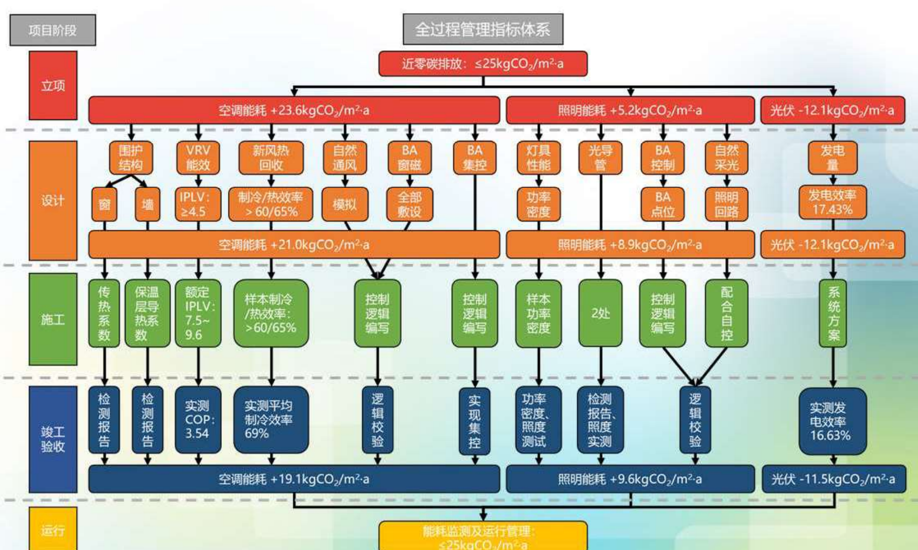
Case: an office building of Hong Qiao State Guest Hotel , Shanghai

- Life Cycle Index Control
- Feedback and Revision in Each Stage

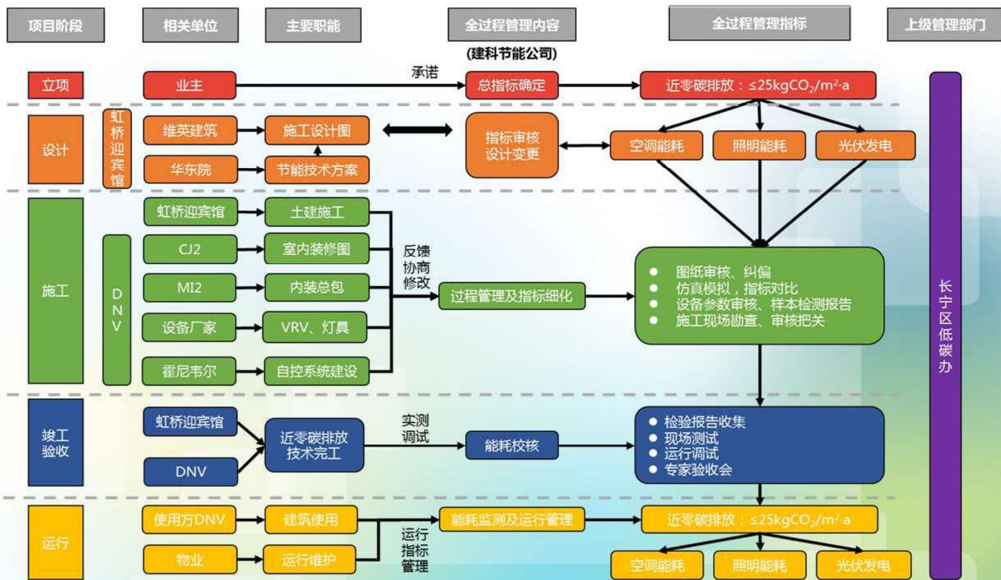
Technical Pattern: Whole Process Management Mode



Technical Pattern: Whole Process Management Mode



Technical Pattern: Whole Process Management Mode



Technical Pattern: Case of Construction of Near-zero Ultra-low-energy Buildings

No.9 Building of Hong Qiao State Guest Hotel

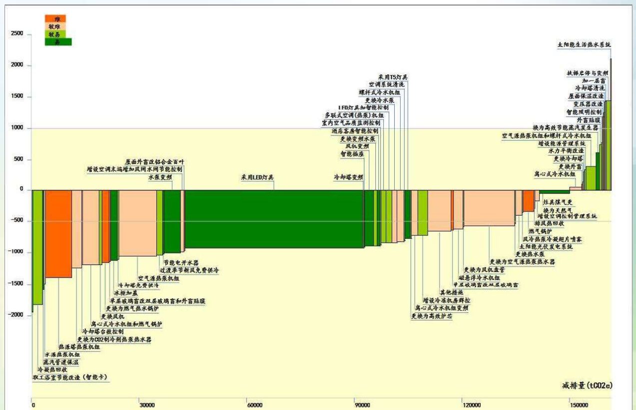
Annual energy consumption	emission per unit building area（$kgCO_2/m^2.a$）
Measured emission	24.39

No.191 Neijiang Road Near-zero Project

Annual energy consumption	emission per unit building area（$kgCO_2/m^2.a$）
Designed emission	6.96

Technical Pattern: Cost Curve of Energy Saving and Emission Reduction

Dynamic energy saving and emission reduction cost curve: support three-dimensional information (abscissa emission reduction; vertical coordinate CO2 emission reduction cost and implementation difficulty), provide four-dimensional information or more, and draw regional emission reduction cost curve



Technical Pattern: Cost Curve of Energy Saving and Emission Reduction

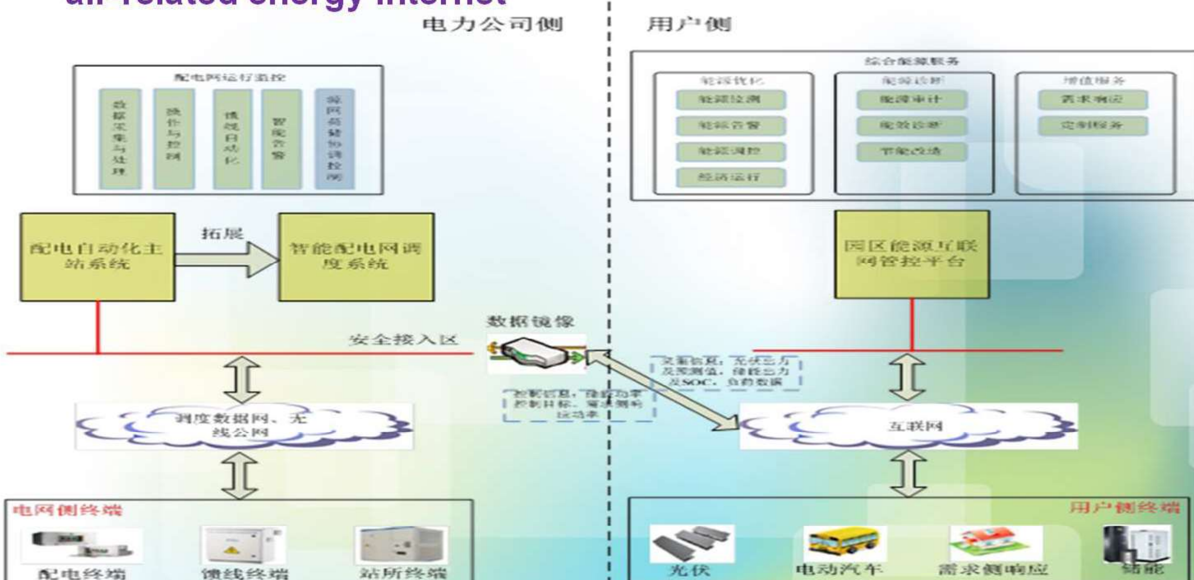
- Development steps of emission reduction cost curve
- A **bottom-up** survey was conducted in Hongqiao area of Changning to analyze the current energy using patterns and determine energy using measures (85 buildings, 57 technologies).
- Based on the data obtained from the survey, draw the CO2 emission reduction curve and determine the potential and cost of various emission reduction measures.
- Rank the emission reduction measures according to their potential, cost and difficulty of implementation
- Set an optional emission reduction scenario and a low-carbon target

Technical Pattern: Cost Curve of Energy Saving and Emission Reduction

- Development steps of emission reduction cost curve
- Collect the data of building energy-saving renovation project, and make a comprehensive analysis of energy-saving and emission reduction technology.
- Based on the data obtained, establish a database, draw a carbon dioxide emission reduction curve, and determine the amount and cost of various emission reduction measures.
- Rank the emission reduction measures according to their amount, cost and difficulty of implementation
- Calculating the actual energy saving of demonstration projects

Innovation and Exploration: Regional energy Internet

air-related energy internet

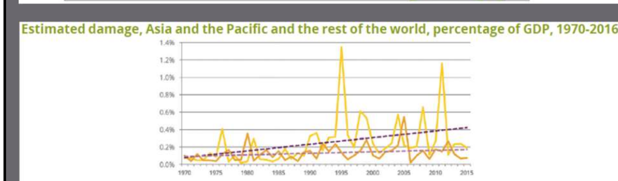



長寧
Changning

ADB

Avoiding the Generation of Disaster Risks in Cities

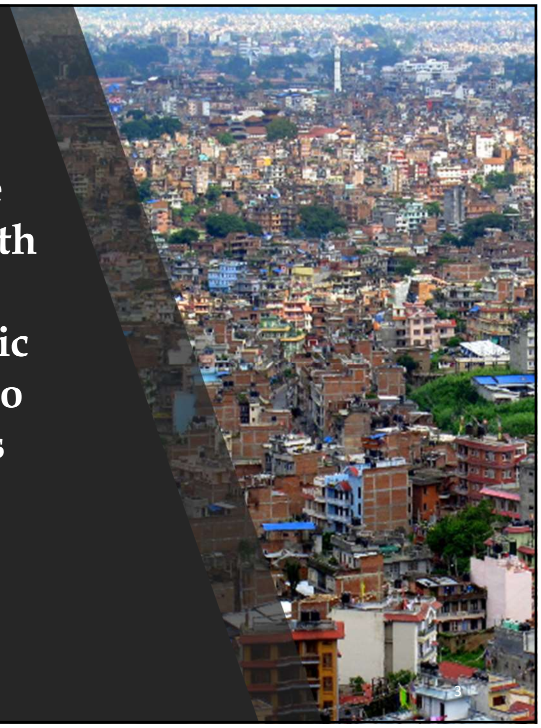
Overview of Urban Risk in Asia Pacific

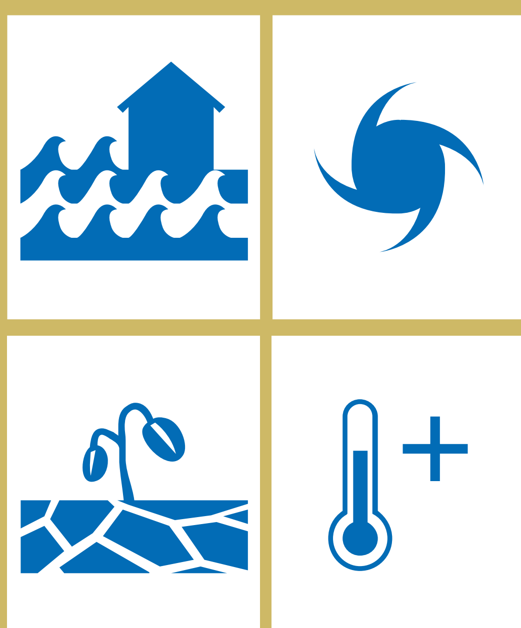


Asia and the Pacific is the region most affected by disasters.

Source: UNESCAP (2017)

Disaster losses are increasing in line with economic growth, reflecting both public and private failure to adequately address disaster risk





Climate change magnifies disaster risk and will increase expected future losses

Disasters in urban areas are likely to exacerbate inequalities

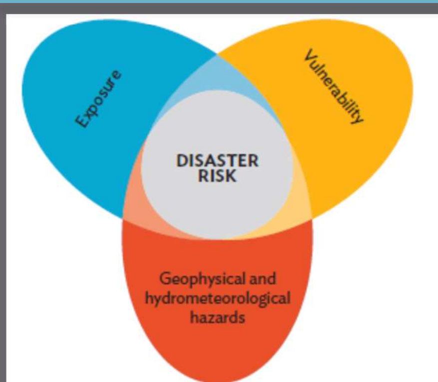
Building Resilient Urban Future:

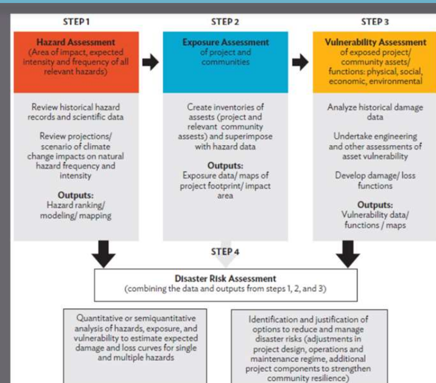
Asia needs to invest $26 trillion in infrastructure between 2016 and 2030

Source: ADB (2017)

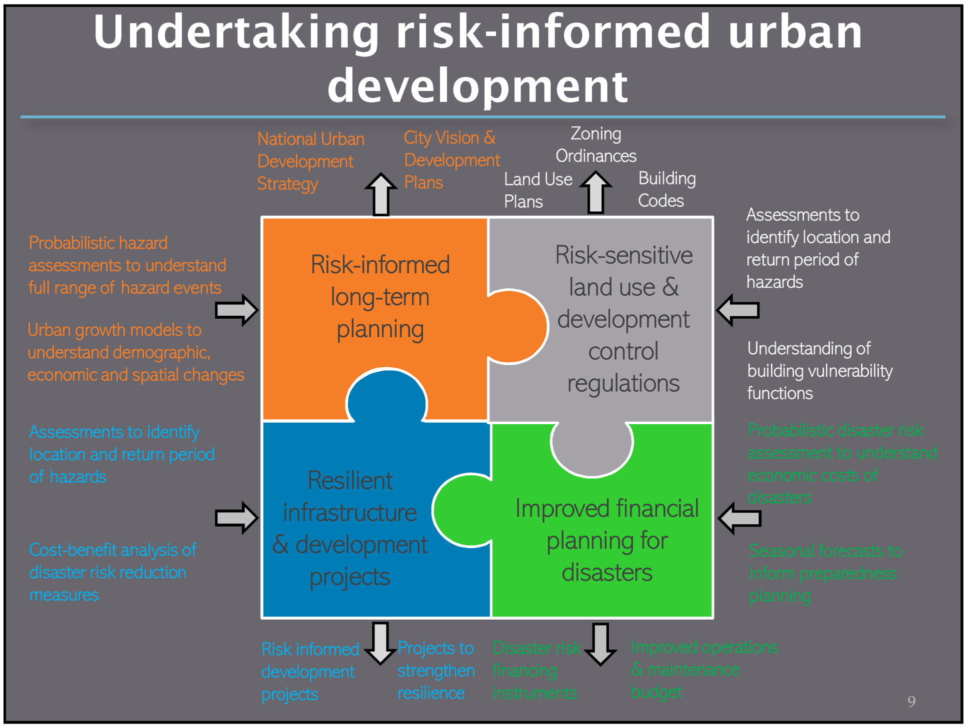
Disaster risk in urban areas is largely a development issue and should be addressed in the context of wider development

Developing Resilient Urban Future





Assessing Disaster Risk: Building an evidence base for action



Undertaking risk-informed urban development
National Urban Development Strategy
City Vision & Development Plans
Zoning Ordinances
Land Use Plans
Building Codes
Probabilistic hazard assessments to understand full range of hazard events
Urban growth models to understand demographic, economic and spatial changes
Risk-informed long-term planning
Risk-sensitive land use & development control regulations
Assessments to identify location and return period of hazards
Understanding of building vulnerability functions
Assessments to identify location and return period of hazards
Cost-benefit analysis of disaster risk reduction measures
Resilient infrastructure & development projects
Improved financial planning for disasters
Probabilistic disaster risk assessment to understand economic costs of disasters
Seasonal forecasts to inform preparedness planning
Risk informed development projects
Projects to strengthen resilience
Disaster risk financing instruments
Improved operations & maintenance budget
9

A new wave of urbanization is unfolding in hazard-exposed areas across Asia and with it, new opportunities for resilient investments are emerging.

ADB

Thank you.

Steven Goldfinch
Disaster Risk Management Specialist
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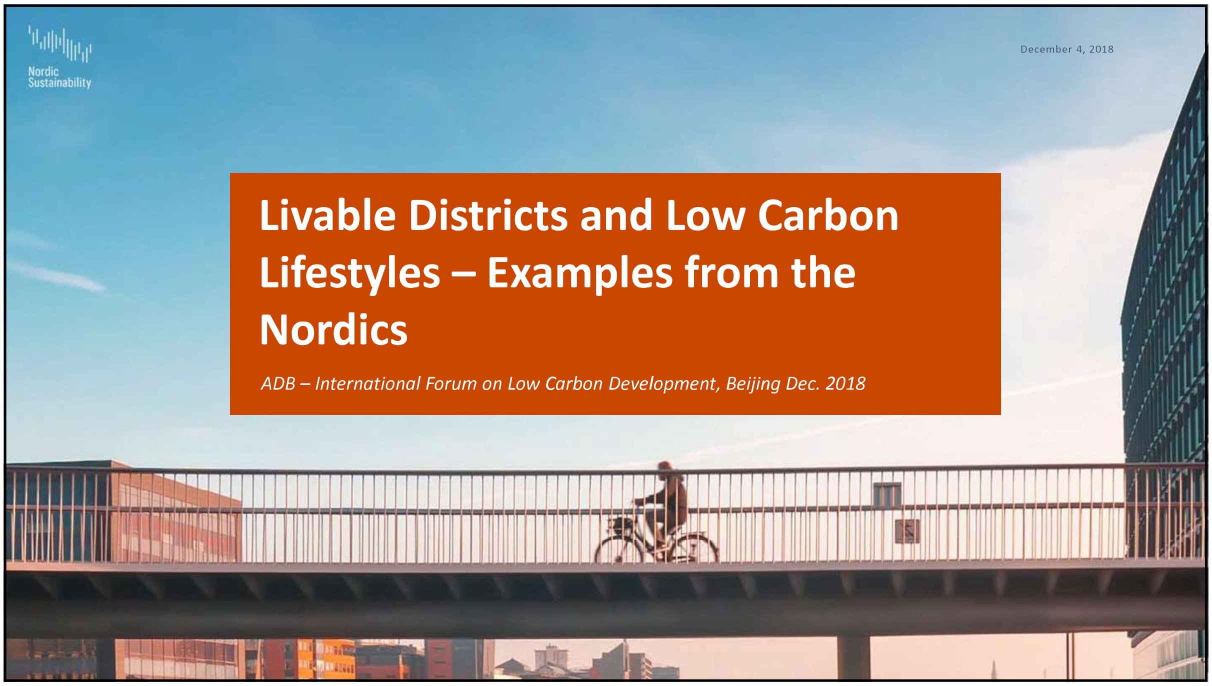


Livable Districts and Low Carbon Lifestyles – Examples from the Nordics

ADB – International Forum on Low Carbon Development, Beijing Dec. 2018

Nordic Sustainability | Copenhagen-based consultancy focused on sustainability

Nordic
Sustainability

OUR FOCUS AREAS

STRATEGY
- City / national / corporate sustainability

ANALYSIS
- SDG Implementation
- Impact analyses

THOUGHT-LEADERSHIP
- Change management
- Best-practice cases

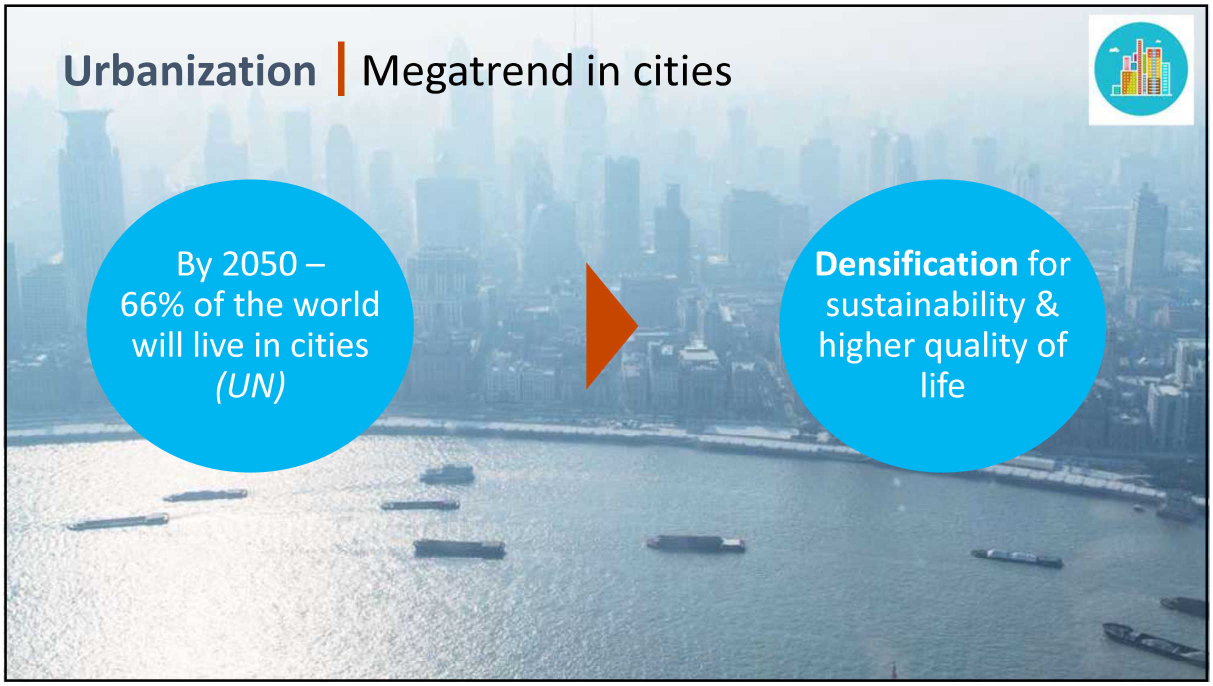
NORDIC – GLOBAL

Focus: International organisations, cities, private sector

SPEAKERS TODAY

Sven Beyersdorff
Partner

Brita Staal
Senior Advisor



Urbanization | Megatrend in cities

By 2050 –
66% of the world will live in cities *(UN)*

Densification for sustainability & higher quality of life

Quality of life | Key for productivity in creative economy

50% higher performance on problem solving task after time in nature

18% higher productivity for workers who have natural light and windows that let in fresh air

15% higher productivity if plants are in the office*

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* Source: International Business Times - https://www.ibtimes.com/how-tech-giants-are-keeping-employees-happy-through-innovative-workspaces-2644174

Development Agenda | SDGs & Sustainability

SUSTAINABLE DEVELOPMENT GOALS (SDGs)

SUSTAINABILITY TRENDS IN CITIES

$12 trn business opportunity

Cities	
Affordable housing	Building resilient cities
Energy efficiency - buildings	Municipal water leakage
Electric and hybrid vehicles	Cultural tourism
Public transport in urban areas	Smart metering
Car sharing	Water and sanitation infrastructure
Road safety equipment	Office sharing
Autonomous vehicles	Timber buildings
ICE vehicle fuel efficiency	Durable and modular buildings

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Challenge | City officials need to navigate

CONTEXT FOR CITY-OFFICIALS

Urbanisation

Development Agenda

Quality of Life

LIVABLE CITIES - AREAS FOR ACTION

1. Nature in cities for livable districts & resilience
2. Social & sustainable lifestyles
3. Urban strategy & district planning

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Inspiration from the Nordics in 3 areas:
1. Nature in cities for livable districts & resilience
2. Social and sustainable lifestyles
3. Urban strategy & district planning


Audience Question
Who among audience has issues with flooding in their districts?
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8

Example:

Climate Resilience: Copenhagen's Climate Quarter

- Water levels will rise 1.6m over 100 years
- Using infrastructure & network of parks to collect water

Relevance for Asian context:

- Financially sound project
- Increased quality of life
- Attractive park space

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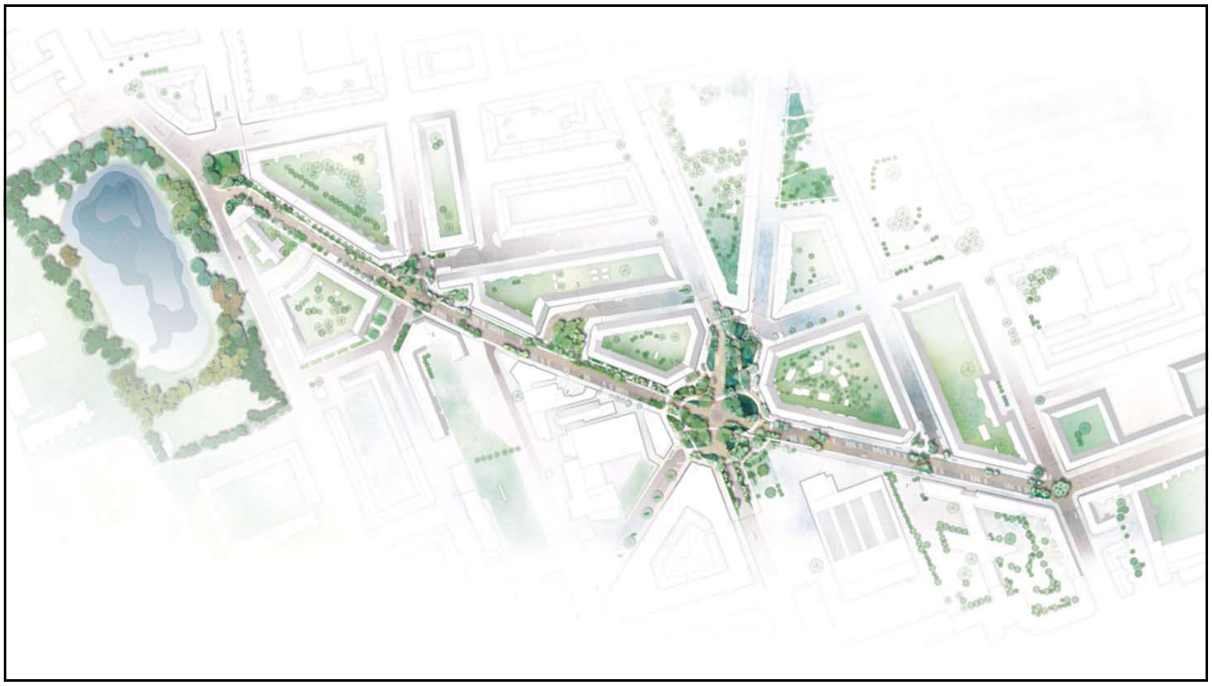

Example:

Climate Impact & Recreation: Rotterdam's Green Rooftops

- Rotterdam has 14.5km^2 flat roofs
- Variety of roof types for biodiversity, water storage, electricity, recreation

Relevance for Asian context:

- Large impact from unused spaces
- Climate change resilience

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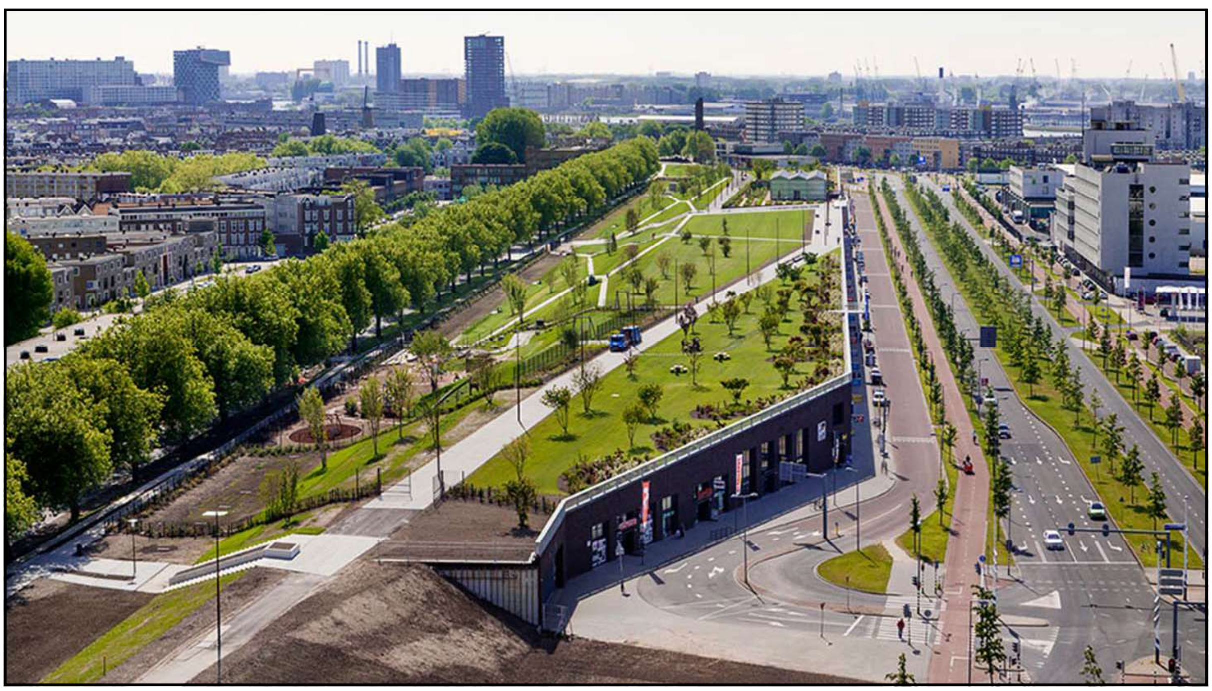

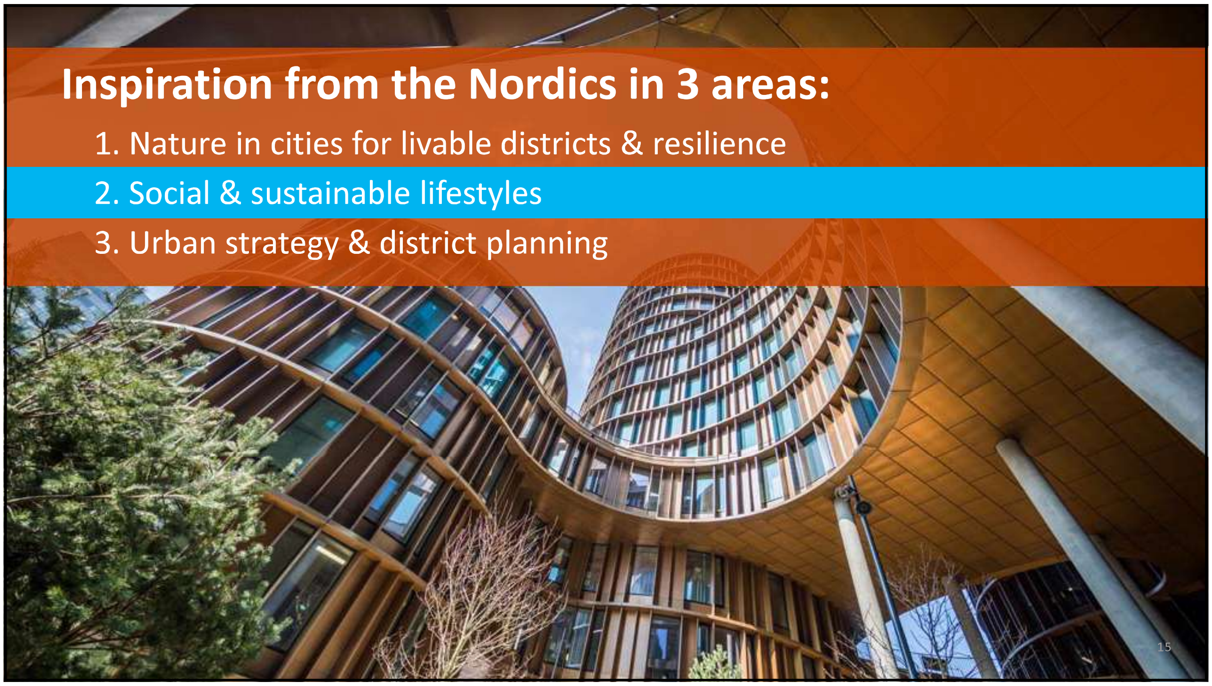
Inspiration from the Nordics in 3 areas:
1. Nature in cities for livable districts & resilience
2. Social & sustainable lifestyles
3. Urban strategy & district planning
15


Audience Question
Who among audience works with health & consumption-related issues in cities?
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16

Example:

Transport: Copenhagen’s Bicycle Snake & Highways

- 750km of super highways throughout city
- 60% of trips <5k by bike

Relevance for Asian context:

- Less pollution/congestion
- Health benefits
- Biking seen as ”cool”

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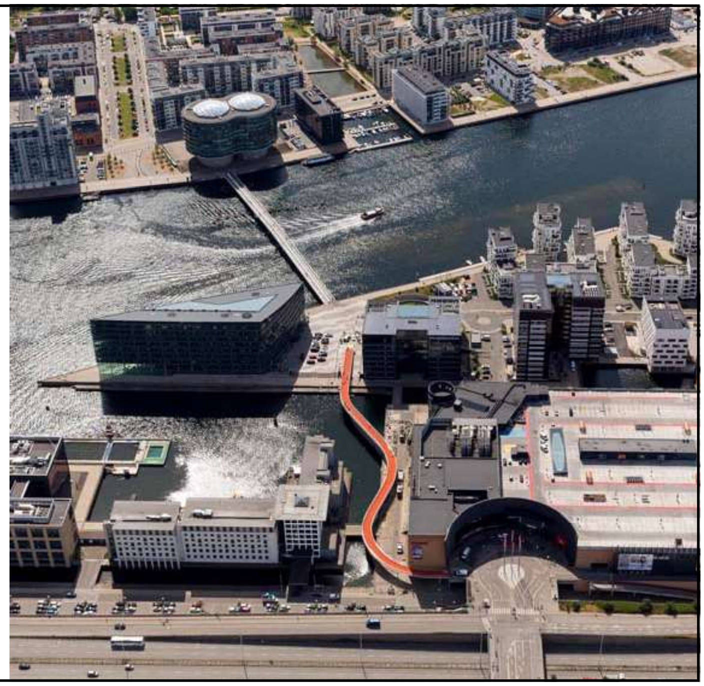
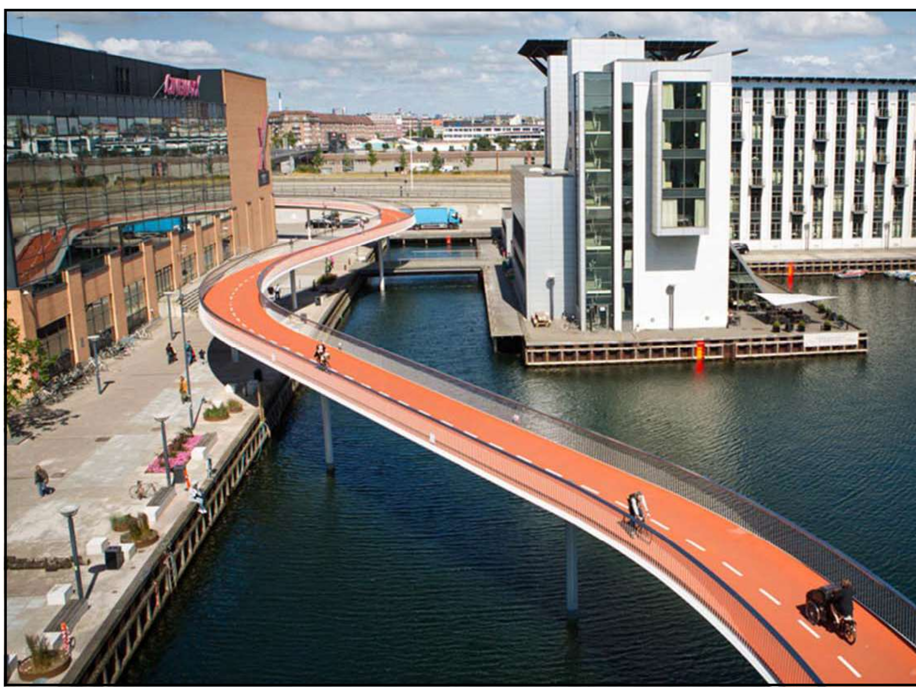




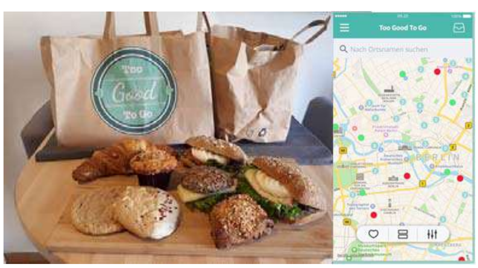
Example:

Beijing Bicycle Highway – large scale adaptation

Example:

Food Waste:

Too Good to Go & "Food Central"



- Phone app to get food that would otherwise be thrown away

Relevance: Less food waste and greater consumer awareness

- Foodbank for industrial food waste in some Nordic cities

Relevance: Food for vulnerable communities and public institutions

Example:

Recreation & Energy: Copenhagen's Power Ski Slope

- $640mio incineration Power Plant
- Ski slope on roof
- Powering 62,500 homes

Relevance for Asian context:

- Energy in central location and social purpose
- Dual-use of industrial building

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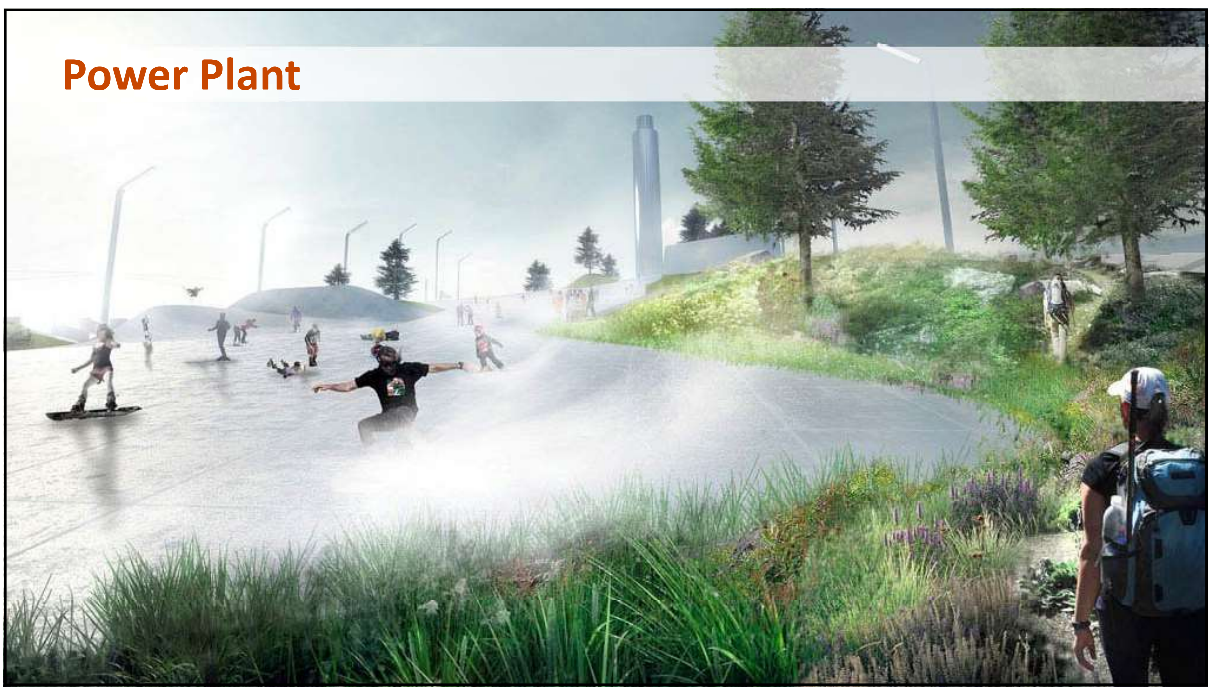
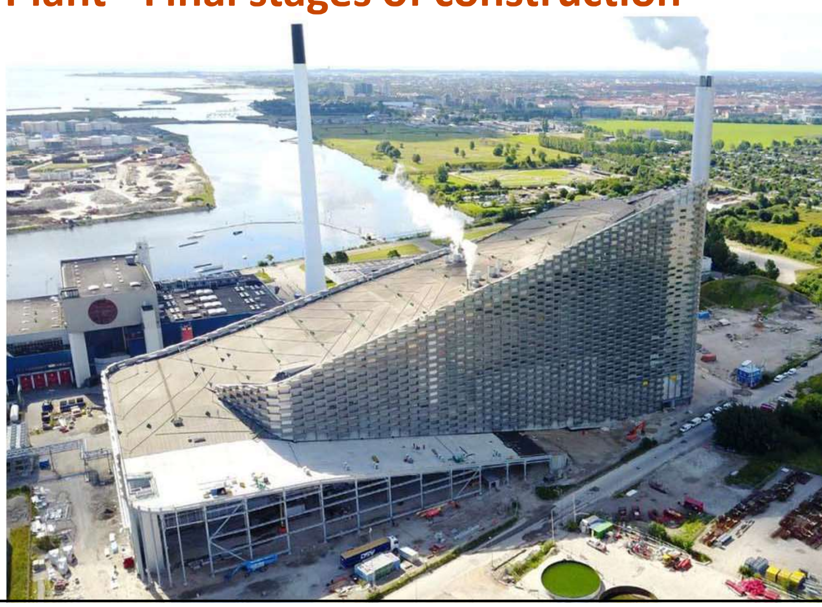
Power Plant



Power Plant

Power Plant - Final stages of construction




Inspiration from the Nordics in 3 areas:
1. Nature in cities for livable districts & adaptation
2. Social & sustainable lifestyles
3. Urban strategy & district planning
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25


Audience Question
Who among audience works in a city with a 10 year plan?
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26

Example:

City strategy: Oslo Municipality Climate capital 2019

- Objective: Reduce emissions & improve quality of life
- Lower GHG emissions by 50% by 2020, and 95% by 2030
- All public transport fossil-free by 2020, and car-free center by 2019

Relevance for Asian context:

- Clear emissions policies work: 35% decrease since 2012
- Integrated efforts across city

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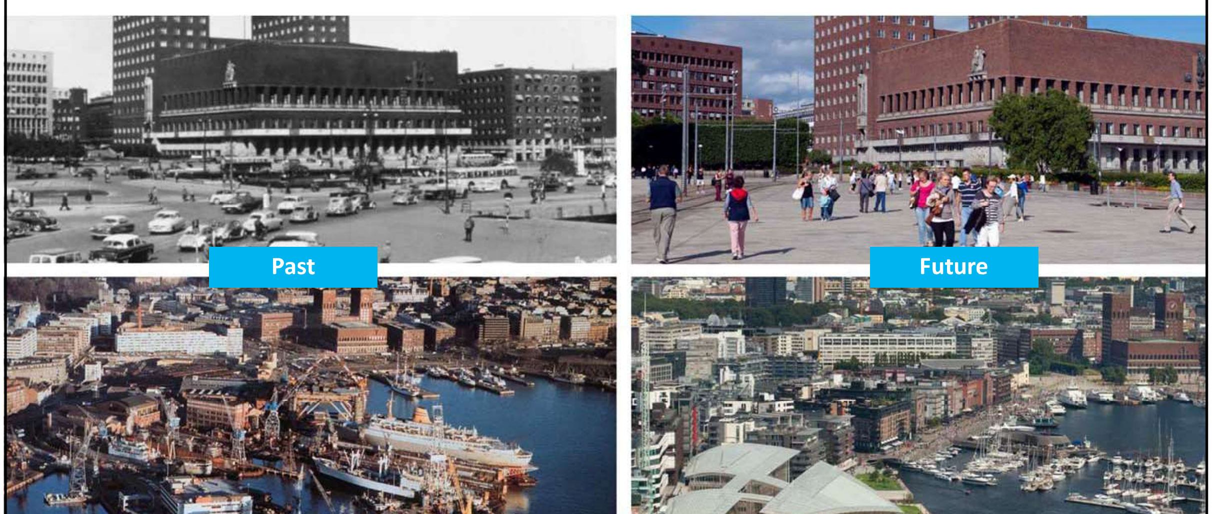
Affecting ability of sustainable living in cities



Oslo Harbour baths

Example:

Climate strategy: Incineration for energy & CCS

- World's first carbon capture and storage from non-recyclable waste piloted
- Would cut 12% of Oslo's fossil CO_2 emissions
- Aim: capture ~400ktons CO_2/yr

Relevance for Asian context:

- City-owned plant that brings major innovation

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Example:

District planning: Stockholm's Royal Seaport

- New infrastructure project: 12,000 new homes, 35,000 work places
- Aim: carbon-neutral by 2030
- 50% increase biogas prod.
- 20% solar energy for houses

Relevance for Asian context:

- Repurposing of "old" district
- Eco-friendly district = only 5% cost increase

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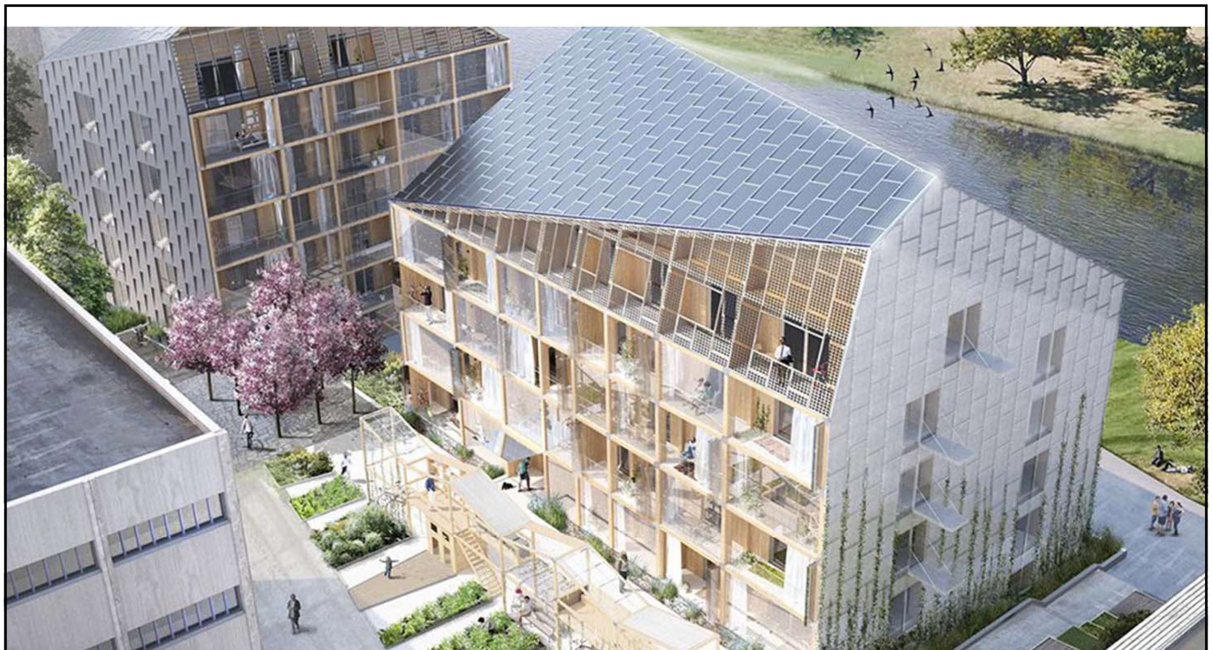

> “A city exists for the sake of a good life, not for the sake of life only”

Aristotle

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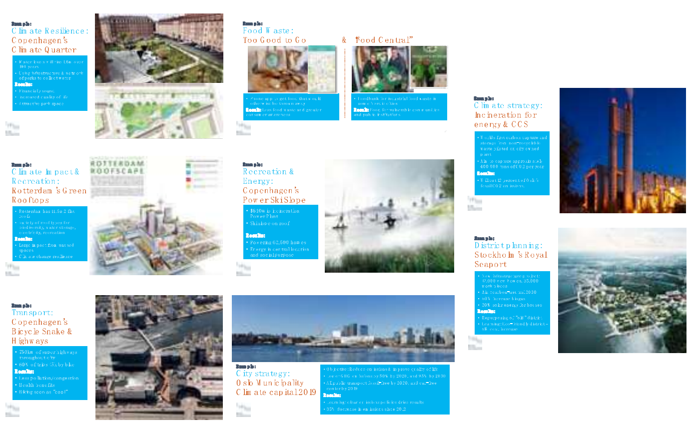
It’s up to you | Sustainability & Quality of life

8 EXAMPLES – MANY MORE OUT THERE



For more information, get in touch

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Nordic Sustainability

Re-defining Public Transport

ADB Workshop

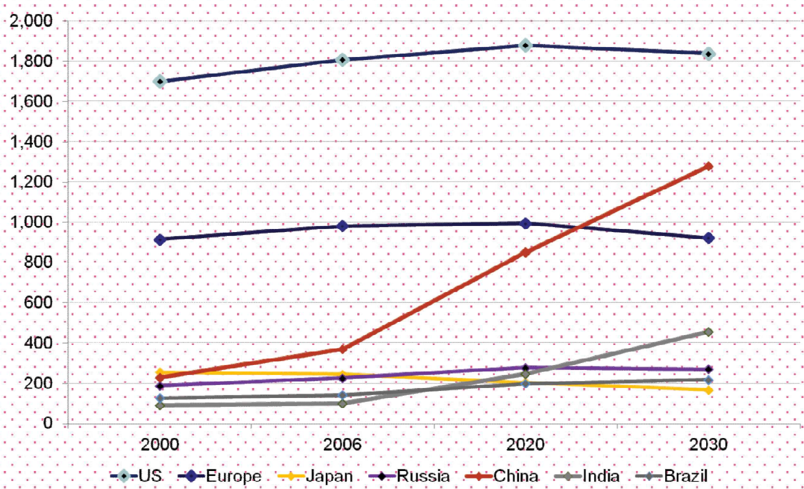
Beijing – 4th December 2018

Presentation by:

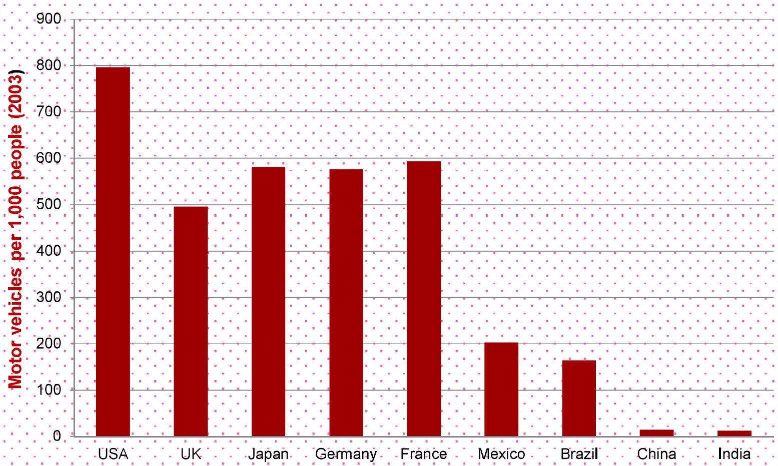
O.P. Agarwal

World Resources Institute

Transport Sector CO2 Emissions are rising

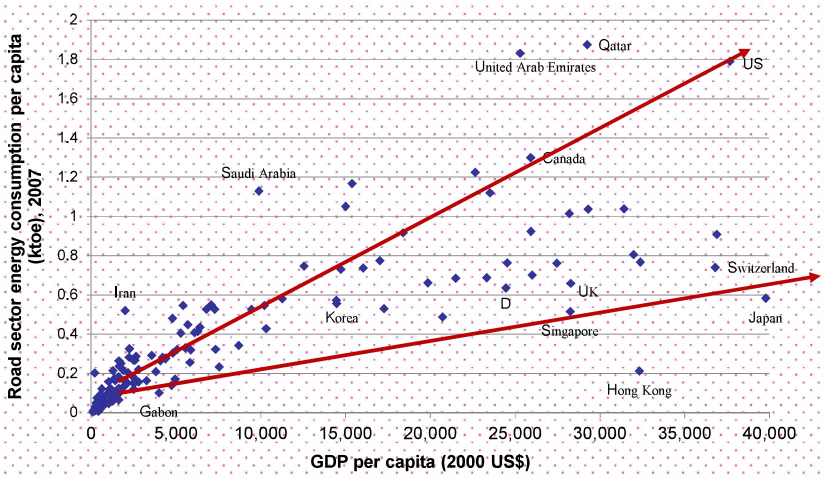


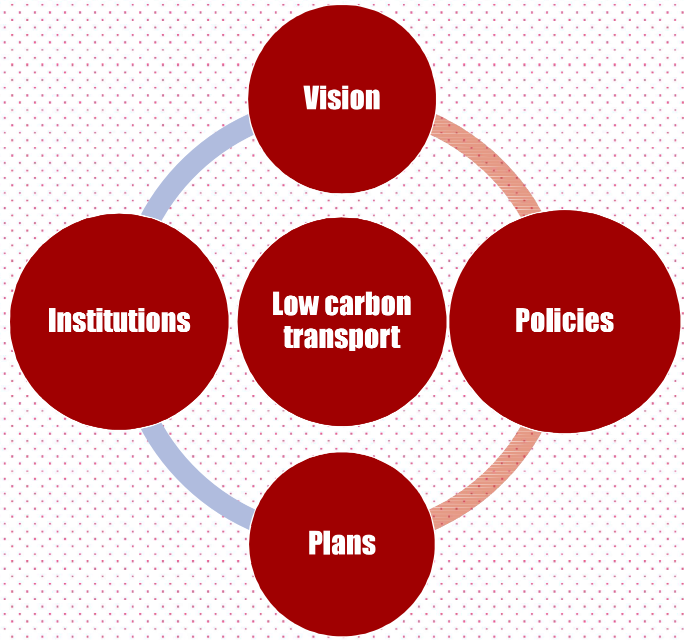
Motor Vehicles per 1,000 People



Source: World Bank, World Development Indicators

Transport Energy Consumption and Income





Vision

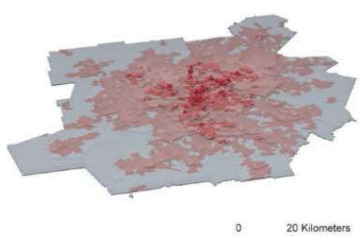
What kind of city do we want?

A sprawling city with a lot of highways?

A compact city with places accessible by walking or public transport?

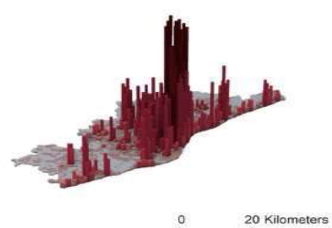
A Tale of Two Cities

ATLANTA



Population: 5.26 million
Total area: 16,605 km²
Urban area: 7692 km²
Transport emissions: 6.9 tonnes CO_2 p.c.
Traffic fatalities: 564 per year

BARCELONA



Population: 5 million
Total area: 3263 km²
Urban area: 648 km²
Transport emissions: 1.2 tonnes CO_2 p.c.
Traffic fatalities: 31 per year

A low carbon **Vision** will seek a compact city

Policies

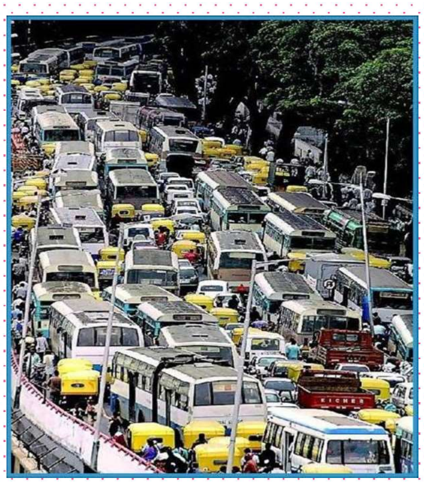
Walking and cycling are the cleanest forms of transport

But their shares are coming down for two reasons:
1. As cities grow – travel distances are longer and cannot be covered by walking or cycling
2. Due to lack of good segregated infrastructure, they are no longer safe

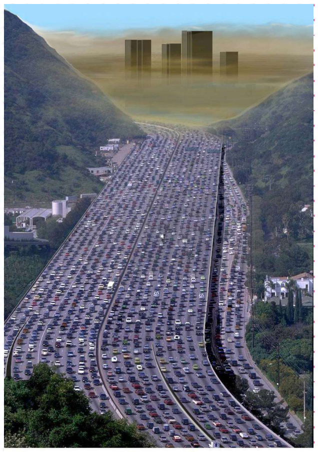
Due to longer travel distances – people have moved to motorized forms of transport

Due to poor quality of public transport - people have moved to personal motor vehicles

This has led to congestion



Impact of endless road expansion



Courtesy Transfuture.net

WE CAN NOT BUILD OUR WAY OUT OF CONGESTION

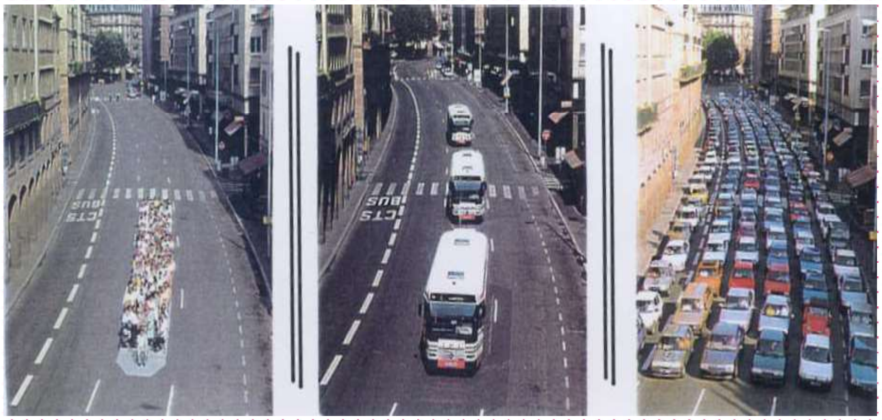
. . . and not just congestion

Air pollution is estimated to cause around 800,000 deaths in urban areas every year.
WHO

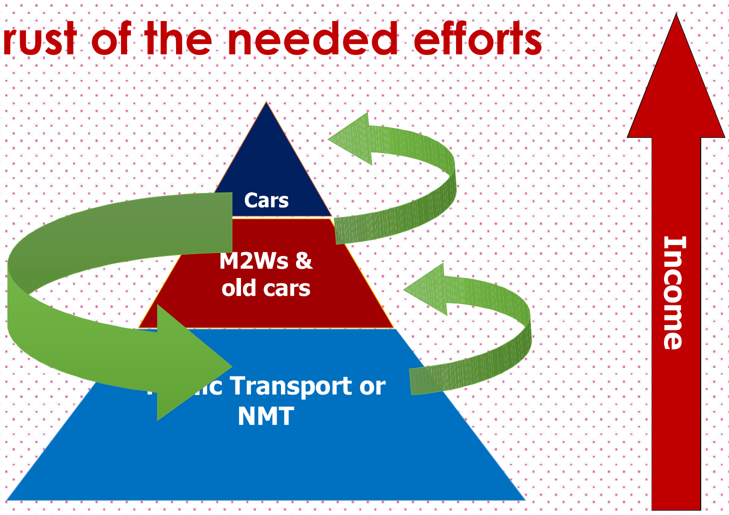
Transport accounts for around 14% of human-created GHG emissions.
BBC, 2009

Traffic accidents cause 1.2 million deaths each year.
WHO, 2010

The solution



Thrust of the needed efforts



Low carbon policies must

- Promote public transport and non-motorized modes
- Discourage personal motor vehicles
- Promote electric mobility
- Promote shared mobility

Plans

Our Public Transport has been designed for those who can not afford a personal motor vehicle

Yet, today, we need Public Transport to be attractive even for those who can afford personal motor vehicles

HENCE, PUBLIC TRANSPORT HAS TO BE "RE-DESIGNED"

Needs of personal motor vehicle users

- Variety of services to meet different requirements
- Available on demand
- Convenience of door to door service
- Reliable
- Free from the hassles of crowding
- Ease of boarding, alighting and transfer
- Quick, Safe, Clean and Comfortable

How can these needs be met

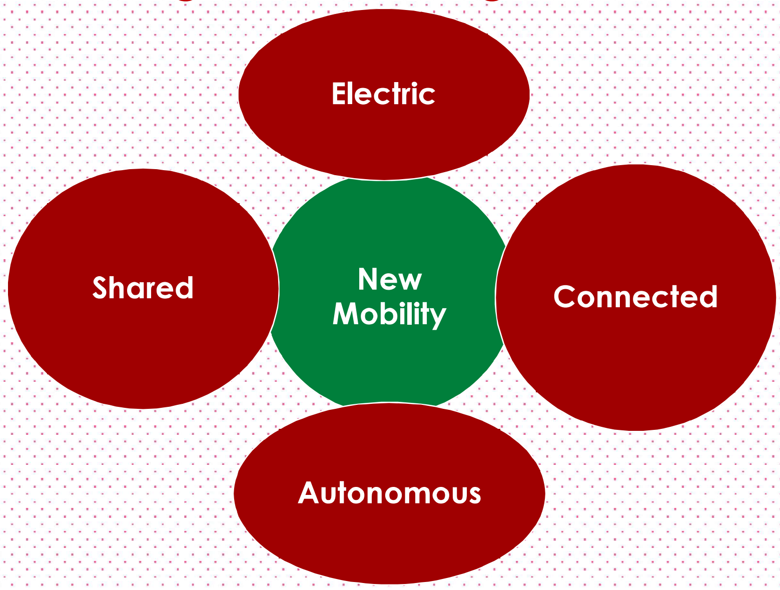
- Integrated system with easy transfers
- Clean and attractive vehicles
- Adequate capacity
- Widening the definition of public transport - go beyond fixed route and fixed schedule services
- Offer a variety of services to meet different needs
- Facilitate availability on demand
- Innovative financing to balance quality with affordability

- **Leverage new paradigms that are emerging**

What are the barriers to doing this

- Balancing quality with affordability
- Lack of institutions for multi-modal integration
- Dependence of financing only from fares and subsidy
- Lack of open data systems / reluctance to share data

Convergence of four global trend



Low carbon plans

- Invest in multi-modal and well integrated public transport systems that allow easy transfers
- Invest in safe and clean footpaths and cycle tracks
- Redefine public transport to include app based shared mobility – large cars, vans and small buses
- Increase the cost of personal motor vehicle use and ownership
    - High parking fees
    - High fuel cost
    - High registration fees
    - Limit car ownership
- Invest in infrastructure to support electric mobility

Institutions

Fragmented governance

- There are many components to the urban transport system
  - Roads
  - Bus
  - Metro
  - Taxi
  - Enforcement
  - Street lighting
- Each is managed by a different agency
- Lack of coordination – difficult to get integration

Lead Institution

- Coordinates all aspects of urban transport
- Undertakes planning, contracting, and oversight — not necessarily operations
- Undertakes effective regulation and enforcement
- Has the financial strength to be effective
- Examples:
  - Transport for London
  - Land Transport Authority of Singapore
  - TransLink in Vancouver

Summarizing

Way forward for low carbon transport

- Vision for a compact city with mixed use planning to enable short trip lengths
- Clear policies promoting non-motorized modes and public transport
- Establish a lead institution to oversee and coordinate transport in the city
- Develop comprehensive land use and mobility plans
- Invest in a high quality integrated public transport system
- Redefine public transport to include a variety of services to meet different needs and attract personal motor vehicle users
- Actively promote shared and electric mobility

Thank You

An experiment for urban energy autonomy in Seoul: The One ‘Less’ Nuclear Power Plant policy

Prof. Taedong Lee
Political Science Dept. Yonsei University

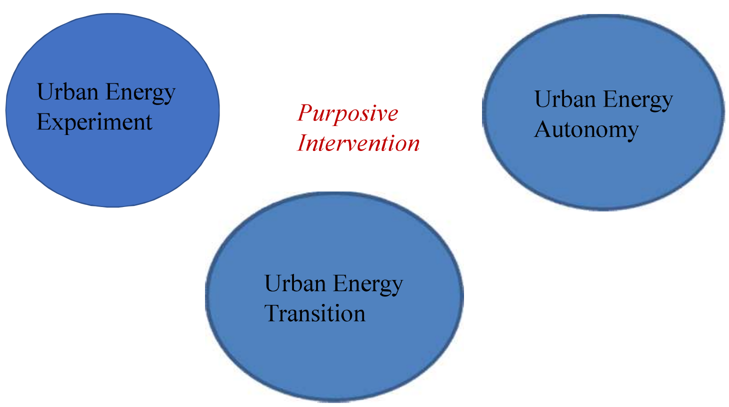
Research Questions

- How and why do cities make energy transition?
- What are the definition and components of urban energy transition?
- How do we evaluate Seoul’s “one less nuclear power plant policy”?

Introduction

- Cities use two thirds of global primary energy consumption and are powered by fossil fuels and uranium
- Are criticized to be main agents causing climate change and exposing their citizens into radiation risks
- Seoul alone consumed 10.3% of the total national energy output while producing 2.95% of its total energy consumption in 2011
- To reverse this trend, Seoul's interesting experiment was initiated since April 2012
- One Less Nuclear Power Plant Policy(OLNPPP)

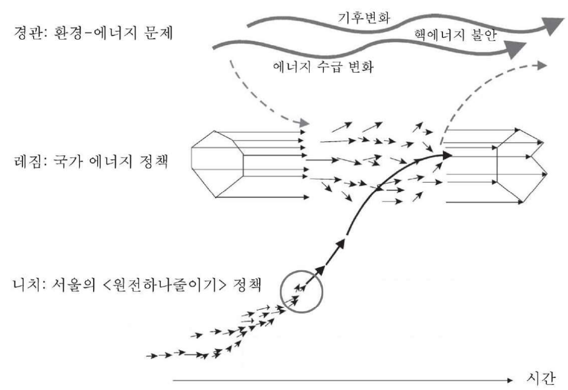
Theoretical Framework on Urban Energy Experiment/Transition/Autonomy



A purposive intervention for energy transition from an energy system based on nuclear and fossil fuels to one based on renewable energy and energy demand management.

MULTILEVEL PERSPECTIVE ON SEOUL ENERGY TRANSITION

<그림 2> 다수준 관점에서 본 에너지 전환 구조도



자료: <그림 1>에 인용한 Schot & Geels (2008:546), 재구성.

An and Lee (2016, in Korean)

A Framework to Analyze Urban Energy Experiment

Policy backgrounds	Domestic and international economic realities	What are domestic and international economic realities that influence on urban energy transition?
	Domestic and international environmentally related political concerns	What are domestic and international environmentally related political concerns contributing to urban energy transition?
	Domestic social issues	How does the siting difficulty influence on urban energy policy? To what extent?
Governance	Aims of urban energy policy	What and why are aims important and prioritized? How are the goals of urban energy policy framed? What kinds of norms and ideas are embedded in the goal setting?
	A process of decision making	Who and which organizations get involved in urban energy policy making process? Are urban energy policies made by top-down, bottom-up or mixed approach? How do the public, city officers, experts and interest groups adopt energy policy measures?
	The role of leadership	What are the role of a mayor and a mayor office in making urban energy policies? How do the mayor and the mayor's office precede urban energy policies?

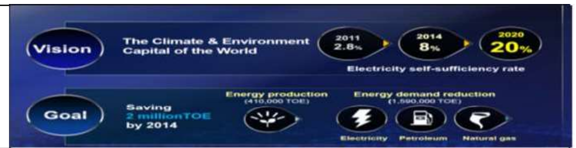
A Framework to Analyze Urban Energy Experiment

Policy Contents	Local renewable energy supply	If there is renewable energy standard and targeted goal, what would be timeline and action plans?
	Energy efficiency measures	Which types of technologies are adopted? What are the focusing fields (such as building, transportation, infrastructure, and lighting) for energy efficiency?
	Energy demand management	What are financial supports, and regulation tools for saving energy? How are communities and individuals mobilized for energy demand management?
	Performance evaluation and monitoring	How and how often do we measure the outcome of policy implementation? What are the criteria for evaluation and monitoring?

Policy Backgrounds of OLNPPP

Policy Backgrounds	Domestic and international economic realities	Power outages in September 15, 2011  
	Domestic and international environmentally related political concerns	Fukushima Daiichi nuclear power plants accident in March 11, 2011 
	Domestic social issues	Transmission towers siting problem in Miryang 

Governance of OLNPPP

Governance	Aims of urban energy policy	
	A process of decision making	* Hope Policy Advisory Panel * Environment and Culture subcommittee: 16 meetings with SMG officials and NGOs * Drafted OLNPPP * Policy Hearing Workshop on Feb 21 and Citizens' Congress (400 citizens-109 proposals) on April 16 * Final version on April 26, 2012 * OLNPPP Promotion Board under the Climate and Environment Headquarters (Leading roles by Environmental Policy and Green Energy Divisions) * Citizens' Committee / Implementation Committee * Public-Private Partnership
	The role of leadership	* Leadership of Mayor - Naming the Policy - Putting top priority on energy policy - Biannual performance evaluations meetings and other meetings organized by a Mayor

Policy Contents of OLNPPP

Policy Contents	Local renewable energy supply	* Small hydro power for water recycling centers * Hydrogen fuel cell power plants * Biogas plants *Energy ordinance amended in July 30 2012 to lower rents for public buildings in case of solar panel installation on rooftops * Installations of solar panels of 200W or smaller for apartments' balconies
	Energy efficiency measures	* Building Retrofit Projects(BRPs) * LED replacement
	Energy demand management	* Targeted reducing Energy consumption in commercial (60%) and residential (28%) sectors * Eco-mileage system * Energy Consulting Services * 150 Energy Designers- schools and commercial buildings * Energy Self-sufficient Villages
	Performance evaluation and monitoring	* Accomplishing 73% of the goal as of the end of March 2014 * Energy conservation (870,000TOE), Energy efficiency (650,000TOE) and New and Renewable energy production (250,000TOE) * Regular performance monitoring meetings * New and Renewable Energy (500,000 TOE (goal) ☞ 250,000TOE) * 96% of BRP benefited to the replacement of windows

Discussion



- OLNPPP as responding to concerns at local, national, regional and global scales
- OLNPPP considers local energy issues beyond administrative jurisdiction
- "Direct experiences" of stakeholders strongly influenced policy formation
- Goals of OLNPPP added "social (or moral) dimension" in the previous "only environmental dimension" of the energy policy ☞ Norm Change
- OLNPPP as the mix of top-down and bottom-up approaches

Policy Implications



- cities can use political opportunities occurring at local, national and global scales for setting goals and agendas, implementing the policy and gaining public supports about their urban energy policies
- creating urban energy policy with great public support can come from the mixed top down and bottom up approaches
- the role of leadership is crucial for setting aims and agendas in the policy formation and policy implementation
- the importance of concrete targets and regular performance evaluations
- must institutionalize setting concrete targets in short, medium and long terms, and implementing regular performance evaluations with legal framework

Conclusion

- Pursuing co-existence with other locals through energy policy is the key message from the experiment (OLNPPP)

- The success of OLNPPP can pressure to reconsider nuclear power plants and transmission towers construction at national and other local levels.

- **Our contribution to urban energy policy literature**

- we conceptualize the meaning of urban energy experiment for urban energy autonomy, based on the concept of urban climate change experiment

- we provide analytic framework for urban energy experiment: background, governance and policy contents

- While this experiment may not be generalizable or applicable to other city context, diffusion and learning through networking and collaboration can facilitate various urban energy experiments across cities around the world

- **Future research agenda**

- In order for that, how local authorities bolster urban energy experiment for energy autonomy with an institutional setting should be analyzed

International Forum on Low Carbon City Development: For Central Asia Regional Economic Cooperation (CAREC) Program Cities in Beijing, People's Republic of China (PRC), 4–6 December 2018.

Low-Carbon Transport Measures for Fast Emerging Cities

Lessons Learned from Seoul & Manila

Gyeng Chul Kim, Ph.D.
Former President, Korea Transport Institute
gckim1004@gmail.com

Rush from rural to URBAN - Hunt for Opportunities

Greater Manila (7 million to 25 million : 3.6x)

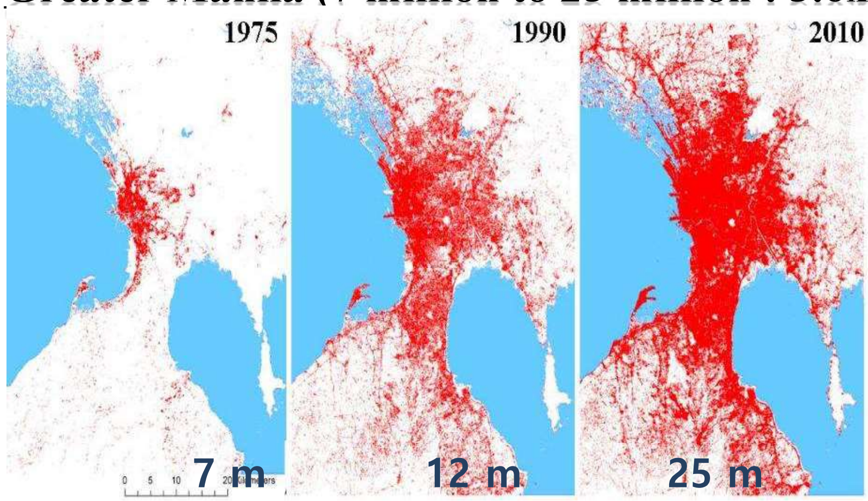
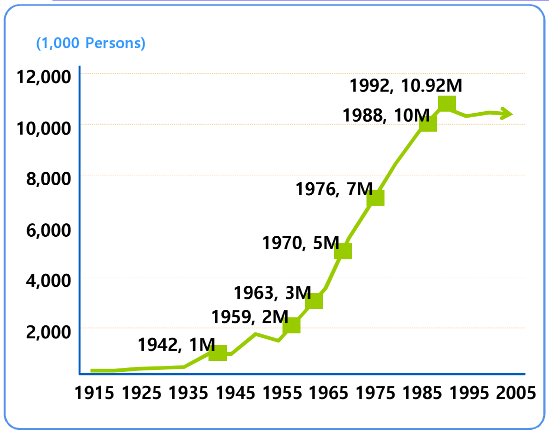


Figure shows urban growth of Manila, Philippines. (Ref: earthzine.org)

Rush from rural to CITIES – Hunt for Opportunities

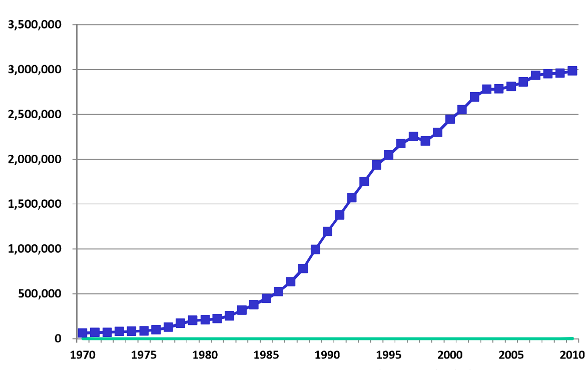


Every 5 years,
2M people come to Seoul.
What to do first?

CARS, CARS, CARS! Motorization (Seoul)

- 1970 : 60,000 cars → 2010 : 2.98 million

[Registered Vehicles in Seoul]



- No. of Vehicles : 49x more

- Road : 4%/year only

→ Emerging challenges?

What we did: Private CAR - the KING

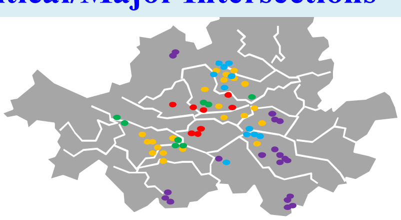
Expansion of Car Lanes – Reduction of Sidewalks, Removal of Bikeways

To make cars go faster, roads are widened BUT sidewalks are reduced.

Social Justice? Heading to a High-Carbon Society?

What Seoul did : Private CAR - the KING

Flyovers Built: 106 (1970-2000) Critical/Major Intersections

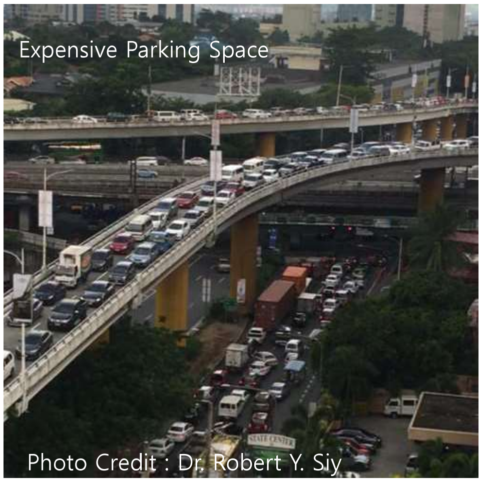


Overpass Built: 256 (1970-2000)

Source: Kim et al, 2011

CAR-obsessed, High-Carbon Cities

More Flyovers for Cars - Attracted More Cars & Heavy Traffic



Uncontrolled increase in private cars is the root cause of traffic & a High-Carbon City.

Urban System Failure

80:20

Cars occupy 80% of road space, but move only 20% of passengers

Jams, Bankruptcy, Costs, Fuel, Asthma, Anger

“Car owners get to use the roads while other commuters get stuck in buses that can't travel fast.”

Low-Carbon Transport Measures

What Seoul did:
PARADIGM SHIFT

Sidewalk Expansion, Bikeway Network, Public Transport Priority

Promote Low-Carbon City

BEFORE	AFTER

Promote Low-Carbon City

BEFORE	AFTER

Mom-Friendly City?
Car-Friendly City?

Demolition of Pedestrian Overpass

BEFORE	AFTER

Promote Low-Carbon City

Promote Low-Carbon City

BEFORE	AFTER

Low-Carbon Transport Measures for Emerging Cities

Lessons Learned from Seoul & Manila

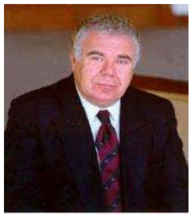
Promote Low-Carbon Transport

BEFORE	AFTER

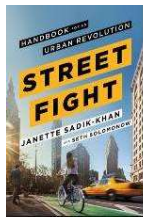
Jeepney Modernization Program

Strong Leadership

Political Leadership – Political Will








Mexico City, Santiago (Chile), Buenos Aires (Argentina), etc.

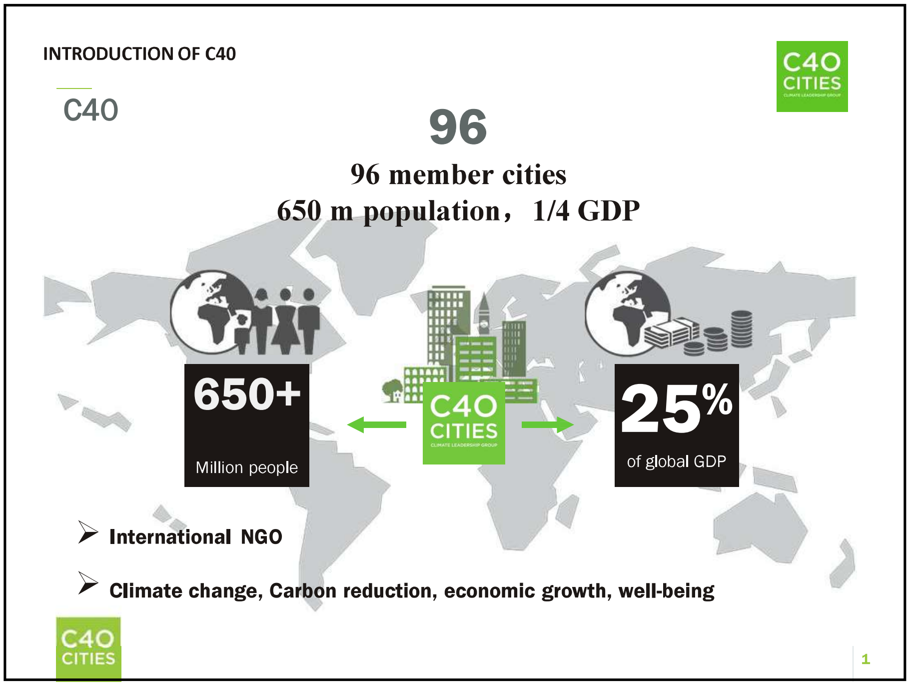
Policy Failure : Private CAR-Oriented, High-Carbon City

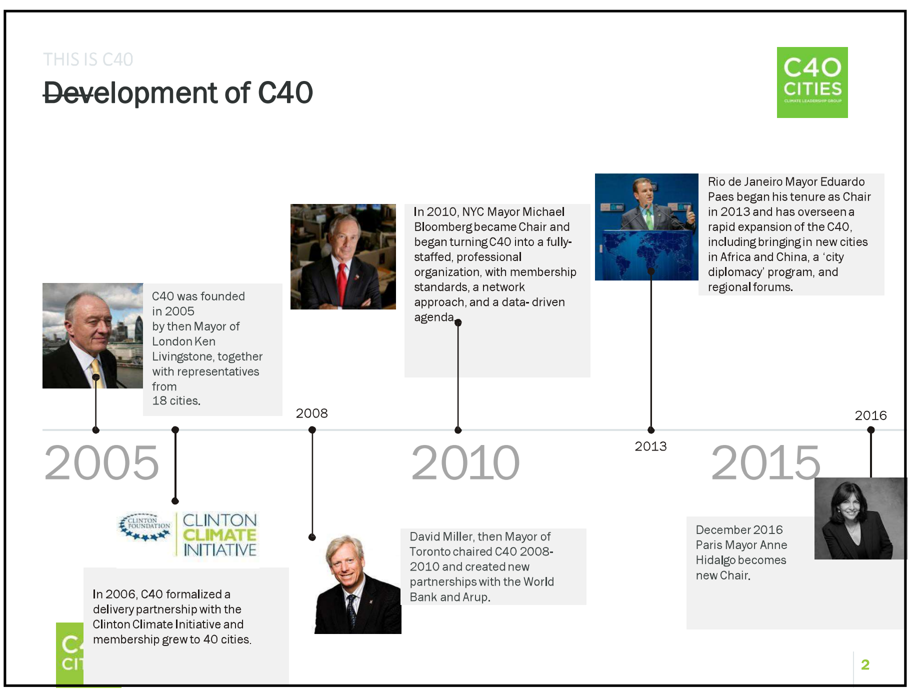
Remove Bike lanes, Build Flyovers & Ped Overpass?
How many passengers in all private cars?
Is the number higher than those in 6 buses'?

Question:

1. **Lower-Carbon Mode (PT&NMT) : TOP Priority - How?**
2. **Action Barrier: What?**
3. **Champion, Leadership: Who? (Local, National ?)**

Source: Wikipedia, BRT Changan_avenue_in_Beijing.jpg


INTRODUCTION OF C40
C40 CITIES
C40
96
96 member cities
650 m population， 1/4 GDP
650+
Million people
C40 CITIES
25%
of global GDP
International NGO
Climate change, Carbon reduction, economic growth, well-being
C40 CITIES
1


THIS IS C40
Development of C40
C40 CITIES
C40 was founded in 2005 by then Mayor of London Ken Livingstone, together with representatives from 18 cities.
In 2010, NYC Mayor Michael Bloomberg became Chair and began turning C40 into a fully-staffed, professional organization, with membership standards, a network approach, and a data- driven agenda.
Rio de Janeiro Mayor Eduardo Paes began his tenure as Chair in 2013 and has overseen a rapid expansion of the C40, including bringing in new cities in Africa and China, a 'city diplomacy' program, and regional forums.
2005
2008
2010
2013
2015
2016
CLINTON CLIMATE INITIATIVE
In 2006, C40 formalized a delivery partnership with the Clinton Climate Initiative and membership grew to 40 cities.
David Miller, then Mayor of Toronto chaired C40 2008-2010 and created new partnerships with the World Bank and Arup.
December 2016 Paris Mayor Anne Hidalgo becomes new Chair.
2

C40 has 12 member cities in China （by Oct 2018）

C40 model：knowledge sharing, TA, training & certification

Chinese cities winning C40 awards

Chinese cities active in networks

Chinese cities hosting C40

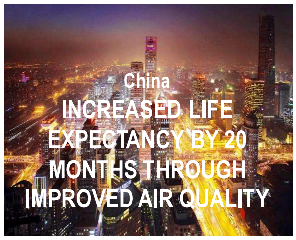
Chinese cities at C40 Summit

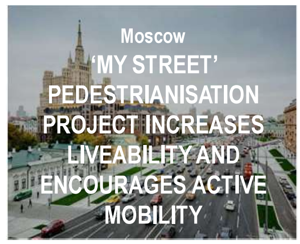
Positive feedback from Chinese cities

"Wuhan is experiencing extremely rapid growth, and the city is committed to developing in the most environmentally and sustainable way possible…We were so pleased to welcome and learn from all of the C40 international experts who joined us in Wuhan. This workshop and C40's networks allow us to learn from best practices from around the world." (Wuhan, Climate Positive workshop)

Chinese cities part of C40 led TA programs

Climate action does not come at the cost of growth

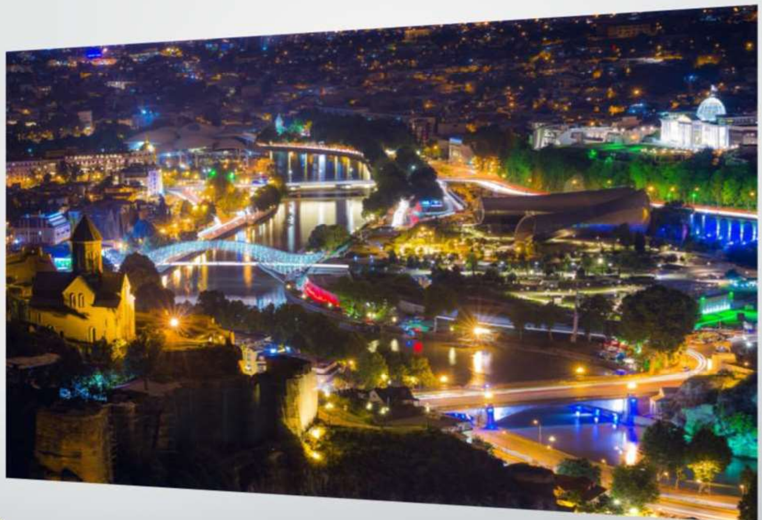




Deadline 2020 Programme: support cities to deliver Paris Agreement

The C40 Deadline 2020 Programme aims to support all C40 cities to develop by 2020 Climate Action Plans aligned with the goals of the Paris Agreement

DEADLINE 2020



Tbilisi City Hall

Deputy Mayor Maia Bitadze

Challenges for Tbilisi City

- Urban development:
  - Waste management
  - Energy efficiency
  - High density
- Renovation of public transportation and urban mobility system
- Coverage, quality and accessibility of the city's parks and other recreational amenities

Steps to be taken by Tbilisi City

- Proper urban planning, sound waste management system, foster energy efficiency
- New public transport scheme, upgrade public transport, sustainable urban mobility
- Enhancing coverage, quality and accessibility of the city's parks and other recreational amenities

Thank you for Attention!

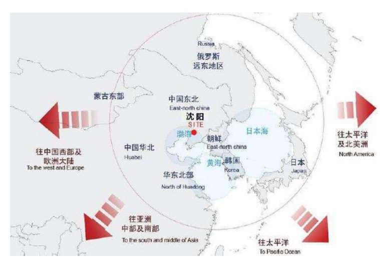
Challenges and Opportunities during Shenyang Low-Carbon Development

Characters and Opportunities

Prospect

Ability

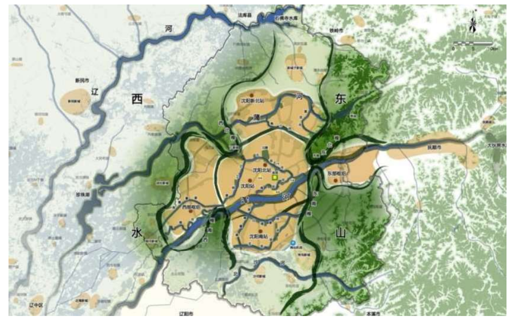
Market



Peak Target

By 2027, Carbon dioxide emissions per unit GDP reduce approximately 60% than the year of 2005.

Total Carbon dioxide emission reach 0.11 billion tons.



Path and Methods

Main Area

- New Energy Vehicle
- Numerical Control Machine
- Robot
- Rail Transit Equipment
- Biomass Energy
- Back Pressure Co-generation
- …………

Market Mechanism

- Local ETS
- Carbon industrial cluster
- …………

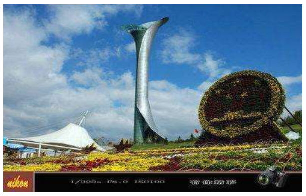
Policy

- Eco-compensation
- Green Finance
- Finance and Taxation Policy
- …………

Project Cooperation

- Green Energy
- Smart Equipment
- Green Architecture
- Producer Services
- Comprehensive Utilization of Resources
- …………

Lucid Waters and Lush Mountains are Invaluable Assets
The World of Ice and Snow are also Invaluable Assets



Shenyang is opening her arm to the whole world towards solution of GHG problem, green development, and creating a better tomorrow.

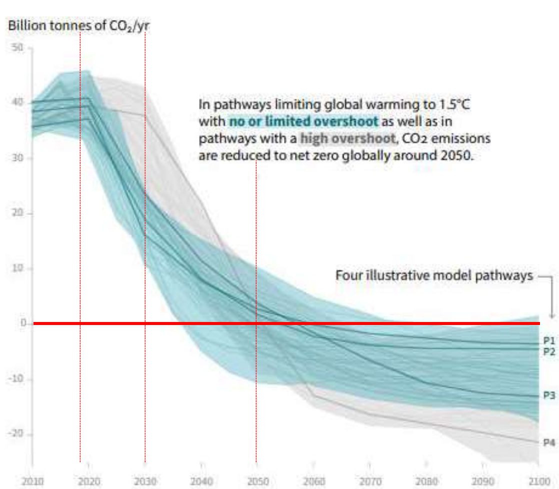
Thank you!

WORLD RESOURCES INSTITUTE

Evidence-based city climate action planning for global 1.5ºC goal

Dr. Fong Wee Kean
Deputy Director, WRI China
Global Lead, Subnational Climate Strategy

IPCC's 1.5ºC pathways

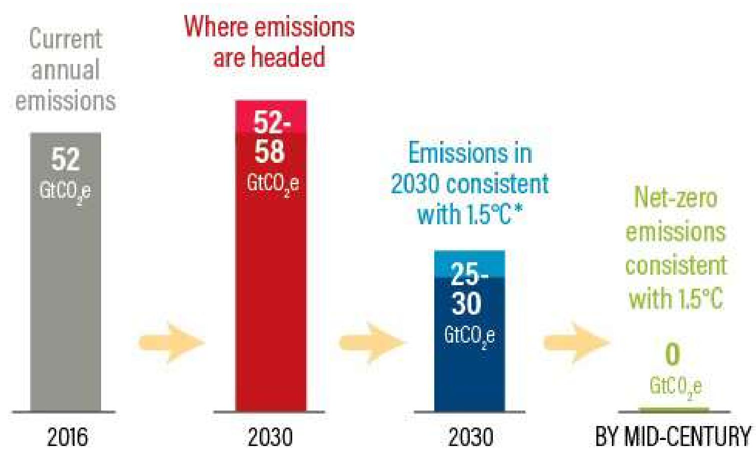


IPCC "*Global Warming 1.5ºC*" report:

The world needs to peak emissions before 2030 and reach net-zero emissions by 2050

Graphic: IPCC

The NDCs are not in line with the 1.5ºC goal



Graphic: WRI

WORLD RESOURCES INSTITUTE

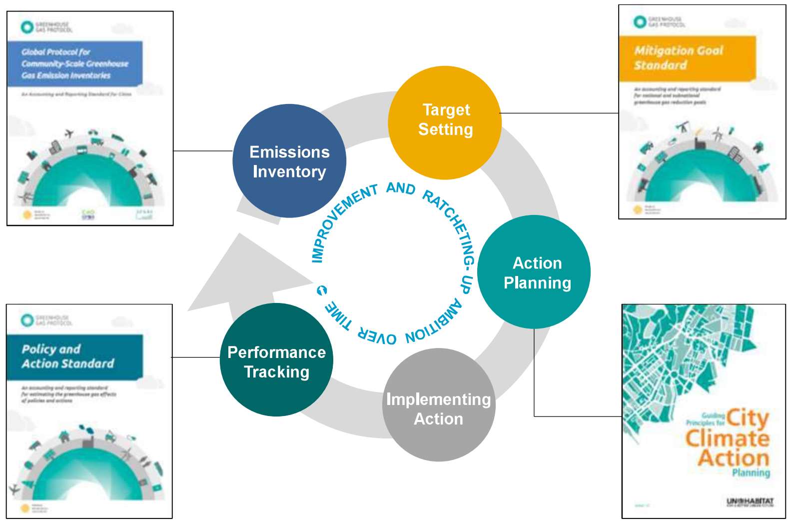
Evidence-based climate action planning

You can't manage what you can't measure

Graphic: WRI

WORLD RESOURCES INSTITUTE

Action planning standards and tools



Graphic: WRI, GHG Protocol, Guiding Principles for City Climate Action Planning

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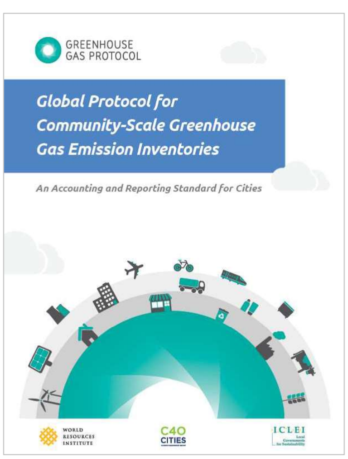
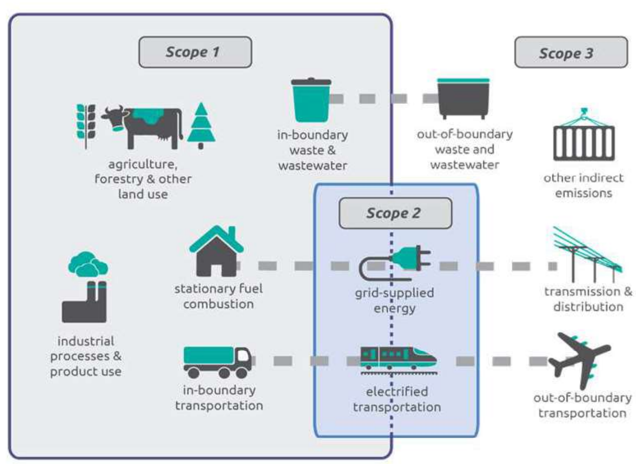
GHG Inventory – GPC





Source: GHGP

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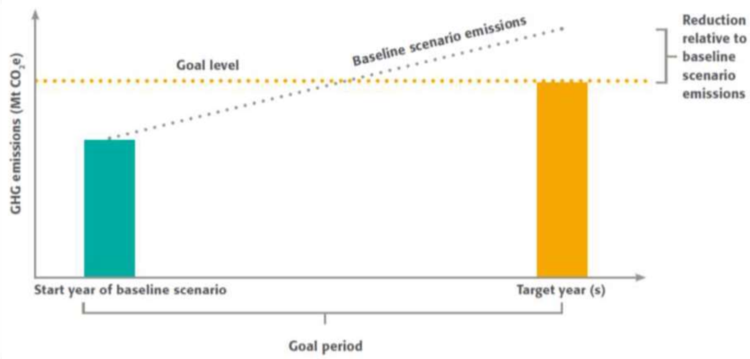
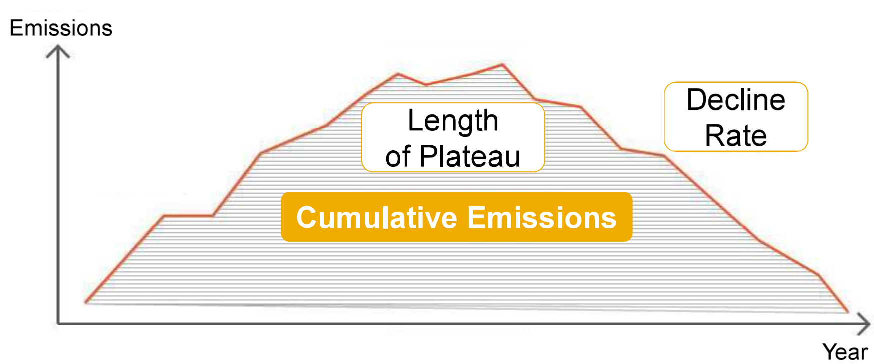
Target – Mitigation Goal Standard



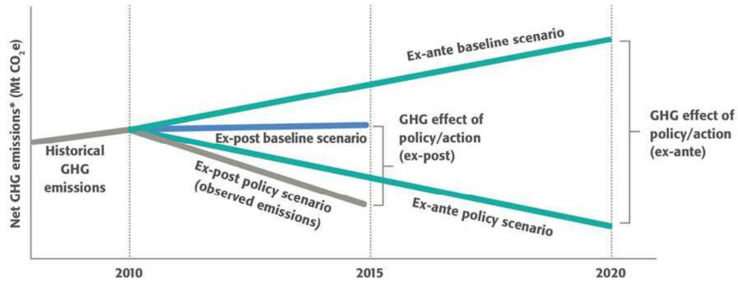
Graphic: GHGP

Target – Peaking and phasing out emissions



Graphic: WRI

Performance tracking – Ex-ante and ex-post assessment



Source: GHGP

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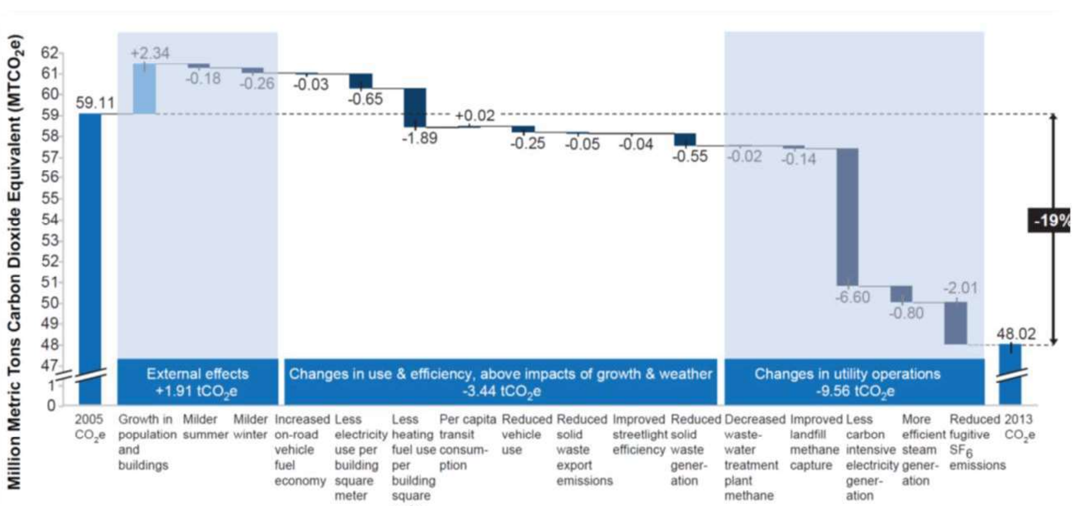
Performance tracking – GHG data analysis



Source: PlaNYC

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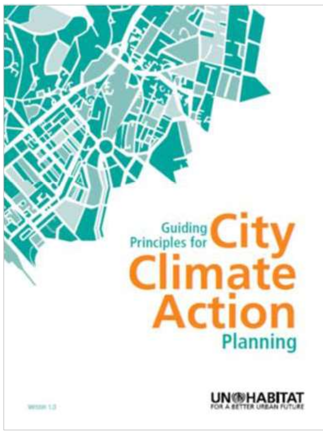
Inclusive climate action planning



Graphic: WRI

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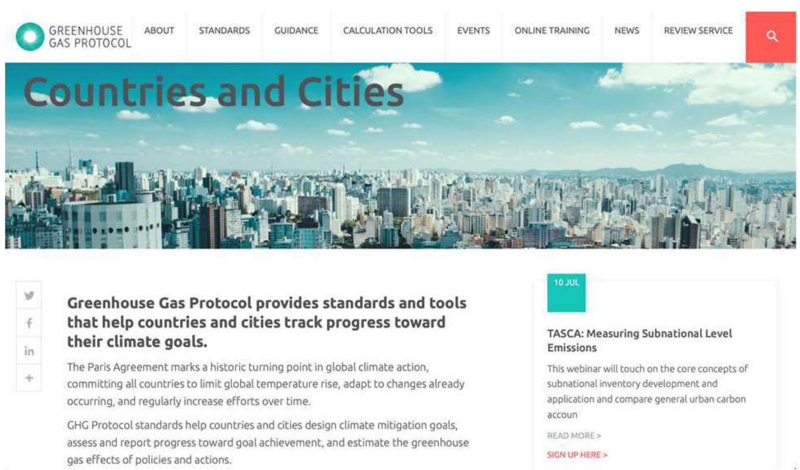
GHG Protocol

ghgprotocol.org



Graphic: GHGP

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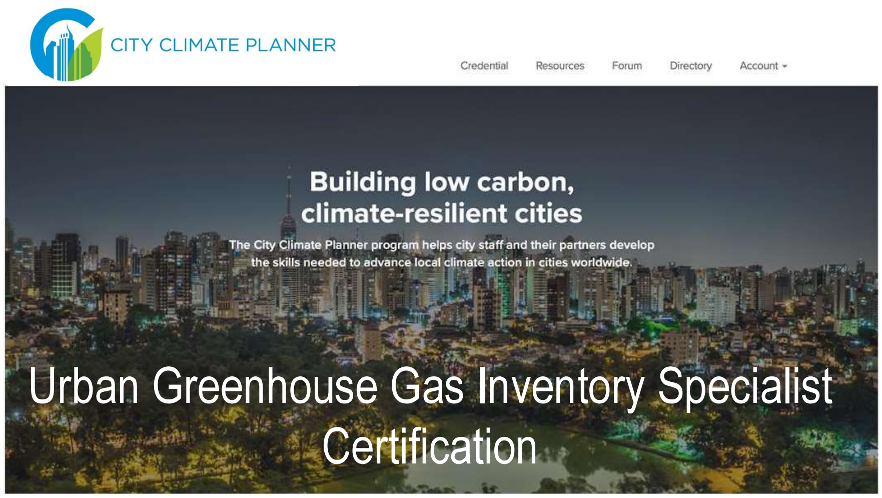
City Climate Planner program

cityclimateplanner.org



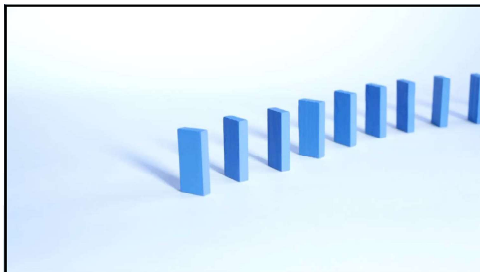
Graphic: City Climate Planner program

Thank You!

Fong Wee Kean

wkfong@wri.org

www.wri.org
www.ghgprotocol.org



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CIrcle

The clockwork that makes modern society tick

Tjitte Nauta – Regional Manager Asia / Strategic Advisor
Integrated Water Management

International Forum on Low Carbon Development for Central Asia Regional Economic Cooperation Program Cities - Beijing, December 4-6th, 2018

Are you safe?

This presentation / links for Circle Videos:

Introduction to CIrcle
https://www.youtube.com/watch?v=R204VdO216U

Case of Waterland
https://www.youtube.com/watch?v=O5dz7LwvO_c&t=53s

Case of Cork
https://www.youtube.com/watch?v=9tISZo8cmMY

Summary

'Critical Infrastructure' means an asset, system or part thereof [...] which is essential for the maintenance of vital societal functions, health, safety, security, economic or social well-being of people, and the disruption or destruction of which would have a significant impact in a Member State as a result of the failure to maintain those functions.

Source: European Commission (2008): Council Directive 2008/114/EC of 8 December 2008 "on the identification and designation of European critical infrastructures and the assessment of the need to improve their protection.

Circle - Cascading domino effects of floods on critical infrastructures

Over the past decades, the increasing frequency and intensity of extreme climatic events have impacted the society in unimaginable ways. Particularly the interruptions of critical infrastructures such as electricity, communication, drinking water or transport systems lead to enormous, often long-lasting societal impacts including fatalities and economic losses.

CIrcle helps stakeholders to understand the complex and interdependent relations between critical infrastructure systems. These relations, or causal links, can be investigated and visualized even within the context of a relatively data poor environment.


Blackout in Italy
National Blackout in 2003


2010 Queensland Floods
Australia
Source: 2010 Queensland Floods on Boston Big Picture


Thailand floods 2011


Blackout in Manhattan
Hurricane Sandy (October 2012)
Source: Wikipedia Commons – User Hybirdd

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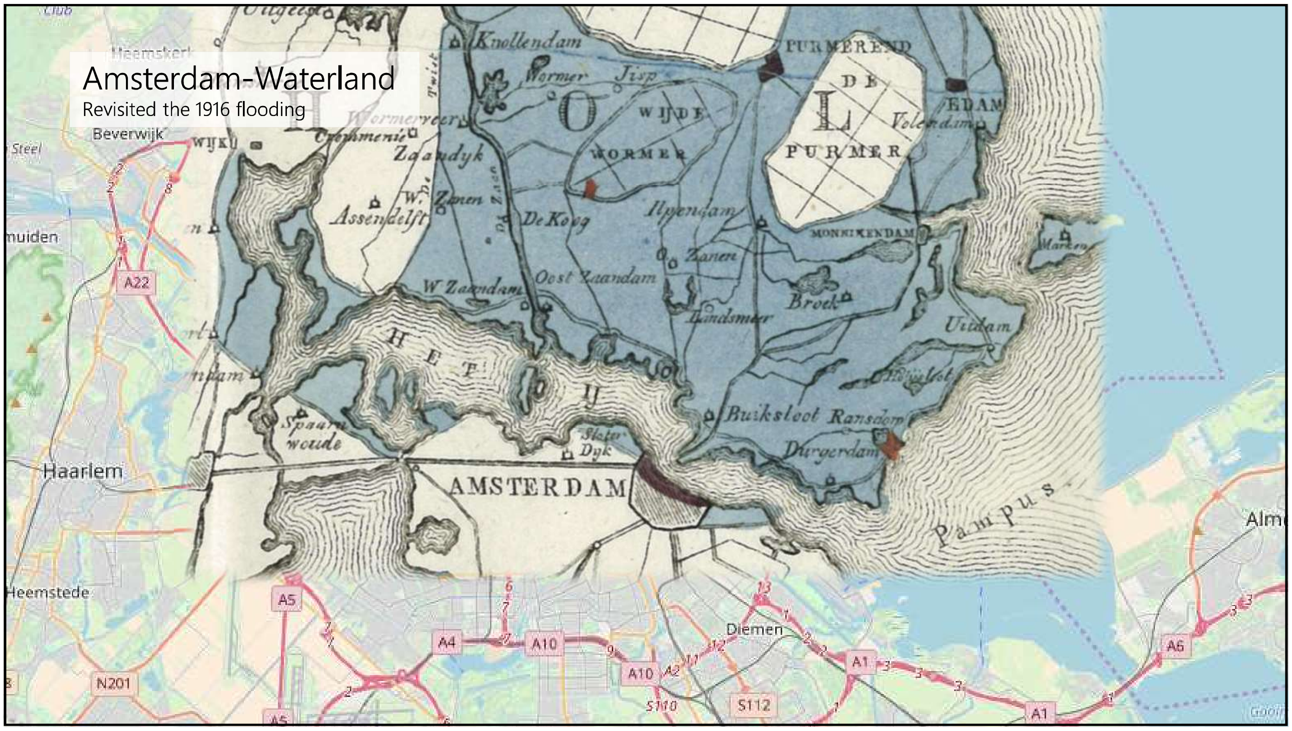
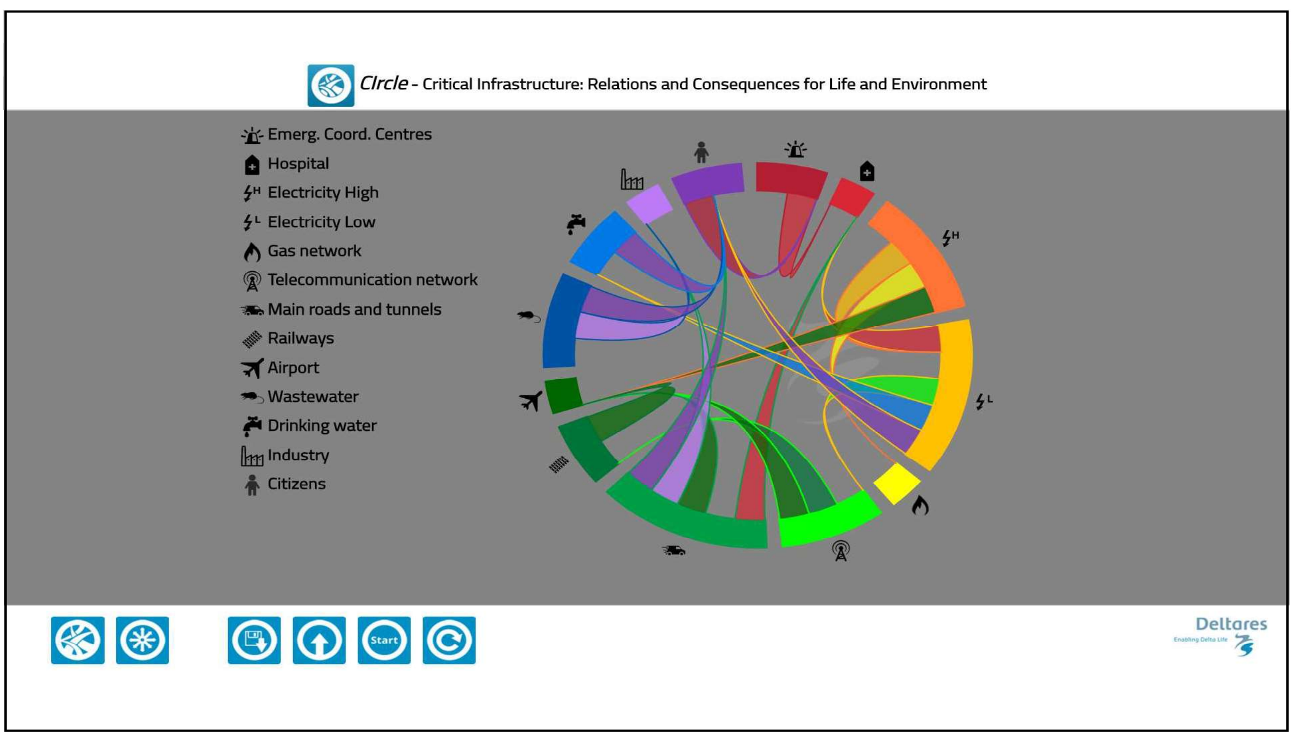

Amsterdam-Waterland
Revisited the 1916 flooding


CIrcle - Critical Infrastructure: Relations and Consequences for Life and Environment
Emerg. Coord. Centres
Hospital
Electricity High
Electricity Low
Gas network
Telecommunication network
Main roads and tunnels
Railways
Airport
Wastewater
Drinking water
Industry
Citizens
Start
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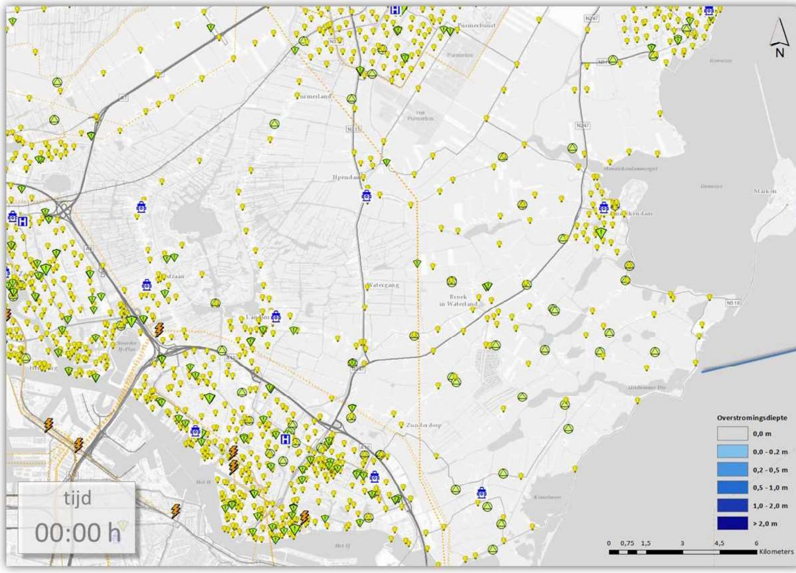
CIrcle case study - Cascading-effects in Waterland 1916 – 2016



Two dike breaches cause Waterland to flood entirely within 36 hours.

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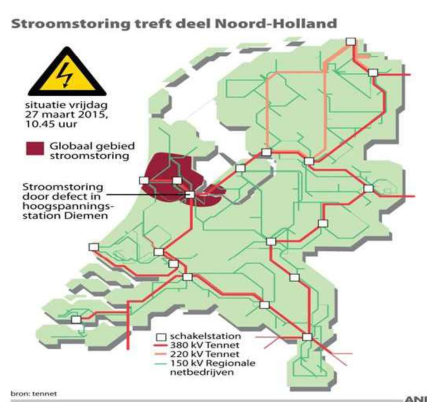
Large Power Outage Amsterdam 2015



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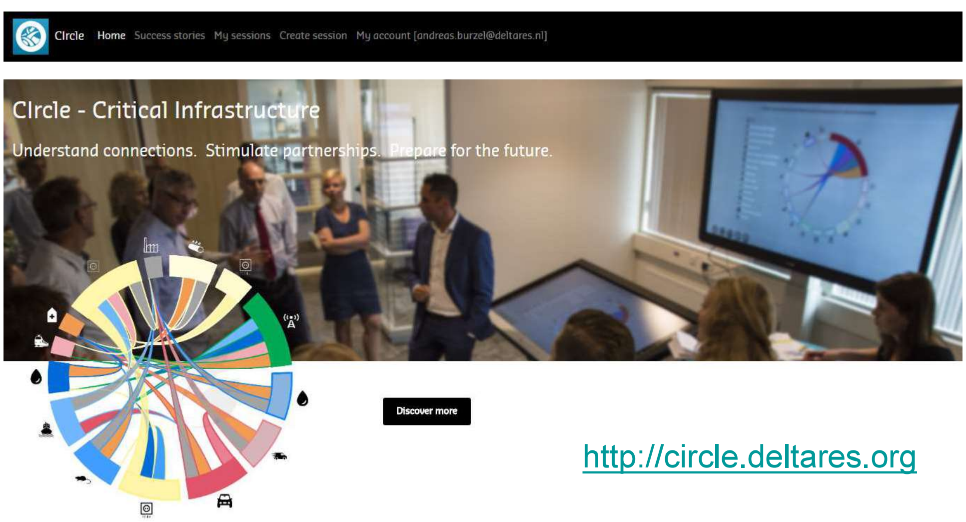
Cork, ireland – interactive flood modeling

CIrcle Online – Open to the Community



http://circle.deltares.org

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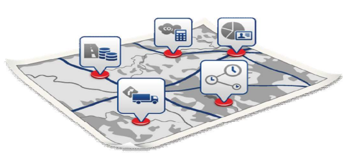
Non-digital Circle

Contributes in…

Awareness and overview

Collaboration



Planning

Decision making

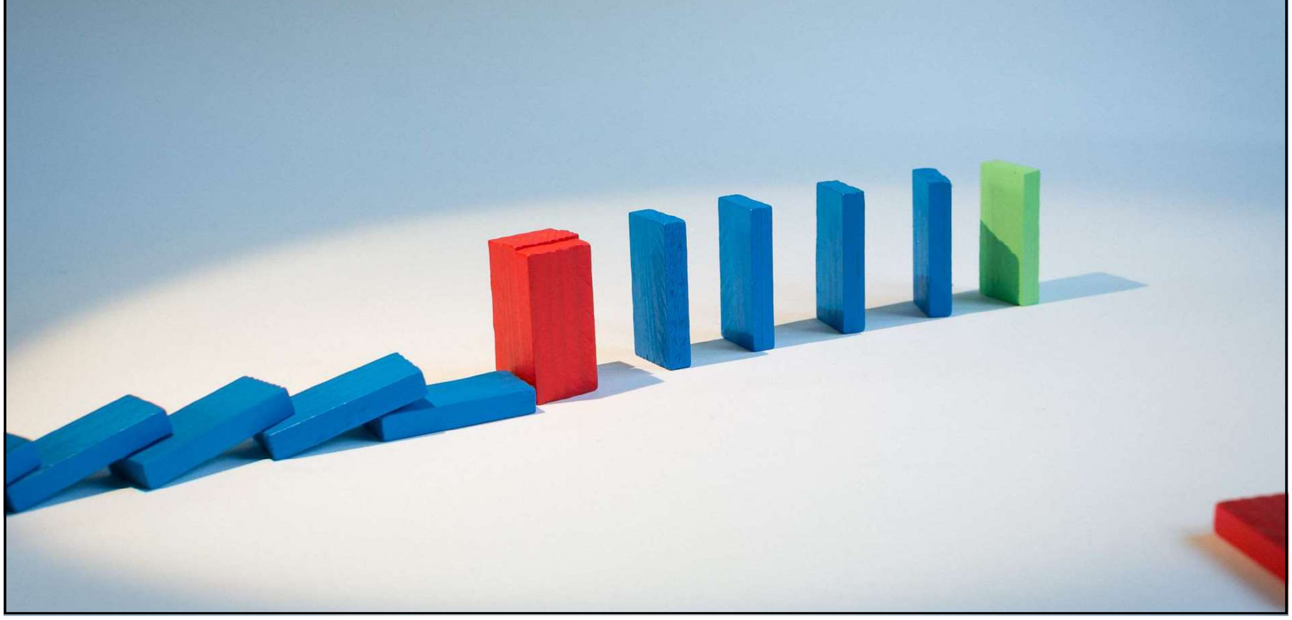
Prioritizing actions

Summary

- CI is very relevant
  - networks enable the flux of people, goods, data and money
- We have little or no experience in CI failure
  - climate change – extreme patterns
  - likelihood to fail increases with increasing complexity
  - in the next 30 years more infrastructure will be build than since built from the beginning of industrialization
- 'Small impacts, large consequences' events are difficult to identify
- Awareness can lead to increased resilience

Perfect tool for disaster management and planning
("if you fail to plan, you plan to fail")

Thank you for your attention!



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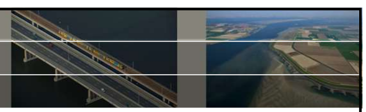
Collaborative approach for the design of resilient cities

ADAPTATION SUPPORT TOOL

frans.vandeven@deltares.nl
reinder.brolsma@deltares.nl

Context for Adaptation



Climate change:
- Increase rainfall intensity
- Increase in temperature
- Sea level rise
- (Increase in drought)

Continuous population growth and urbanization
- Land use change leading to
  - Reduced infiltration and increased runoff
  - Increased urban heat island effect
- Increased water demand
- Land subsidence in delta cities

Cities designed for current or past conditions => retrofitting

Urban Nature based solutions – Sponge cities

Urban Nature-based solutions (NBS) refers to the sustainable management and use of nature (e.g. Green Infrastructure) for tackling societal challenges.

- Effective in climate adaptation
- Additional benefits
- Adding function to green

In practice both **soft and hard engineering solutions**.

Ecosystem based solutions

Hybrid solutions

SOFT ENGINEERING **HARD ENGINEERING**

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Climate adaptation – Stakeholder engagement

Maximizing:
- Flooding
- Heat stress
- Drought

Maximizing:
- Livability / urban regeneration
- Health potential
- Sustainable economic development

In existing cities climate adaptation involves many stakeholders:

E.g. urban planners, drainage departments, road department, landscape designers, project developers, housing corporations, etc.

Co-creation as part of stakeholder engagement

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Adaptation Support Tool (AST)

The Adaptation Support Tool:

Assist stakeholders (urban planners, drainage departments, municipalities, landscape designers, project developers, housing corporations, etc.)

in the process of **decision making** and

enabling **a collaborative design process** towards more resilient cities.

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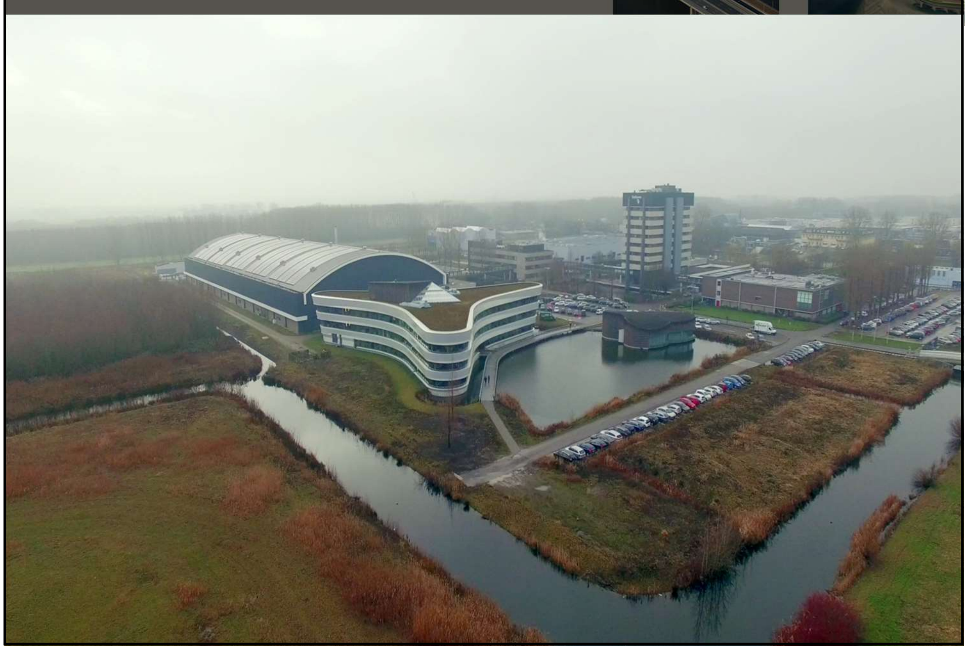
AST application New Orleans



AST in the adaptation process

Problem analysis
- Exposure
- Risk

- Hydraulic, Heatstress model, …

Exploring adaptation options

- AST

Detailed effect analysis of adaptation measures

- Hydraulic, Heatstress model, …

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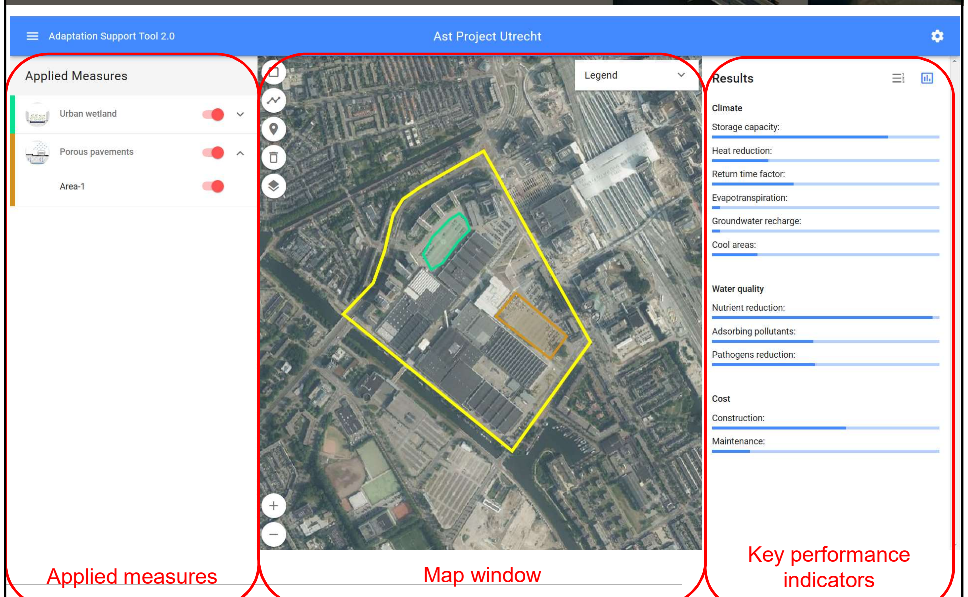
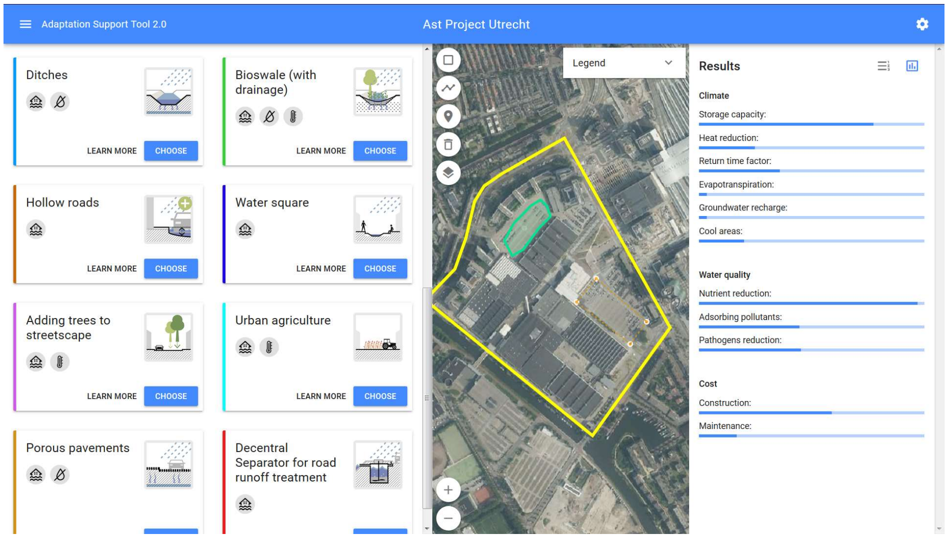
AST 2.0 - User interface



AST 2.0 - User interface



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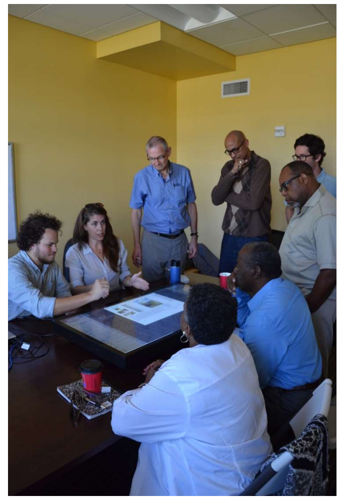
AST 2.0 - 70 Adaptation measures

AST - Sessions



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Utrecht Center – Fair area - AST 2015

Stakeholders: Municipality + Fair

Ambition: Most green, climate resilient and healthy urban area

AST used to collaboratively explore potential adaptation measures

Funding: City of Utrecht, Fair, EU

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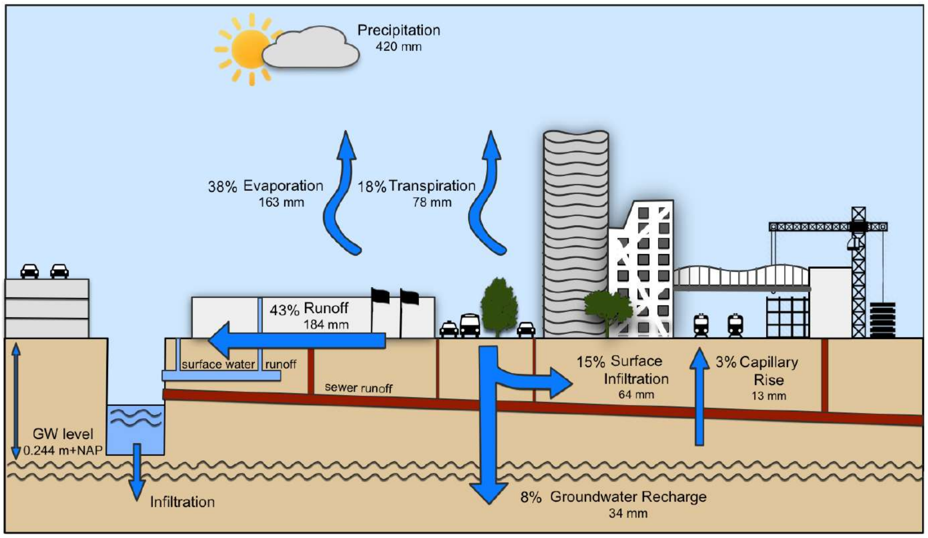
Change the water flow to increase resilience



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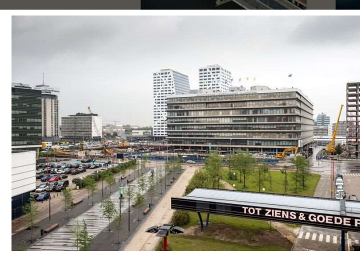
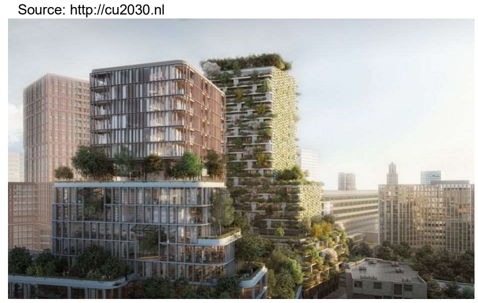
AST to implementation 2018



Source: http://cu2030.nl



Source: www.stefanoboeriarchitetti.net

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Collaborative planning with AST - Experience

Advantages:

- Co-creation really works
- Designs that are supported by the stakeholders
- Positions of the different stakeholders can become very clear
- Solutions are location specific
- Discussions are focused on opportunities and benefits of specific interventions

More information

ast.deltares.nl

Voskamp IM, Van de Ven FHM (2015) Planning support system for climate adaptation: Composing effective sets of blue-green measures to reduce urban vulnerability to extreme weather events. Building and Environment 83, p 159-167. http://dx.doi.org/10.1016/j.buildenv.2014.07.018

van de Ven FHM , RPH Snep, S Koole, RJ Brolsma, R van der Brugge, J Spijker, T Vergroesen (2016) Adaptation Planning Support Toolbox: Measurable performance information based tools for co-creation of resilient, ecosystem-based urban plans with urban designers, decision-makers and stakeholders, Environmental Science & Policy, Volume 66, 2016, Pages 427-436, https://doi.org/10.1016/j.envsci.2016.06.010

McEvoy S, FHM van de Ven, MW Blind, JH Slinger (2018) Planning support tools and their effects in participatory urban adaptation workshops, Journal of Environmental Management, Volume 207, 1 February 2018, Pages 319-333, https://doi.org/10.1016/j.jenvman.2017.10.041

ENABLING DATA FOR CITIES

Bruce Taper, Kinesis

www.kinesis.org

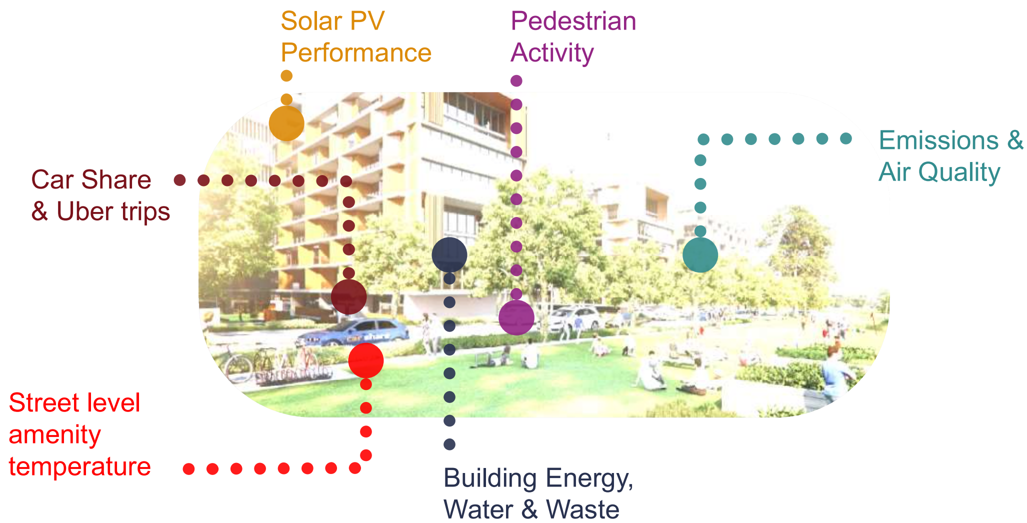
Who We Are

We exist to make cities better through data + software.

- ***Better Data***
- ***Better Decisions***
- ***Better Cities***

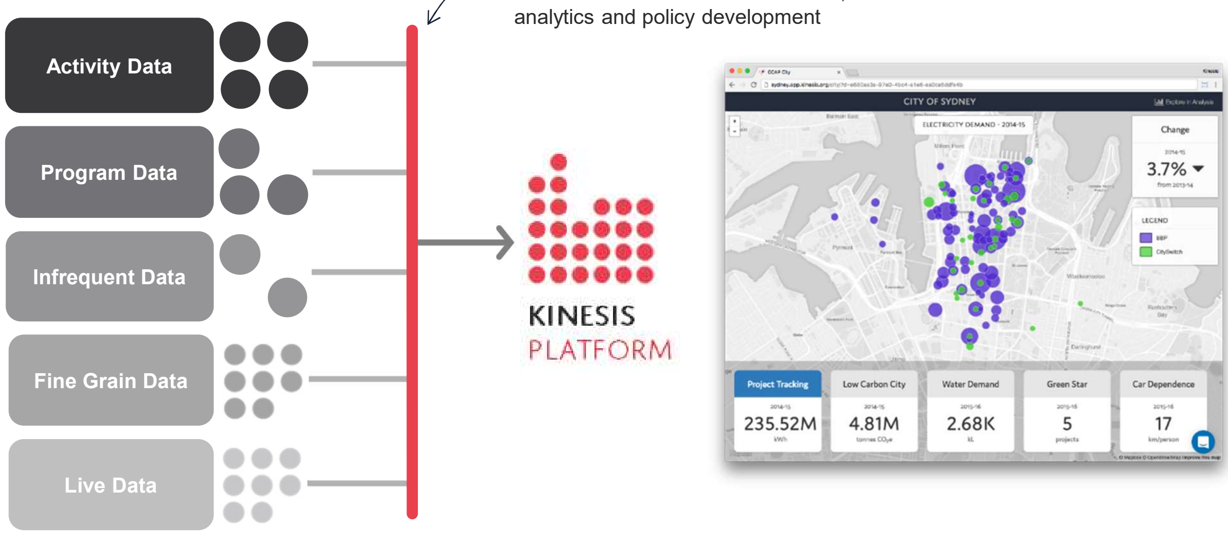
www.kinesis.org

Disparate Urban Data

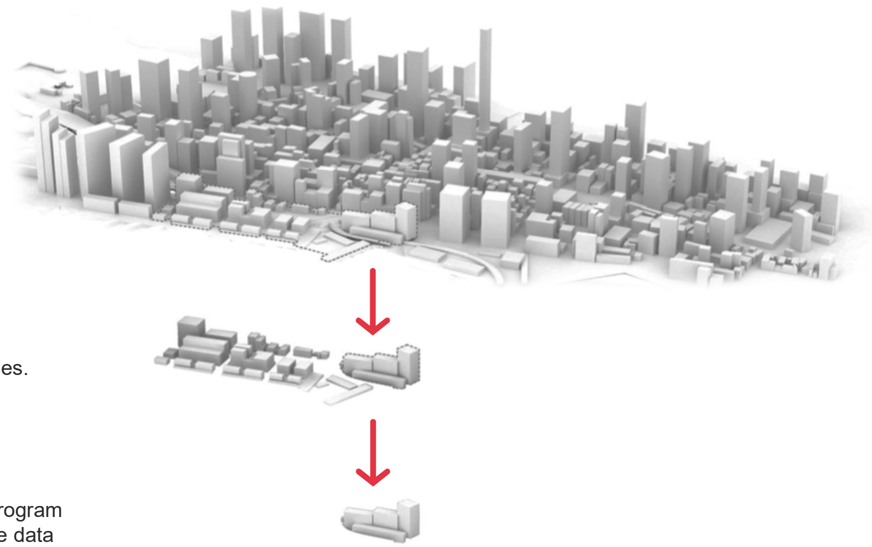


Kinesis Platform

- Single source of truth
- Normalisation of data for broad use, analytics and policy development



Kinesis Platform



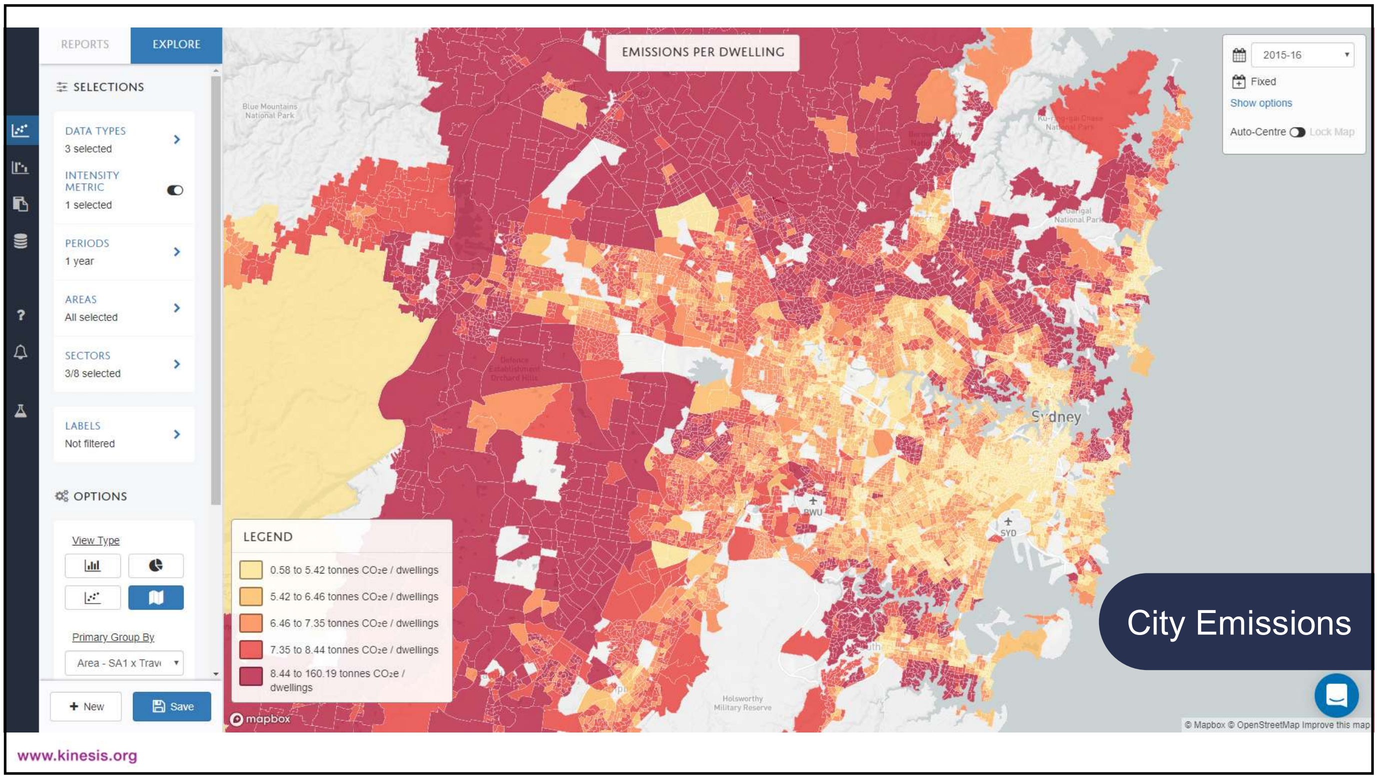
Context
Contextualise and analyse local/metropolitan datasets

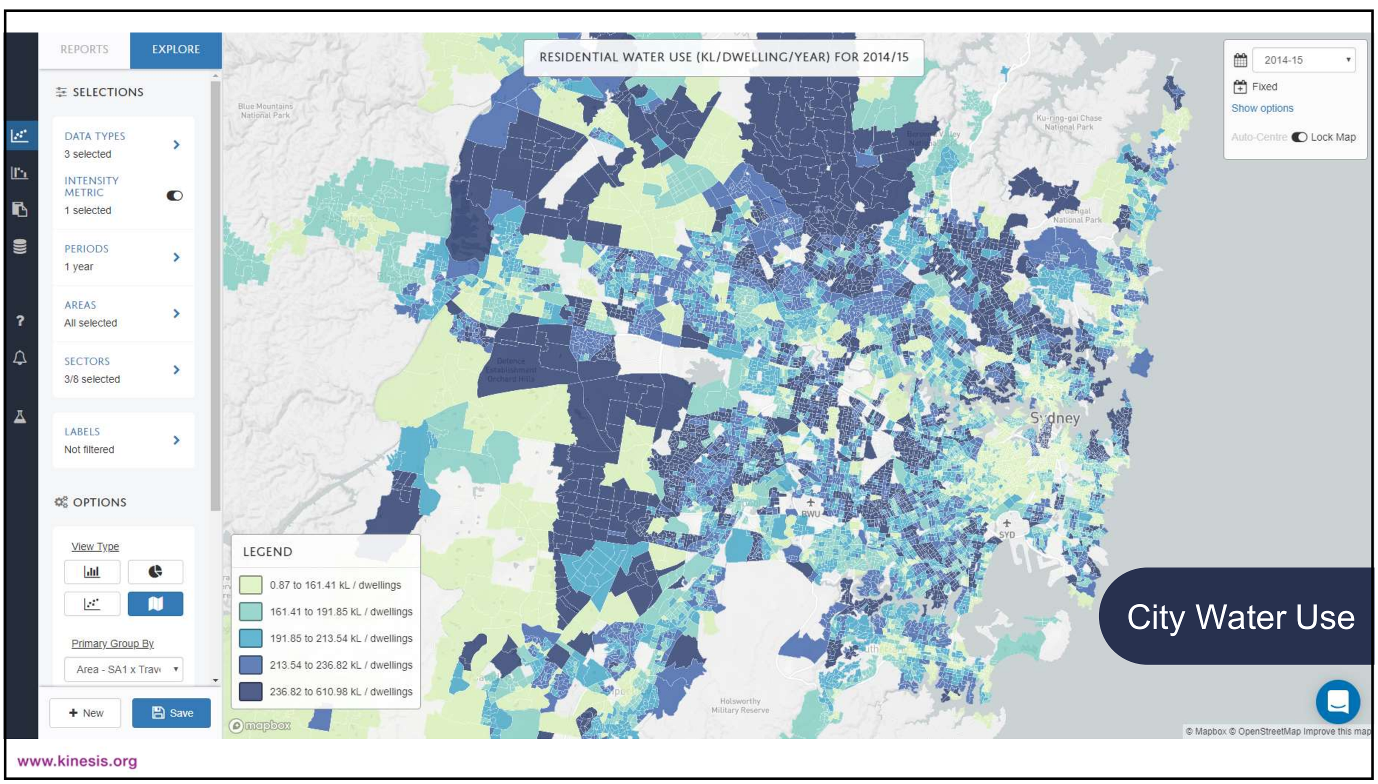
Scenarios
Analyse and predicted the performance of projects & policies.

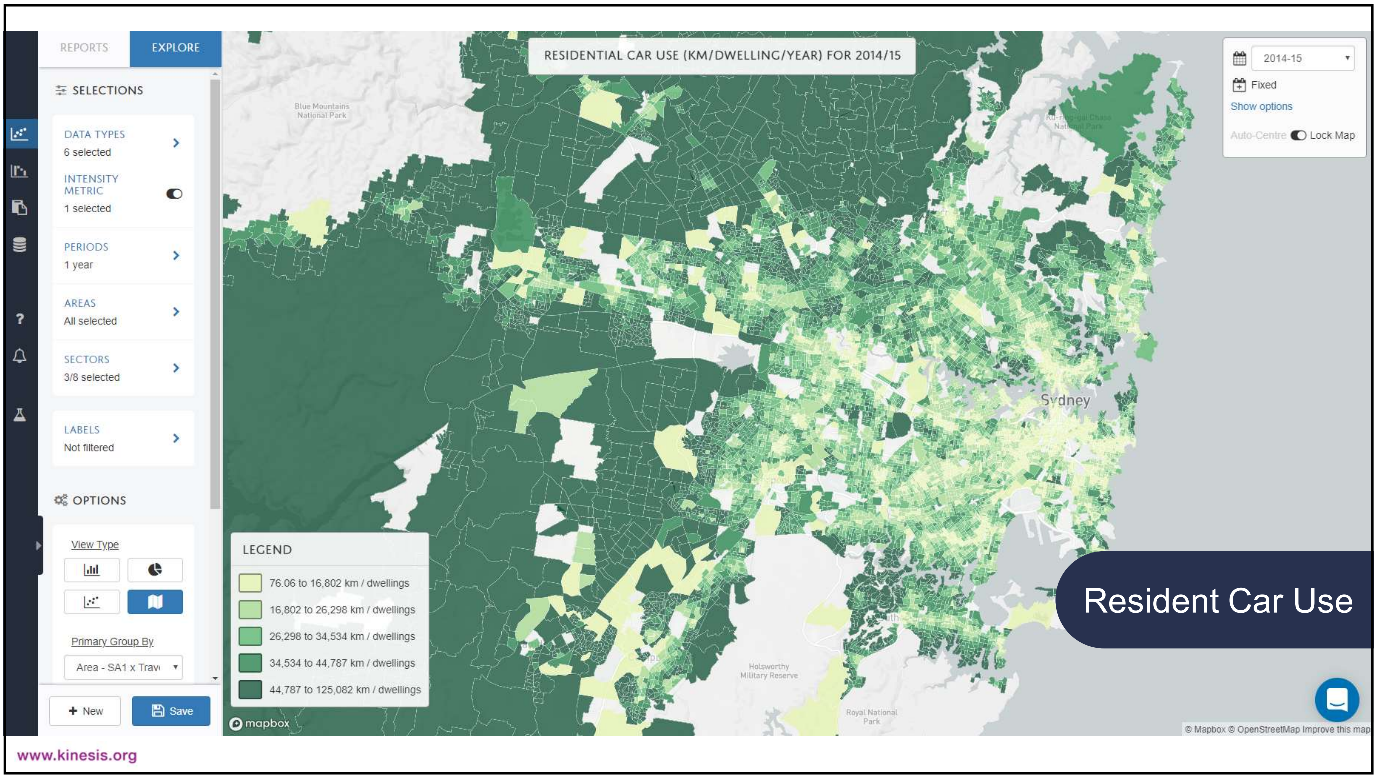
Performance
Track, monitor & report city & program performance, including real-time data

Context

Informing City Policy & Investment

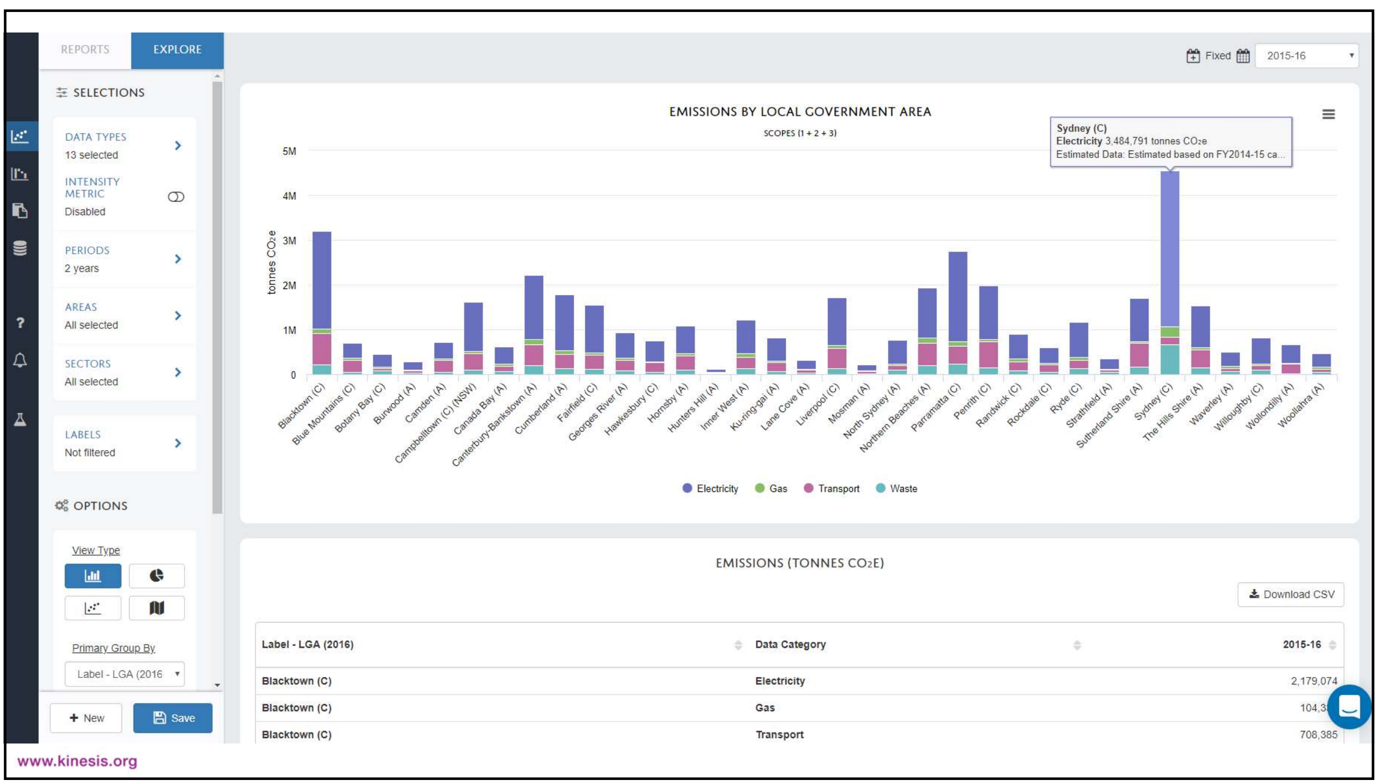

EMISSIONS PER DWELLING
REPORTS
EXPLORE
SELECTIONS
DATA TYPES
3 selected
INTENSITY METRIC
1 selected
PERIODS
1 year
AREAS
All selected
SECTORS
3/8 selected
LABELS
Not filtered
OPTIONS
View Type
Primary Group By
New
Save
2015-16
Fixed
Show options
Auto-Centre
Lock Map
Sydney
LEGEND
0.58 to 5.42 tonnes CO2e / dwellings
5.42 to 6.46 tonnes CO2e / dwellings
6.46 to 7.35 tonnes CO2e / dwellings
7.35 to 8.44 tonnes CO2e / dwellings
8.44 to 160.19 tonnes CO2e / dwellings
City Emissions
www.kinesis.org


RESIDENTIAL WATER USE (KL/DWELLING/YEAR) FOR 2014/15
REPORTS
EXPLORE
SELECTIONS
DATA TYPES
3 selected
INTENSITY METRIC
1 selected
PERIODS
1 year
AREAS
All selected
SECTORS
3/8 selected
LABELS
Not filtered
OPTIONS
View Type
Primary Group By
New
Save
2014-15
Fixed
Show options
Auto-Centre
Lock Map
Sydney
LEGEND
0.87 to 161.41 kL / dwellings
161.41 to 191.85 kL / dwellings
191.85 to 213.54 kL / dwellings
213.54 to 236.82 kL / dwellings
236.82 to 610.98 kL / dwellings
City Water Use
www.kinesis.org



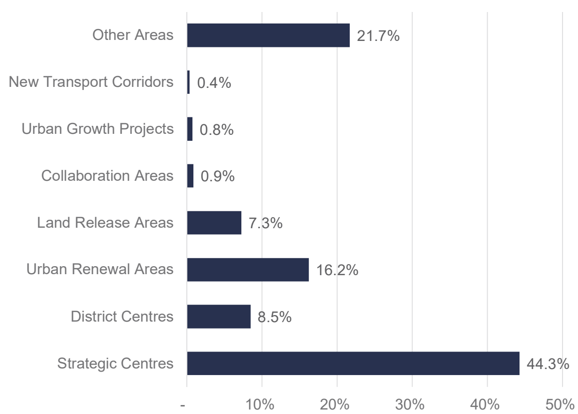
Affecting policy at the state, metropolitan and local levels

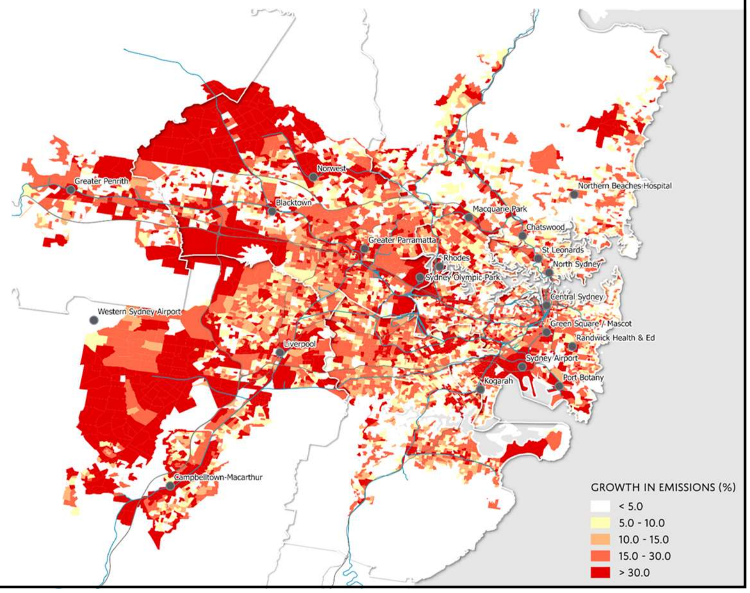

KINESIS
Exploring Net Zero Emissions
for Greater Sydney


REPORTS
EXPLORE
Fixed
2015-16
SELECTIONS
DATA TYPES
13 selected
INTENSITY METRIC
Disabled
PERIODS
2 years
AREAS
All selected
SECTORS
All selected
LABELS
Not filtered
OPTIONS
View Type
Primary Group By
Label - LGA (2016
New
Save
EMISSIONS BY LOCAL GOVERNMENT AREA
SCOPES (1 + 2 + 3)
Sydney (C)
Electricity 3,484,791 tonnes CO2e
Estimated Data: Estimated based on FY2014-15 ca...
5M
4M
3M
2M
1M
0
tonnes CO2e
Blacktown (C)
Blue Mountains (C)
Botany Bay (C)
Burwood (A)
Camden (A)
Campbelltown (C) (NSW)
Canada Bay (A)
Canterbury-Bankstown (A)
Cumberland (A)
Fairfield (C)
Georges River (A)
Hawkesbury (C)
Hornsby (A)
Hunters Hill (A)
Inner West (A)
Ku-ring-gai (A)
Lane Cove (A)
Liverpool (C)
Mosman (A)
North Sydney (A)
Northern Beaches (A)
Parramatta (C)
Penrith (C)
Randwick (C)
Rockdale (C)
Ryde (C)
Strathfield (A)
Sutherland Shire (A)
Sydney (C)
The Hills Shire (A)
Waverley (A)
Willoughby (C)
Wollondilly (A)
Woollahra (A)
Electricity
Gas
Transport
Waste
EMISSIONS (TONNES CO2E)
Download CSV
Label - LGA (2016)
Data Category
2015-16
Blacktown (C)
Electricity
2,179,074
Blacktown (C)
Gas
104,3
Blacktown (C)
Transport
708,385
www.kinesis.org

Greater Sydney Commission

Understanding Emissions Growth across Sydney

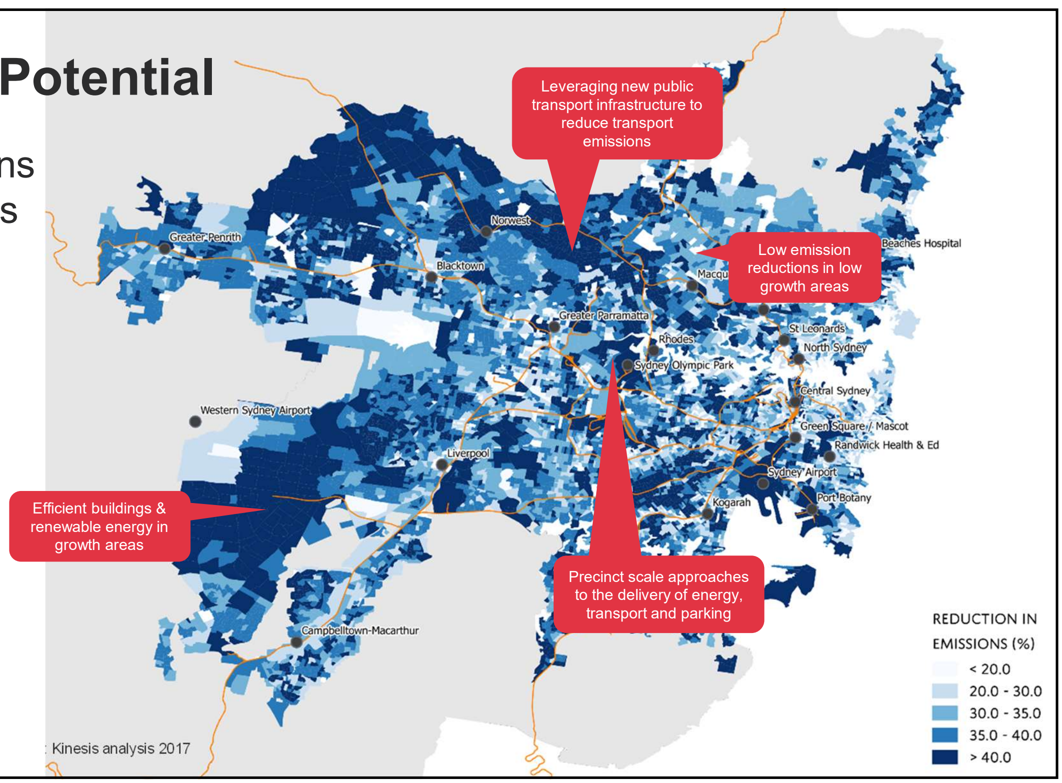




www.kinesis.org

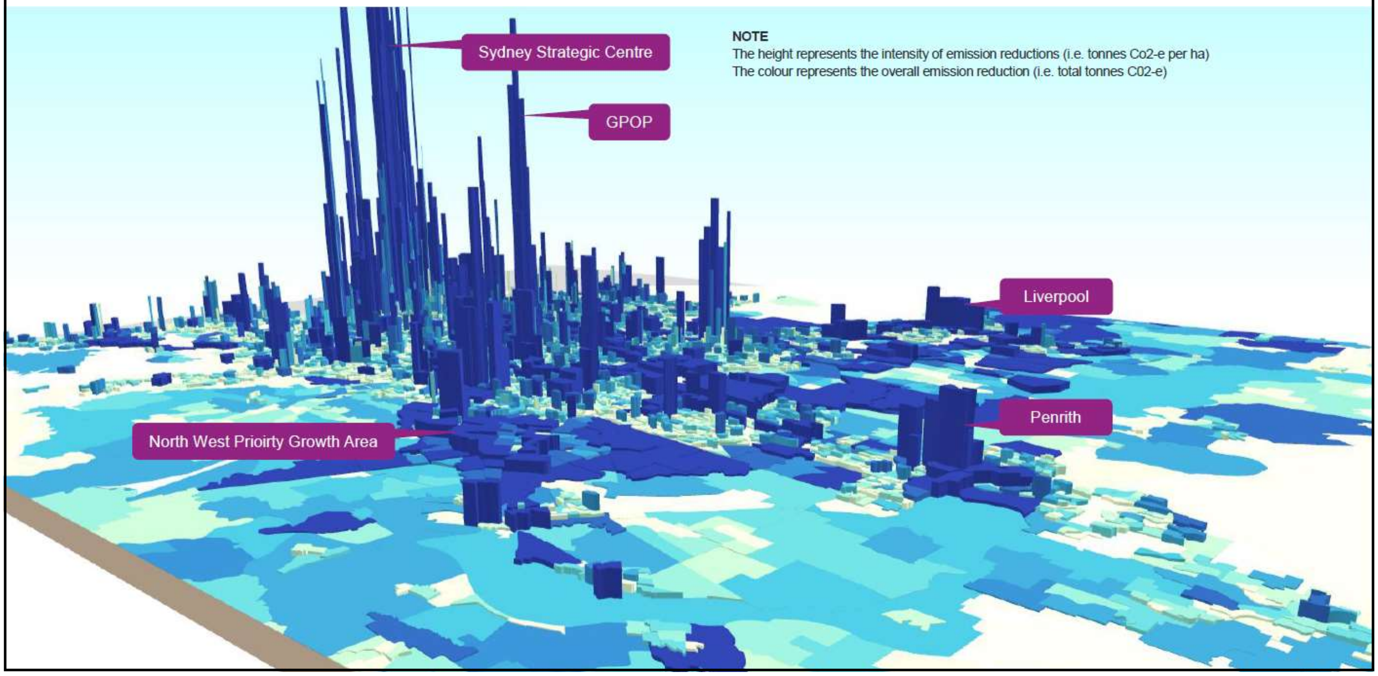
Reduction Potential

Different solutions for different parts of Sydney



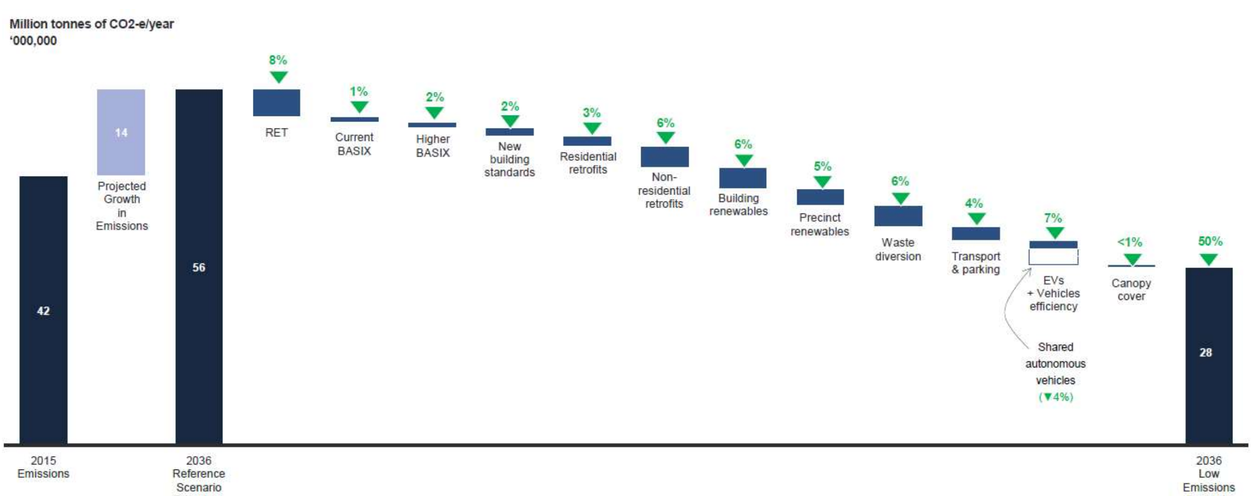
www.kinesis.org

Visualising Emission Reduction Potential



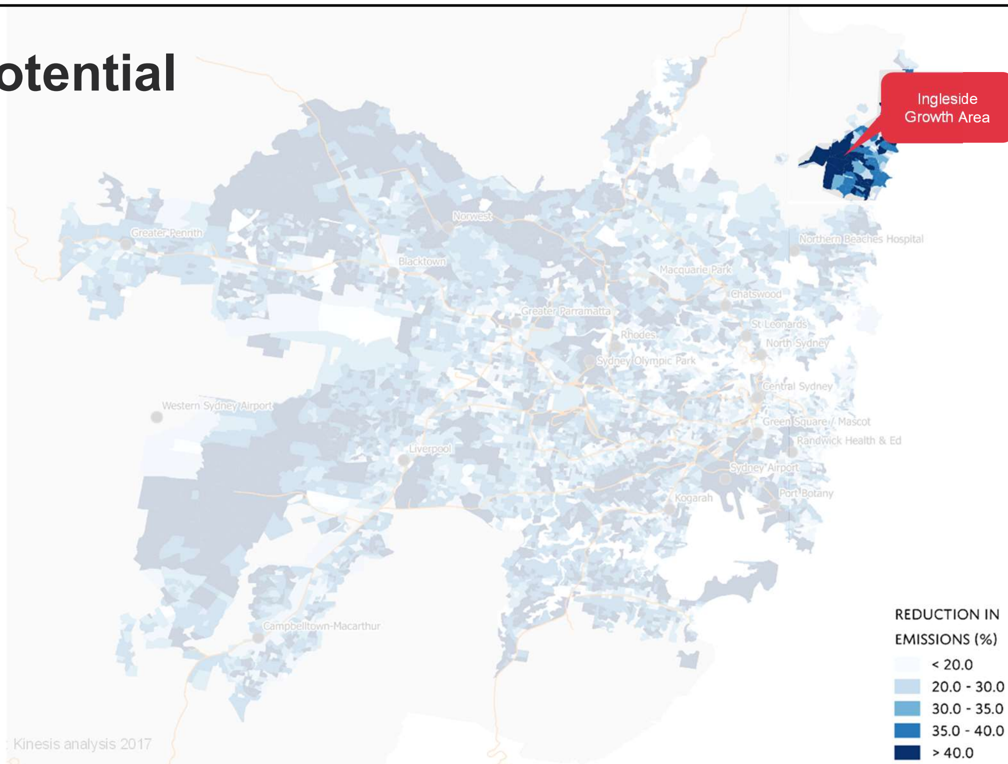
Greater Sydney Emissions Reduction Potential

Emission Reduction Potential by Policy



Reduction Potential

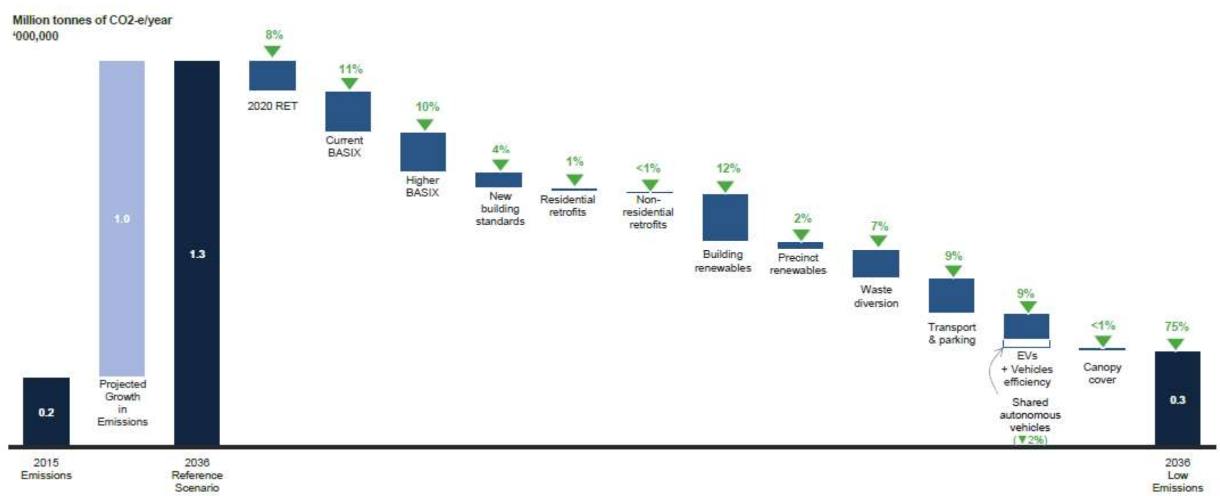
Different solutions for different parts of Sydney



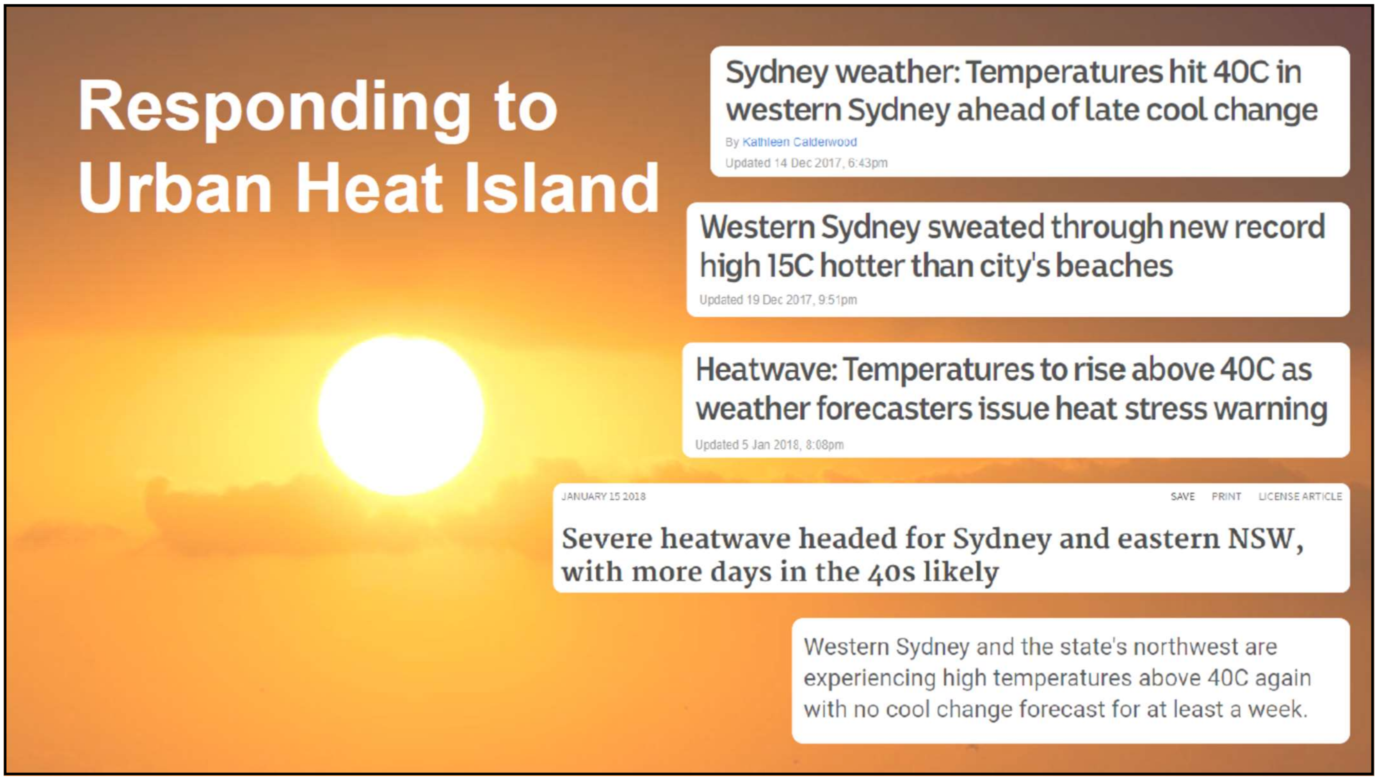
www.kinesis.org

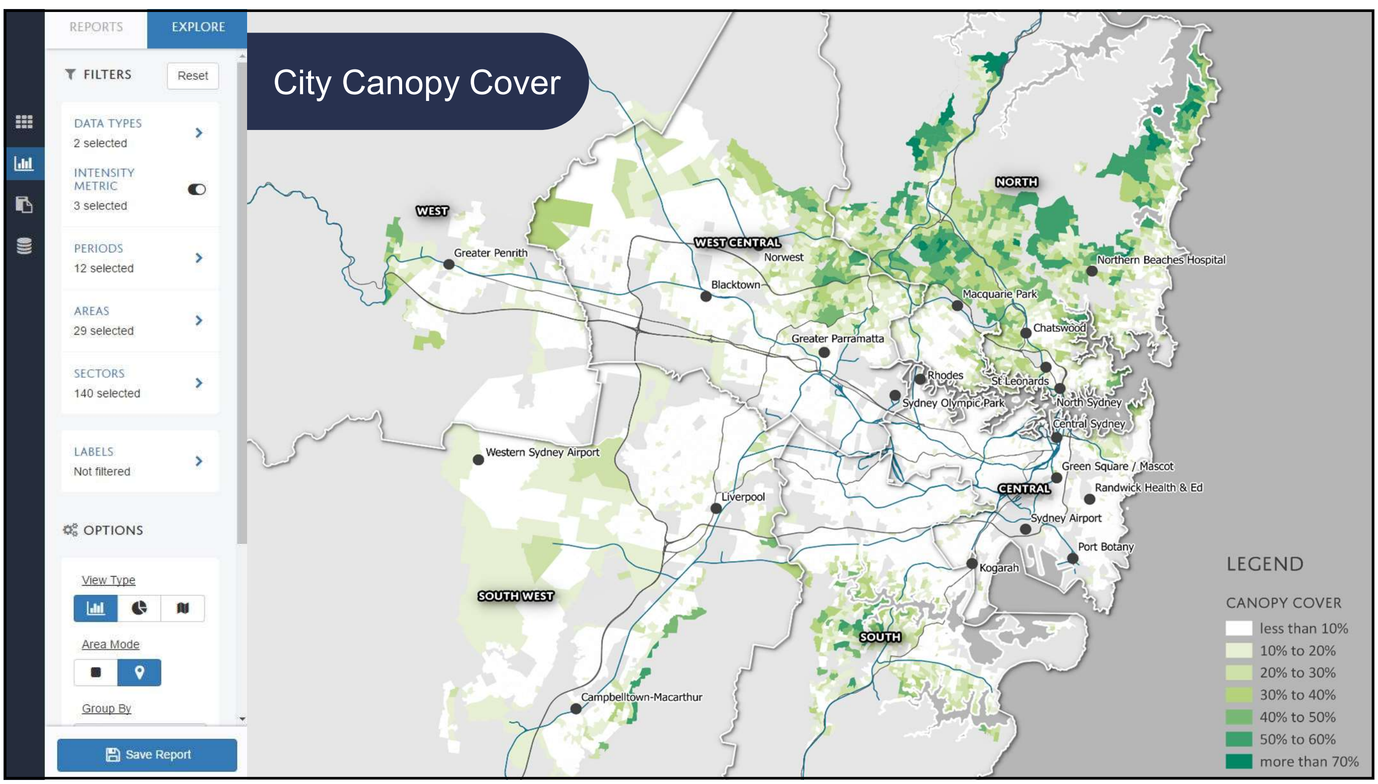
Land Release Areas (e.g. Ingleside)

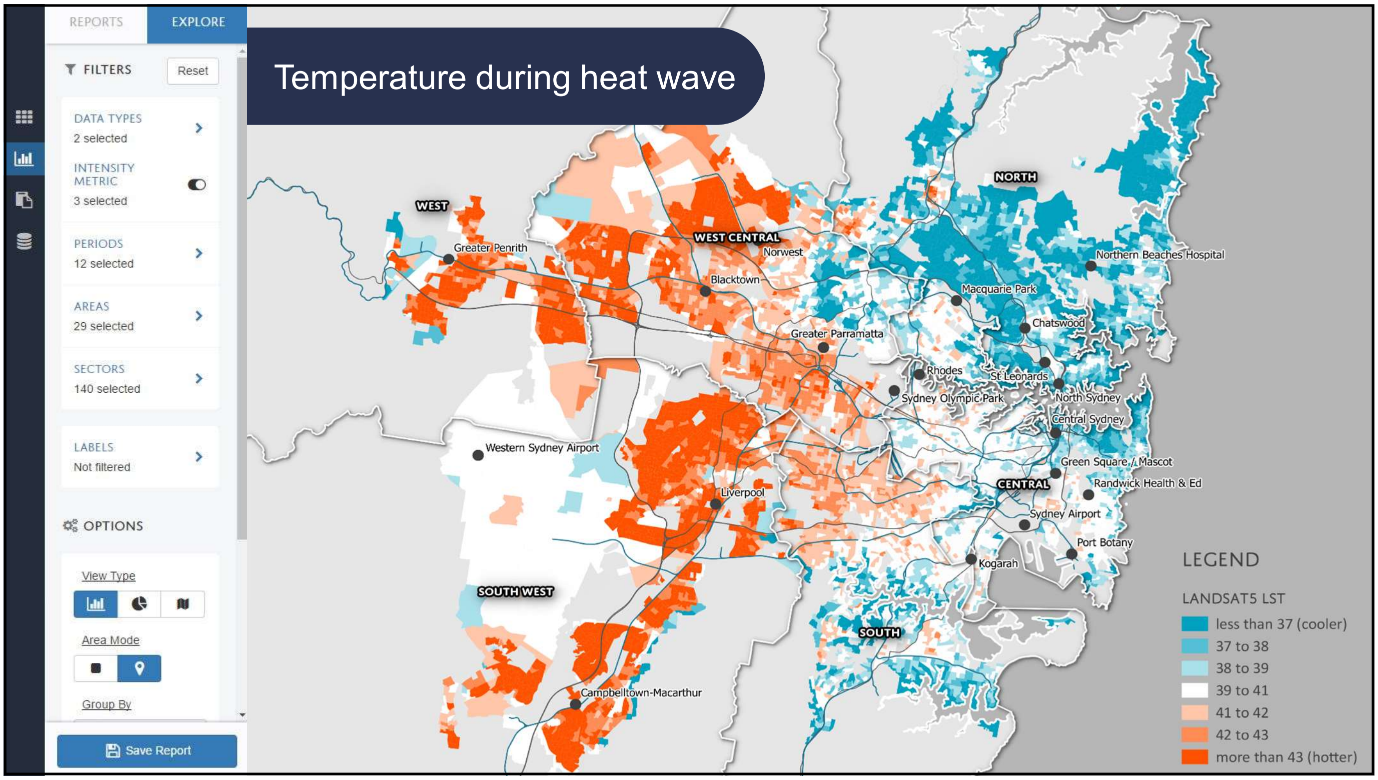
Emission Reduction Potential by Policy

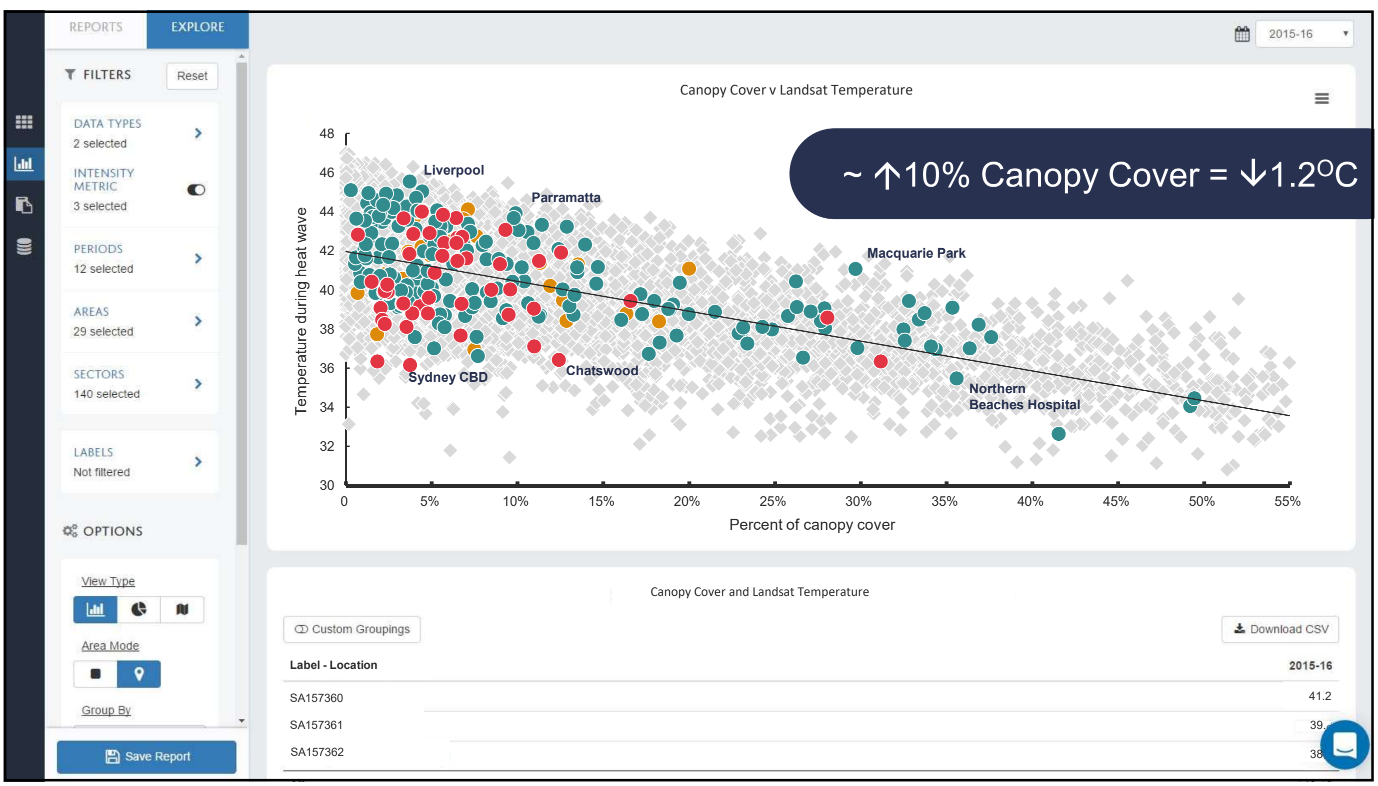


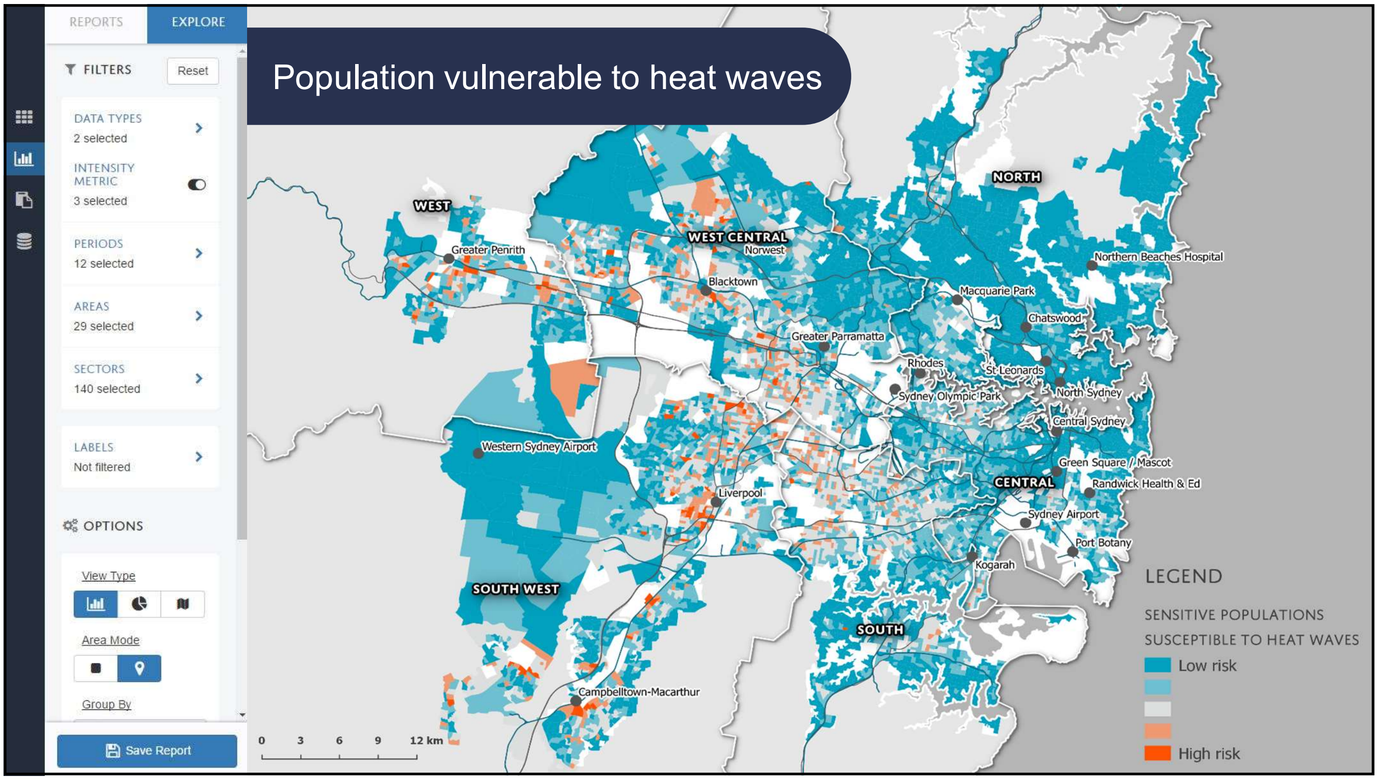
www.kinesis.org

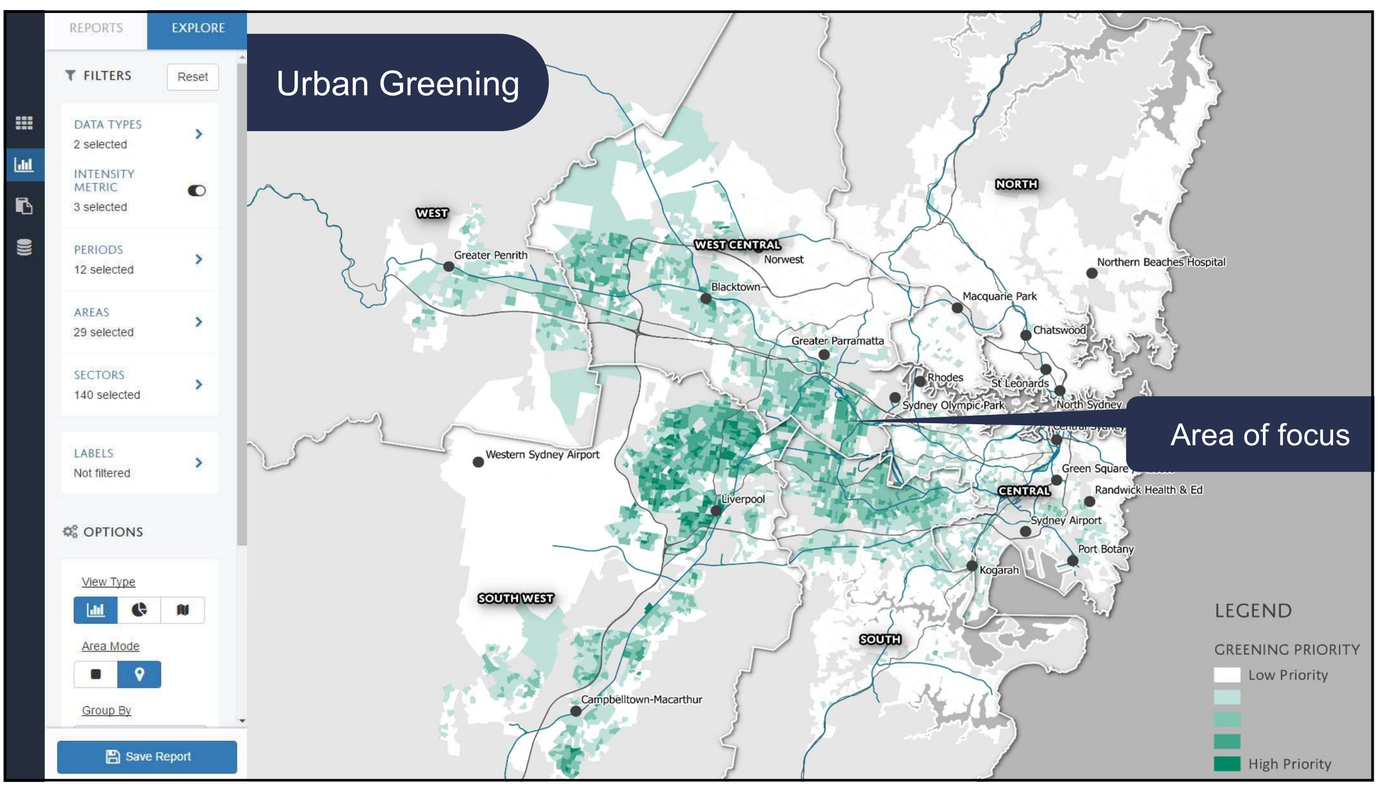

Responding to Urban Heat Island
Sydney weather: Temperatures hit 40C in western Sydney ahead of late cool change
By Kathleen Calderwood
Updated 14 Dec 2017, 6:43pm
Western Sydney sweated through new record high 15C hotter than city's beaches
Updated 19 Dec 2017, 9:51pm
Heatwave: Temperatures to rise above 40C as weather forecasters issue heat stress warning
Updated 5 Jan 2018, 8:08pm
JANUARY 15 2018
SAVE
PRINT
LICENSE ARTICLE
Severe heatwave headed for Sydney and eastern NSW, with more days in the 40s likely
Western Sydney and the state's northwest are experiencing high temperatures above 40C again with no cool change forecast for at least a week.


REPORTS
EXPLORE
FILTERS
Reset
DATA TYPES
2 selected
INTENSITY METRIC
3 selected
PERIODS
12 selected
AREAS
29 selected
SECTORS
140 selected
LABELS
Not filtered
OPTIONS
View Type
Area Mode
Group By
Save Report
City Canopy Cover
WEST
Greater Penrith
WEST CENTRAL
Norwest
Blacktown
NORTH
Northern Beaches Hospital
Macquarie Park
Chatswood
Greater Parramatta
Rhodes
St Leonards
Sydney Olympic Park
North Sydney
Central Sydney
Western Sydney Airport
Green Square / Mascot
CENTRAL
Randwick Health & Ed
Liverpool
Sydney Airport
Port Botany
Kogarah
SOUTH WEST
SOUTH
Campbelltown-Macarthur
LEGEND
CANOPY COVER
less than 10%
10% to 20%
20% to 30%
30% to 40%
40% to 50%
50% to 60%
more than 70%


REPORTS
EXPLORE
FILTERS
Reset
DATA TYPES
2 selected
INTENSITY METRIC
3 selected
PERIODS
12 selected
AREAS
29 selected
SECTORS
140 selected
LABELS
Not filtered
OPTIONS
View Type
Area Mode
Group By
Save Report
Temperature during heat wave
WEST
NORTH
WEST CENTRAL
CENTRAL
SOUTH WEST
SOUTH
Greater Penrith
Norwest
Blacktown
Northern Beaches Hospital
Macquarie Park
Chatswood
Greater Parramatta
Rhodes
St Leonards
Sydney Olympic Park
North Sydney
Central Sydney
Western Sydney Airport
Green Square / Mascot
Randwick Health & Ed
Liverpool
Sydney Airport
Port Botany
Kogarah
Campbelltown-Macarthur
LEGEND
LANDSAT5 LST
less than 37 (cooler)
37 to 38
38 to 39
39 to 41
41 to 42
42 to 43
more than 43 (hotter)


REPORTS
EXPLORE
2015-16
FILTERS
Reset
DATA TYPES
2 selected
INTENSITY METRIC
3 selected
PERIODS
12 selected
AREAS
29 selected
SECTORS
140 selected
LABELS
Not filtered
OPTIONS
View Type
Area Mode
Group By
Save Report
Canopy Cover v Landsat Temperature
~ ↑10% Canopy Cover = ↓1.2°C
Temperature during heat wave
48
46
44
42
40
38
36
34
32
30
Liverpool
Parramatta
Macquarie Park
Sydney CBD
Chatswood
Northern Beaches Hospital
0
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
55%
Percent of canopy cover
Canopy Cover and Landsat Temperature
Custom Groupings
Download CSV
Label - Location
2015-16
SA157360
41.2
SA157361
SA157362

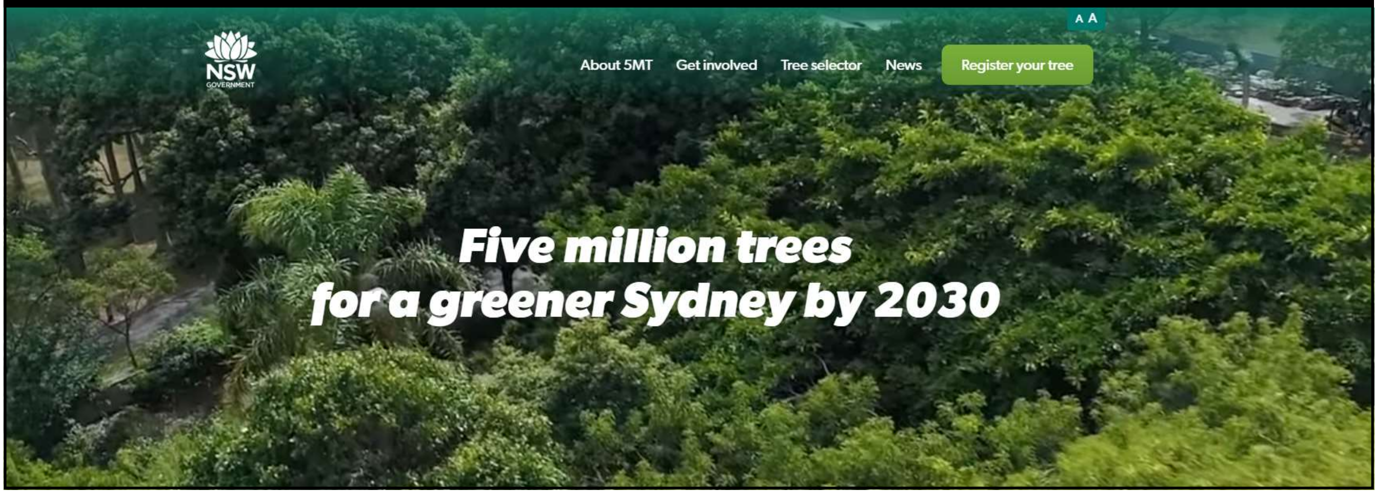

REPORTS
EXPLORE
FILTERS
Reset
DATA TYPES
2 selected
INTENSITY METRIC
3 selected
PERIODS
12 selected
AREAS
29 selected
SECTORS
140 selected
LABELS
Not filtered
OPTIONS
View Type
Area Mode
Group By
Save Report
Population vulnerable to heat waves
WEST
WEST CENTRAL
NORTH
CENTRAL
SOUTH WEST
SOUTH
Greater Penrith
Norwest
Blacktown
Northern Beaches Hospital
Macquarie Park
Chatswood
Greater Parramatta
Rhodes
St Leonards
Sydney Olympic Park
North Sydney
Central Sydney
Western Sydney Airport
Green Square / Mascot
Randwick Health & Ed
Liverpool
Sydney Airport
Port Botany
Kogarah
Campbelltown-Macarthur
0 3 6 9 12 km
LEGEND
SENSITIVE POPULATIONS SUSCEPTIBLE TO HEAT WAVES
Low risk
High risk


REPORTS
EXPLORE
FILTERS
Reset
DATA TYPES
2 selected
INTENSITY METRIC
3 selected
PERIODS
12 selected
AREAS
29 selected
SECTORS
140 selected
LABELS
Not filtered
OPTIONS
View Type
Area Mode
Group By
Save Report
Urban Greening
Area of focus
WEST
WEST CENTRAL
NORTH
CENTRAL
SOUTH WEST
SOUTH
Greater Penrith
Norwest
Blacktown
Northern Beaches Hospital
Macquarie Park
Chatswood
Greater Parramatta
Rhodes
St Leonards
Sydney Olympic Park
North Sydney
Western Sydney Airport
Green Square
Randwick Health & Ed
Liverpool
Sydney Airport
Port Botany
Kogarah
Campbelltown-Macarthur
LEGEND
GREENING PRIORITY
Low Priority
High Priority

Policy Announcement – Greening Sydney

Provision of $37.5 million over four years to add 5 million trees to greater Sydney

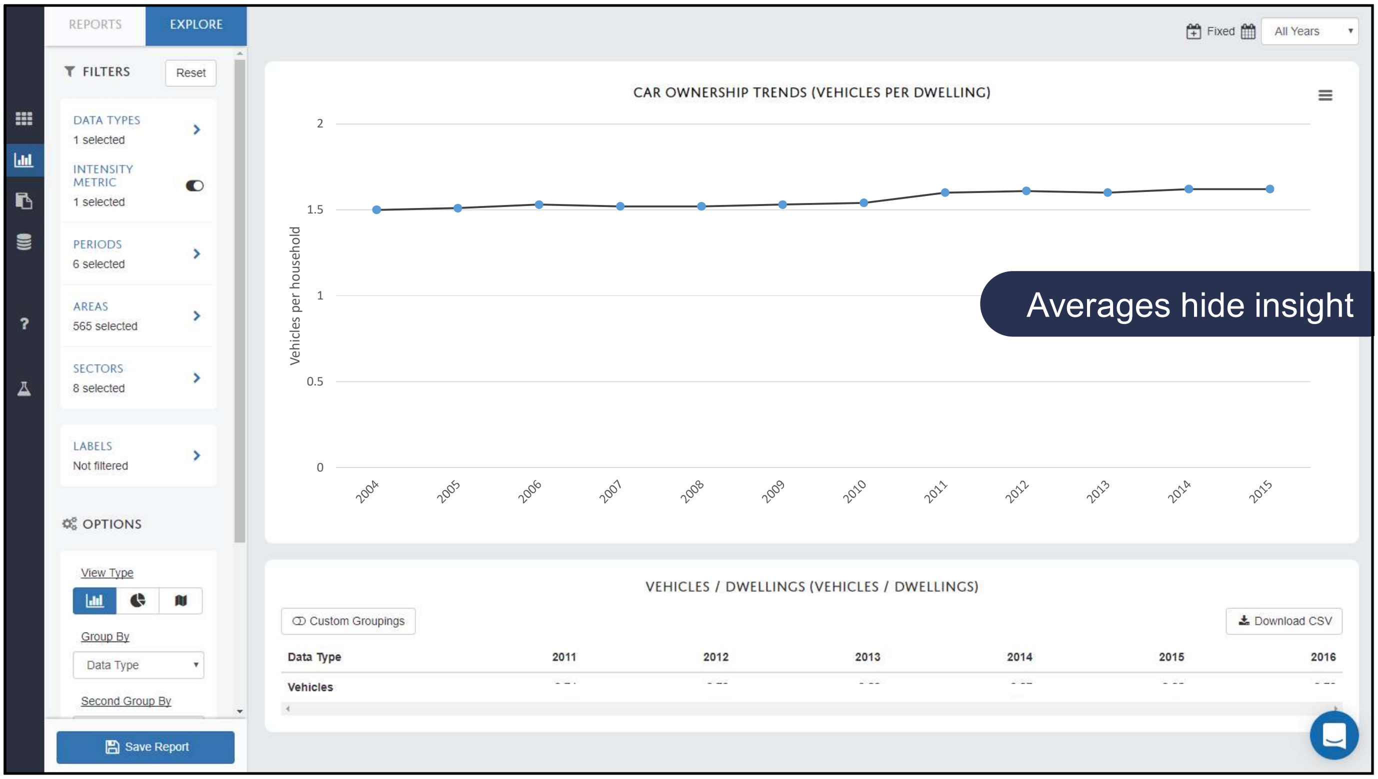
Doubling Sydney's tree canopy cover to 40% by 2030



Metropolitan Parking Innovation

Evidence based review of parking in Sydney

Kinesis
29 August 2017


REPORTS
EXPLORE
FILTERS
Reset
DATA TYPES
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INTENSITY METRIC
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PERIODS
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AREAS
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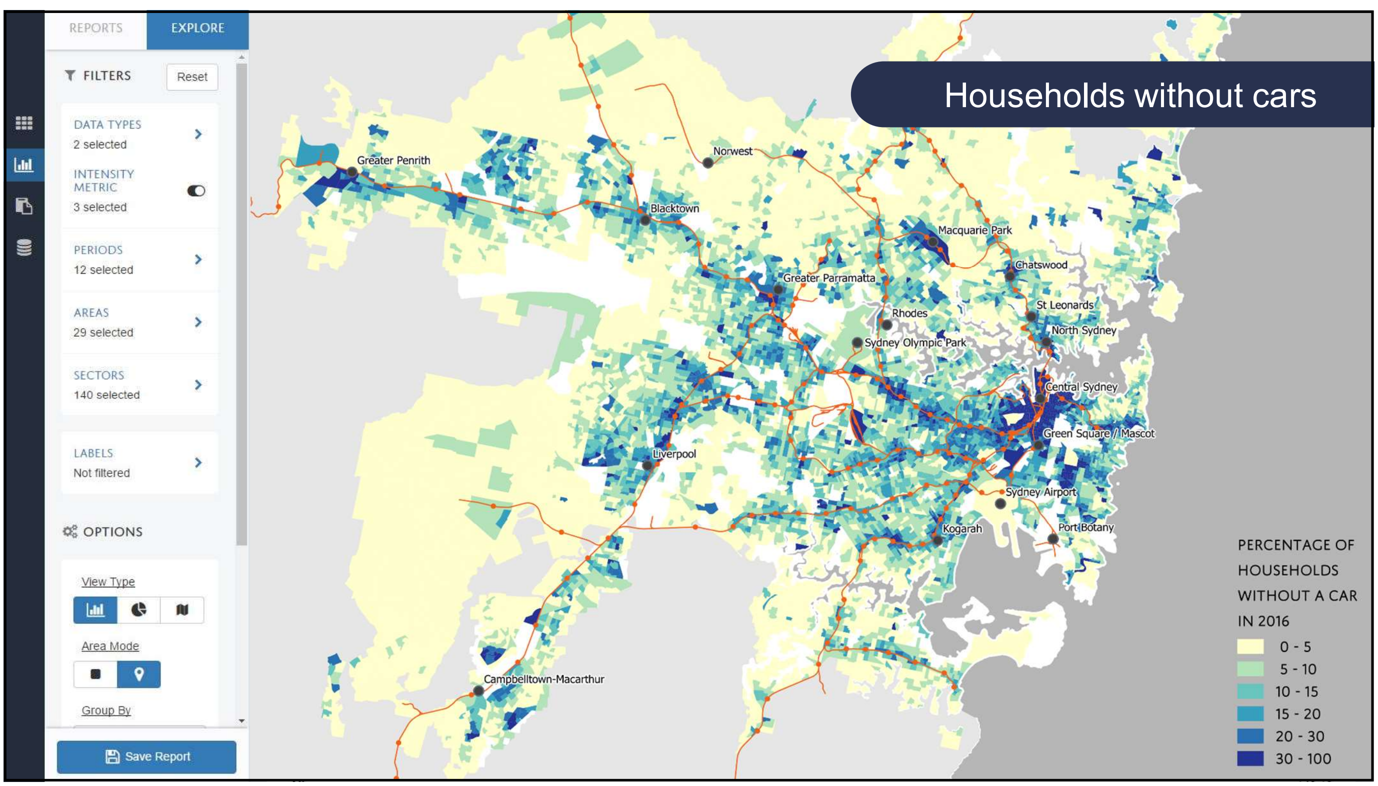
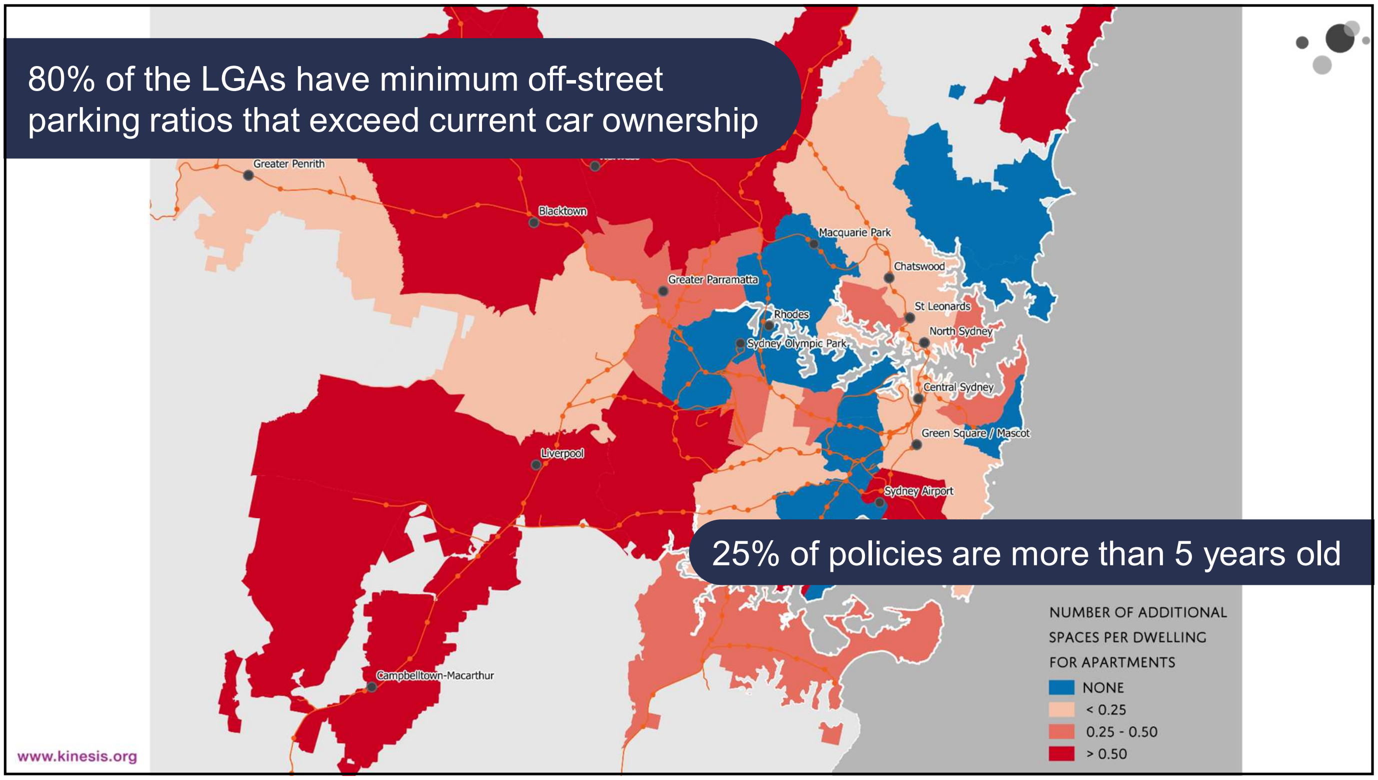
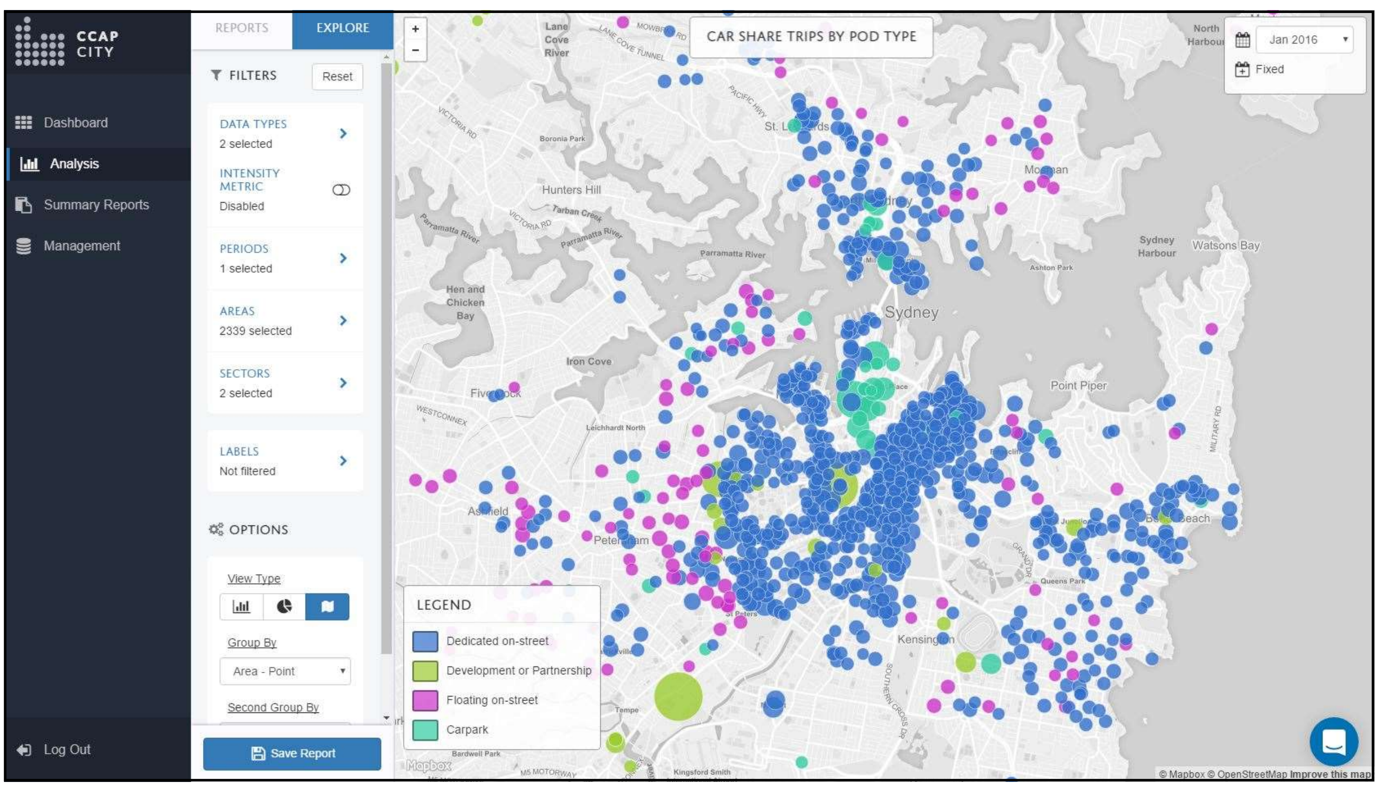
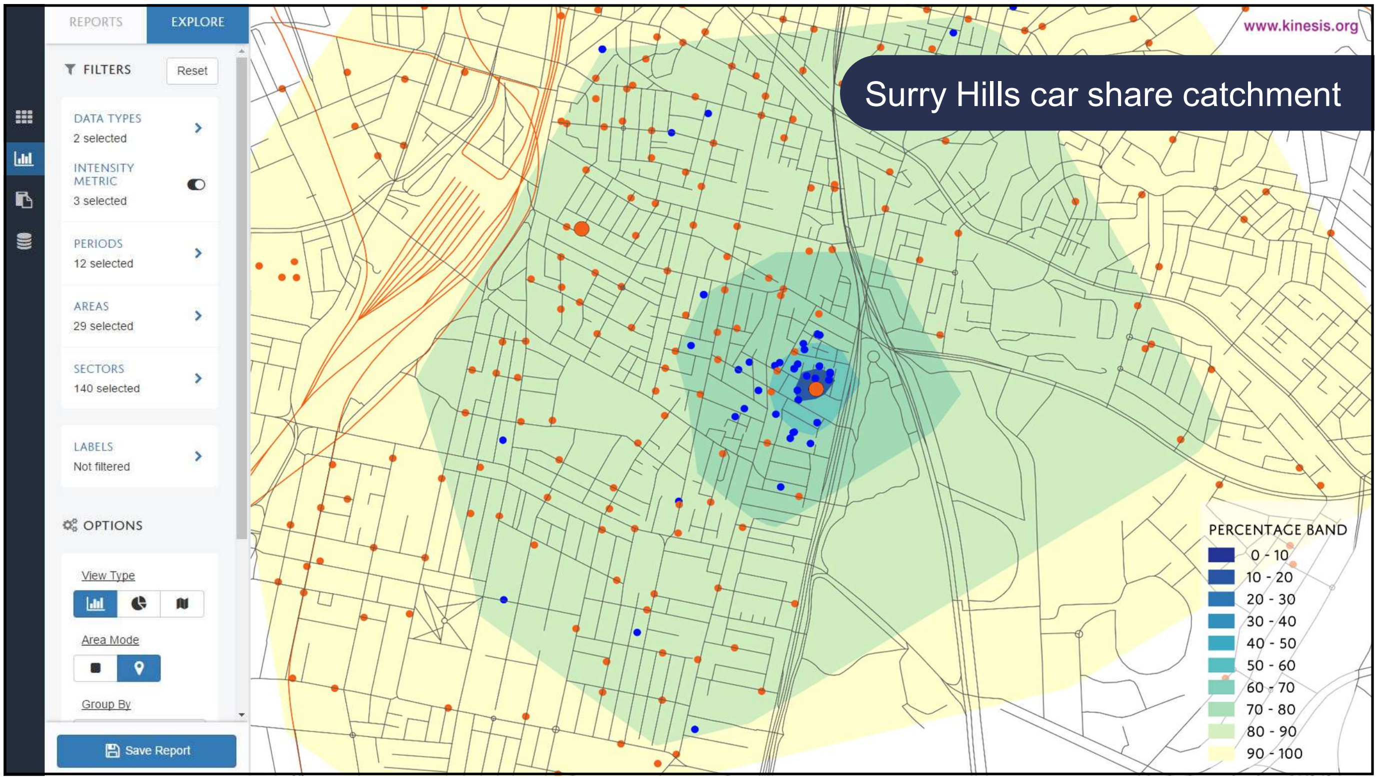
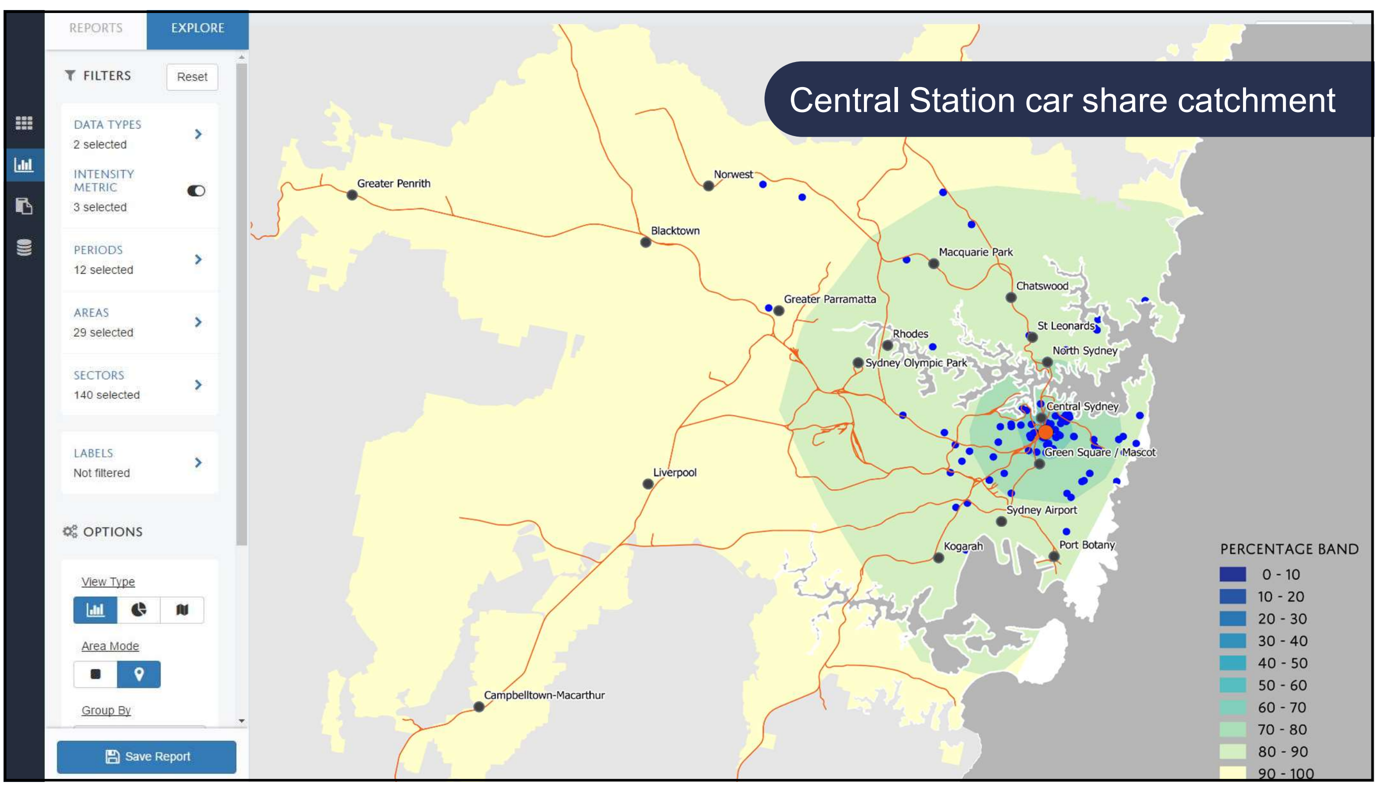
SECTORS
8 selected
LABELS
Not filtered
OPTIONS
View Type
Group By
Data Type
Second Group By
Save Report
Fixed
All Years
CAR OWNERSHIP TRENDS (VEHICLES PER DWELLING)
Vehicles per household
Averages hide insight
VEHICLES / DWELLINGS (VEHICLES / DWELLINGS)
Custom Groupings
Download CSV
Data Type
Vehicles

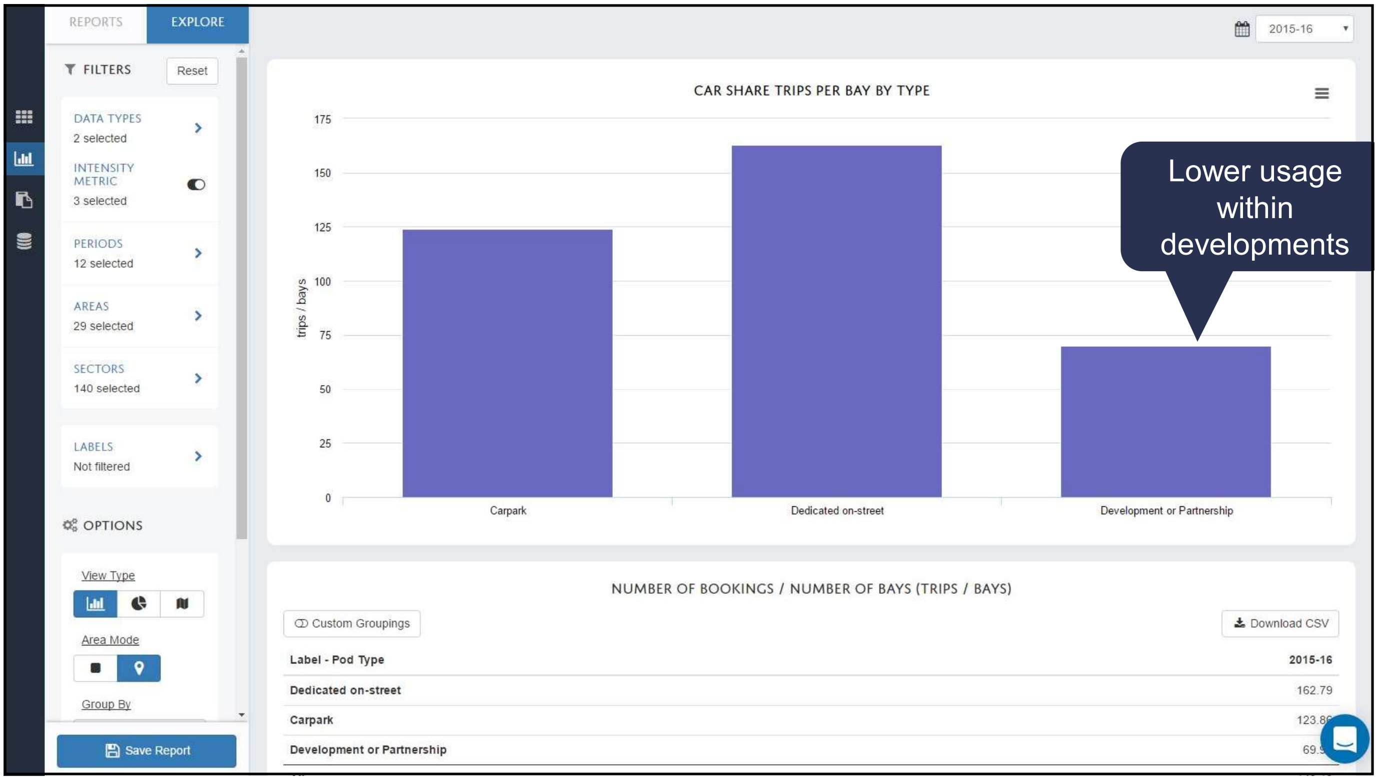

REPORTS
EXPLORE
FILTERS
Reset
DATA TYPES
2 selected
INTENSITY METRIC
3 selected
PERIODS
12 selected
AREAS
29 selected
SECTORS
140 selected
LABELS
Not filtered
OPTIONS
View Type
Area Mode
Group By
Save Report
Households without cars
Greater Penrith
Norwest
Blacktown
Macquarie Park
Chatswood
Greater Parramatta
Rhodes
St Leonards
North Sydney
Sydney Olympic Park
Central Sydney
Green Square / Mascot
Liverpool
Sydney Airport
Kogarah
Port Botany
Campbelltown-Macarthur
PERCENTAGE OF HOUSEHOLDS WITHOUT A CAR IN 2016
0 - 5
5 - 10
10 - 15
15 - 20
20 - 30
30 - 100


80% of the LGAs have minimum off-street parking ratios that exceed current car ownership
25% of policies are more than 5 years old
Greater Penrith
Blacktown
Macquarie Park
Chatswood
Greater Parramatta
St Leonards
Rhodes
North Sydney
Sydney Olympic Park
Central Sydney
Green Square / Mascot
Liverpool
Sydney Airport
Campbelltown-Macarthur
NUMBER OF ADDITIONAL SPACES PER DWELLING FOR APARTMENTS
NONE
< 0.25
0.25 - 0.50
> 0.50
www.kinesis.org


CCAP CITY
Dashboard
Analysis
Summary Reports
Management
Log Out
REPORTS
EXPLORE
FILTERS
Reset
DATA TYPES
2 selected
INTENSITY METRIC
Disabled
PERIODS
1 selected
AREAS
2339 selected
SECTORS
2 selected
LABELS
Not filtered
OPTIONS
View Type
Group By
Area - Point
Second Group By
Save Report
CAR SHARE TRIPS BY POD TYPE
Jan 2016
Fixed
LEGEND
Dedicated on-street
Development or Partnership
Floating on-street
Carpark
Sydney
© Mapbox © OpenStreetMap Improve this map


REPORTS
EXPLORE
FILTERS
Reset
DATA TYPES
2 selected
INTENSITY METRIC
3 selected
PERIODS
12 selected
AREAS
29 selected
SECTORS
140 selected
LABELS
Not filtered
OPTIONS
View Type
Area Mode
Group By
Save Report
www.kinesis.org
Surry Hills car share catchment
PERCENTAGE BAND
0 - 10
10 - 20
20 - 30
30 - 40
40 - 50
50 - 60
60 - 70
70 - 80
80 - 90
90 - 100

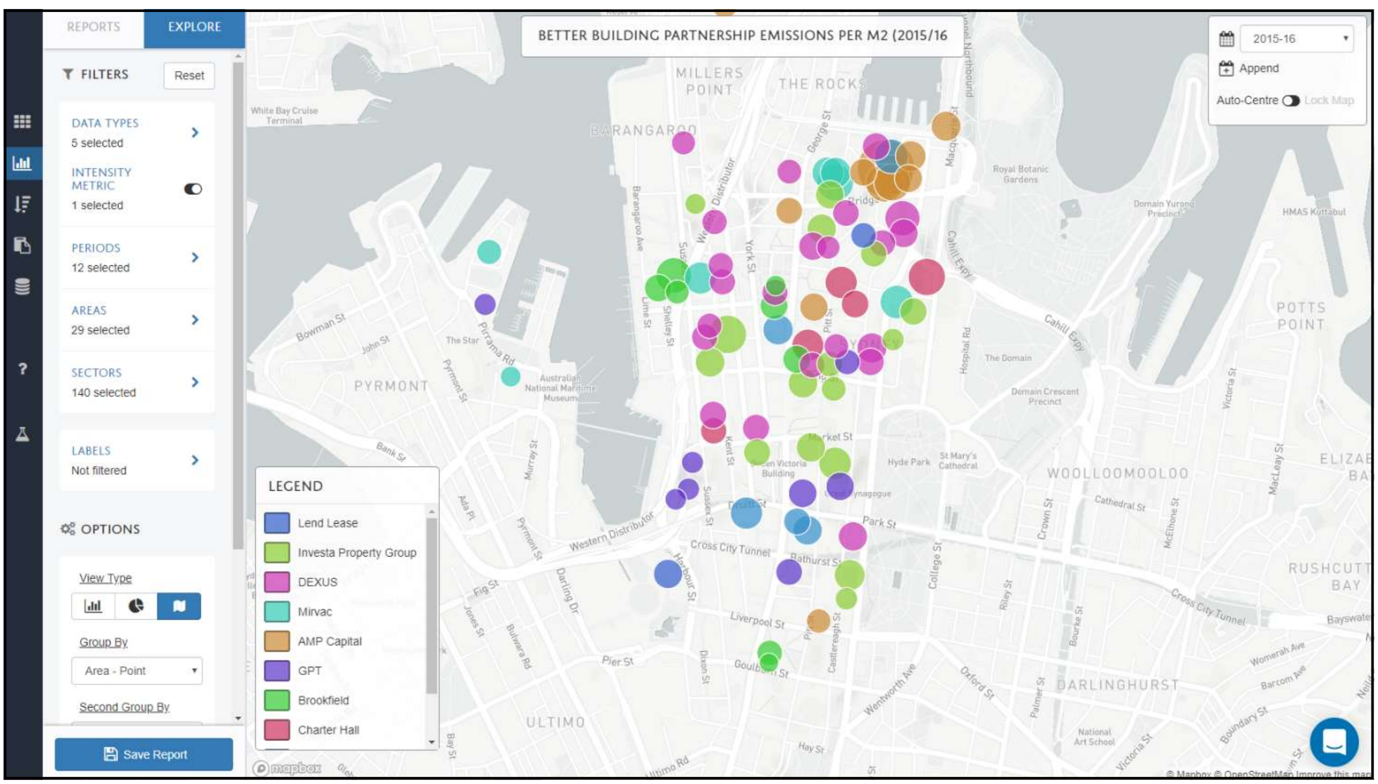

REPORTS
EXPLORE
FILTERS
Reset
DATA TYPES
2 selected
INTENSITY METRIC
3 selected
PERIODS
12 selected
AREAS
29 selected
SECTORS
140 selected
LABELS
Not filtered
OPTIONS
View Type
Area Mode
Group By
Save Report
Central Station car share catchment
Greater Penrith
Norwest
Blacktown
Macquarie Park
Chatswood
Greater Parramatta
Rhodes
St Leonards
North Sydney
Sydney Olympic Park
Central Sydney
Green Square / Mascot
Liverpool
Sydney Airport
Kogarah
Port Botany
Campbelltown-Macarthur
PERCENTAGE BAND
0 - 10
10 - 20
20 - 30
30 - 40
40 - 50
50 - 60
60 - 70
70 - 80
80 - 90
90 - 100



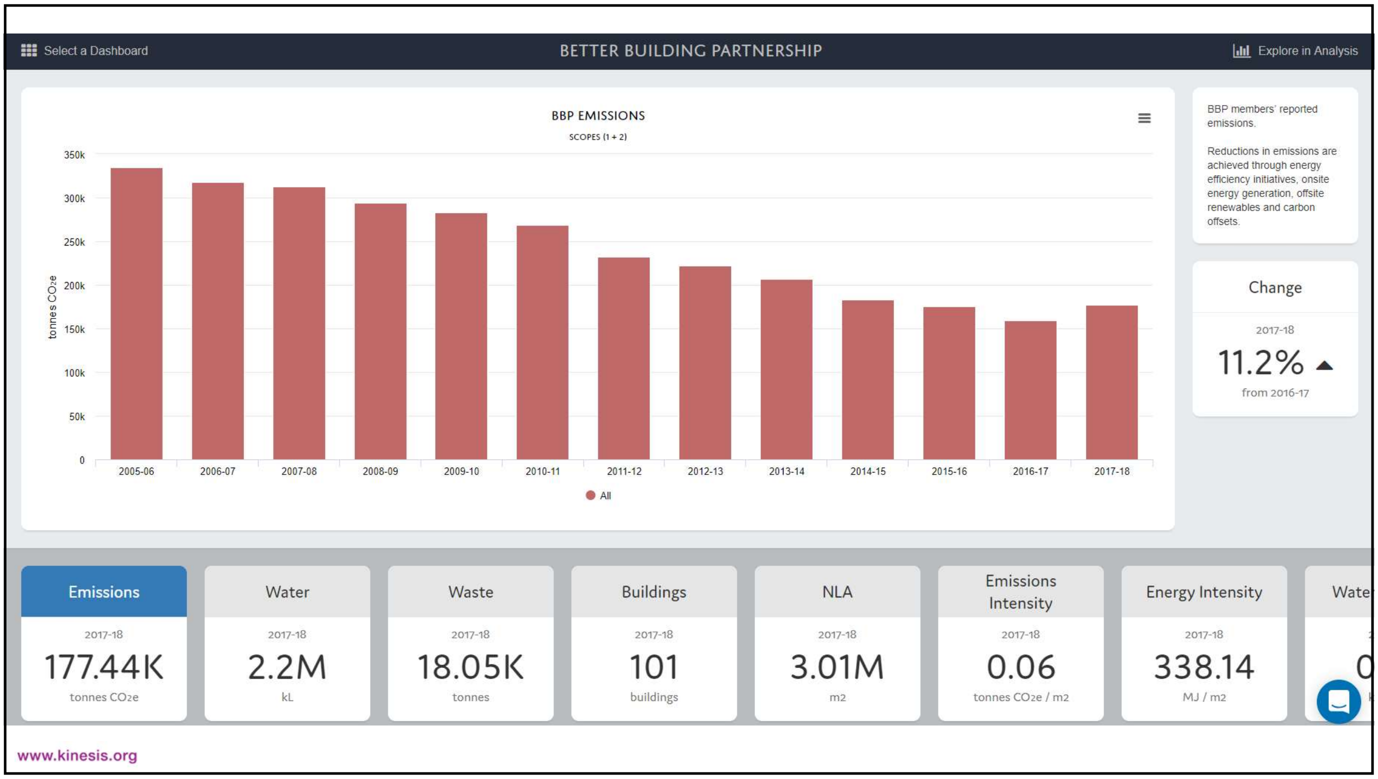
Performance

Monitoring + Dashboards

Better
Building
Partnership
CITY OF SYDNEY



REPORTS
EXPLORE
FILTERS
Reset
DATA TYPES
5 selected
INTENSITY METRIC
1 selected
PERIODS
12 selected
AREAS
29 selected
SECTORS
140 selected
LABELS
Not filtered
OPTIONS
View Type
Group By
Area - Point
Second Group By
Save Report
BETTER BUILDING PARTNERSHIP EMISSIONS PER M2 (2015/16
2015-16
Append
Auto-Centre
Lock Map
LEGEND
Lend Lease
Investa Property Group
DEXUS
Mirvac
AMP Capital
GPT
Brookfield
Charter Hall
MILLERS POINT
THE ROCKS
BARANGAROO
PYRMONT
ULTIMO
WOOLLOOMOOLOO
DARLINGHURST
POTTS POINT
RUSHCUTTERS BAY
Royal Botanic Gardens
The Domain
Hyde Park



Urban Data Ecosystem

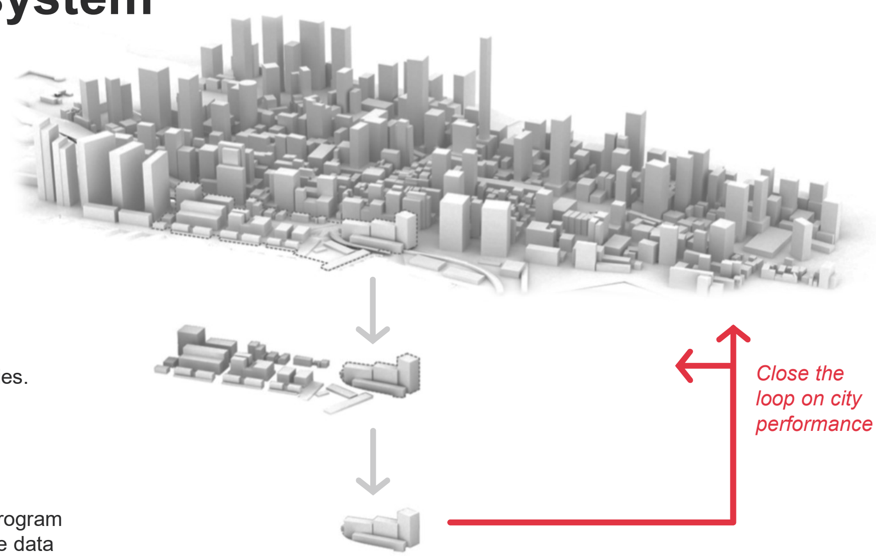
Public + Private

Urban Data Ecosystem

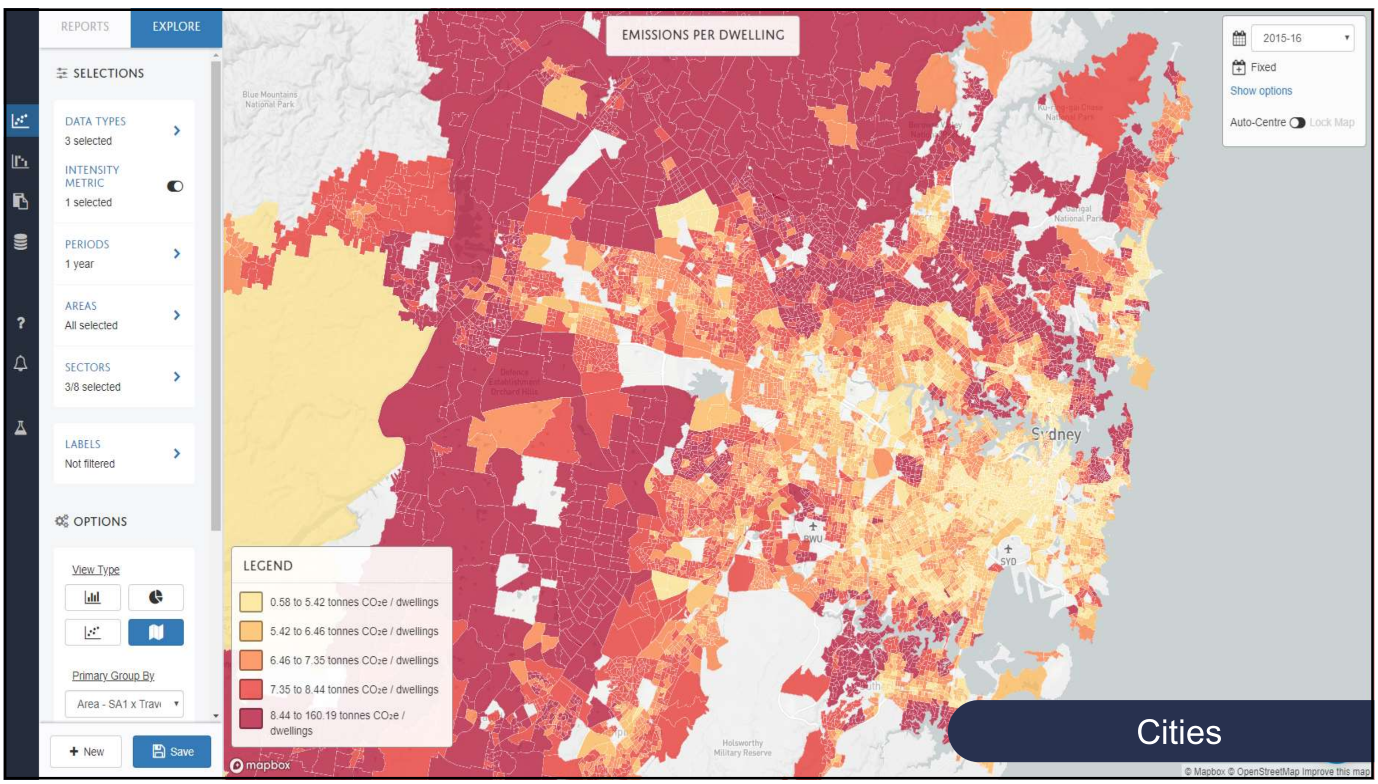
Context
Contextualise and analyse local/metropolitan datasets

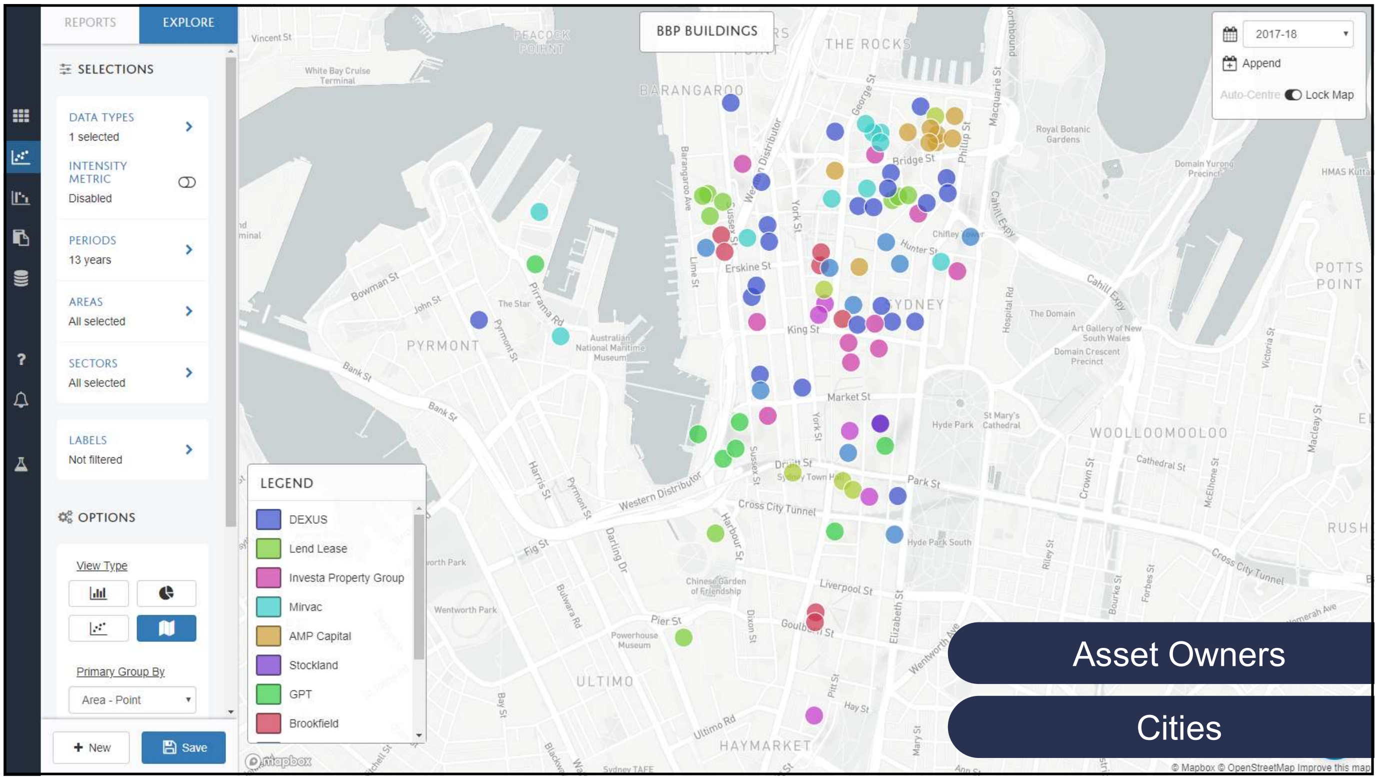
Scenarios
Analyse and predicted the performance of projects & policies.

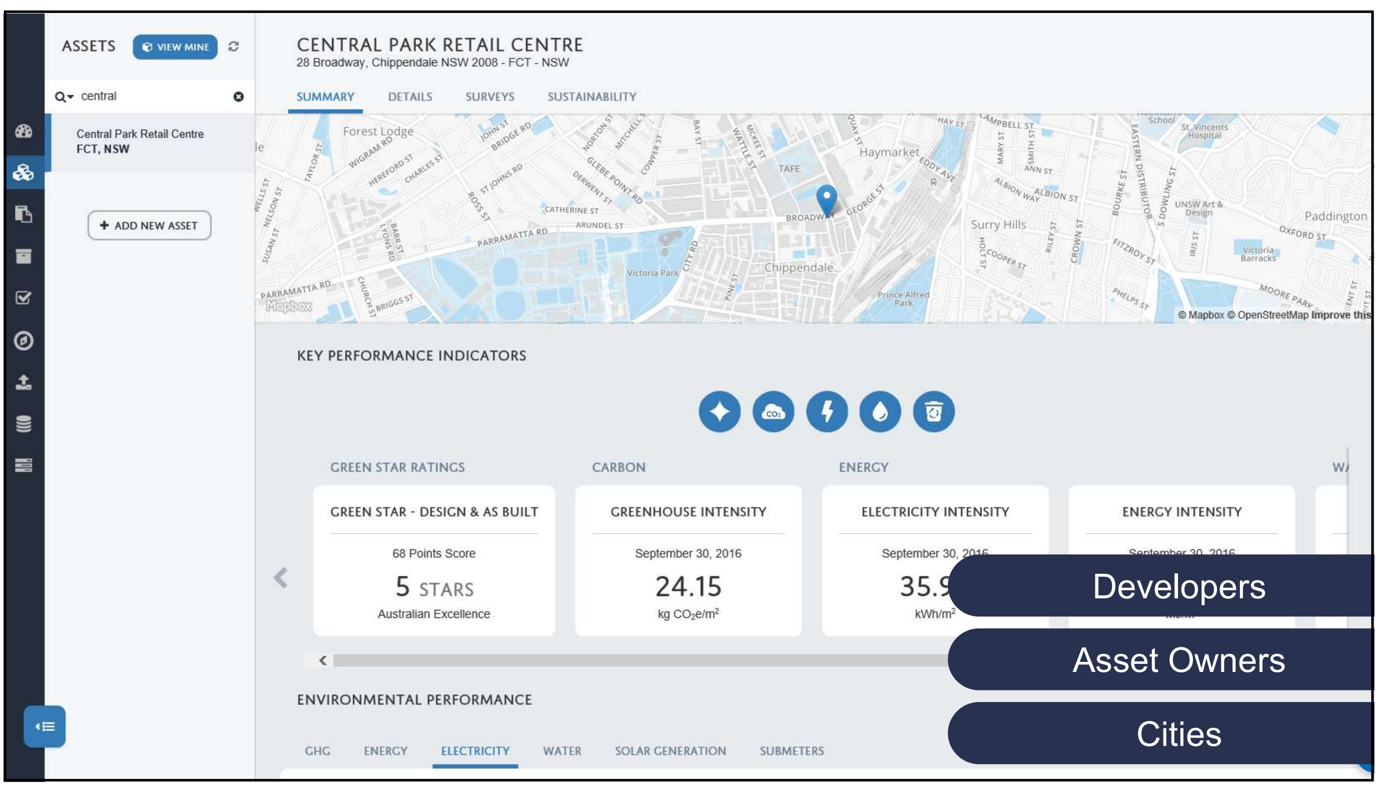
Performance
Track, monitor & report city & program performance, including real-time data

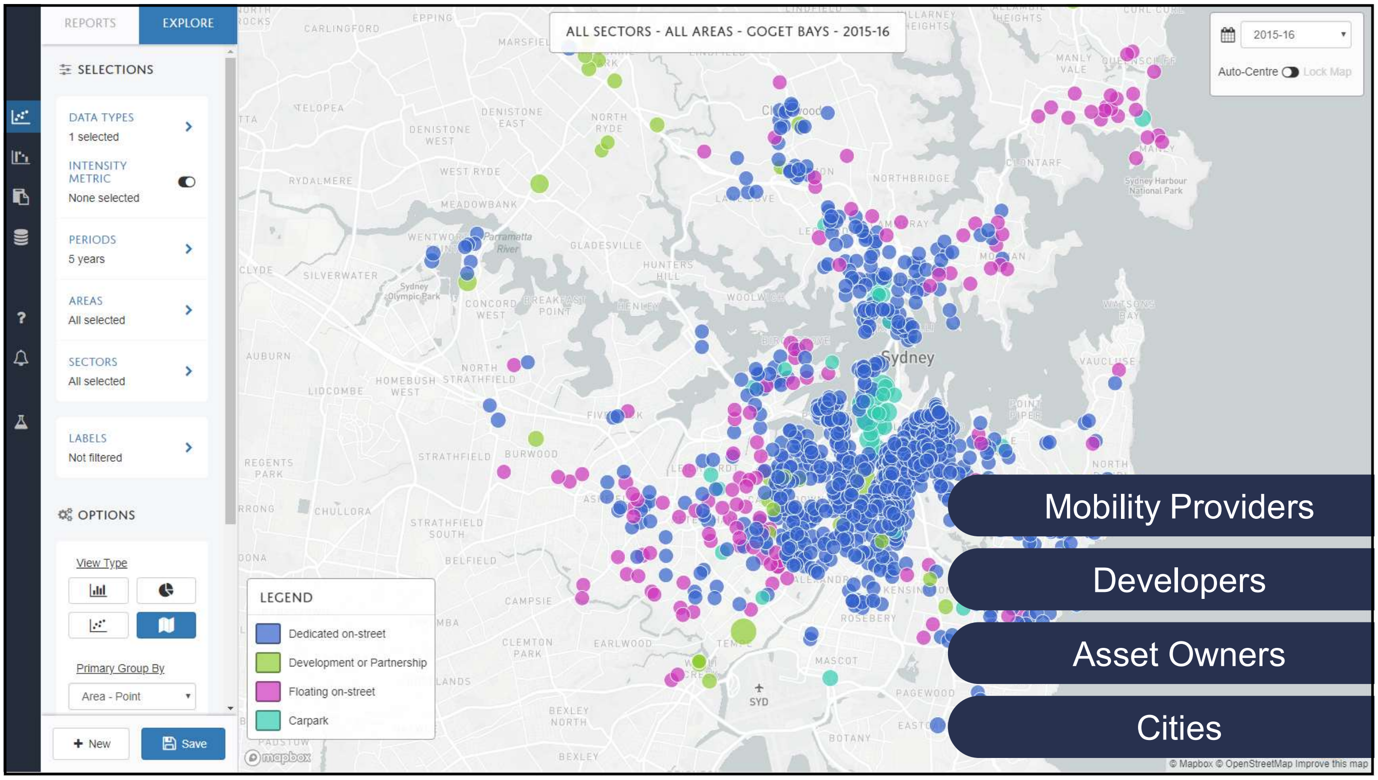


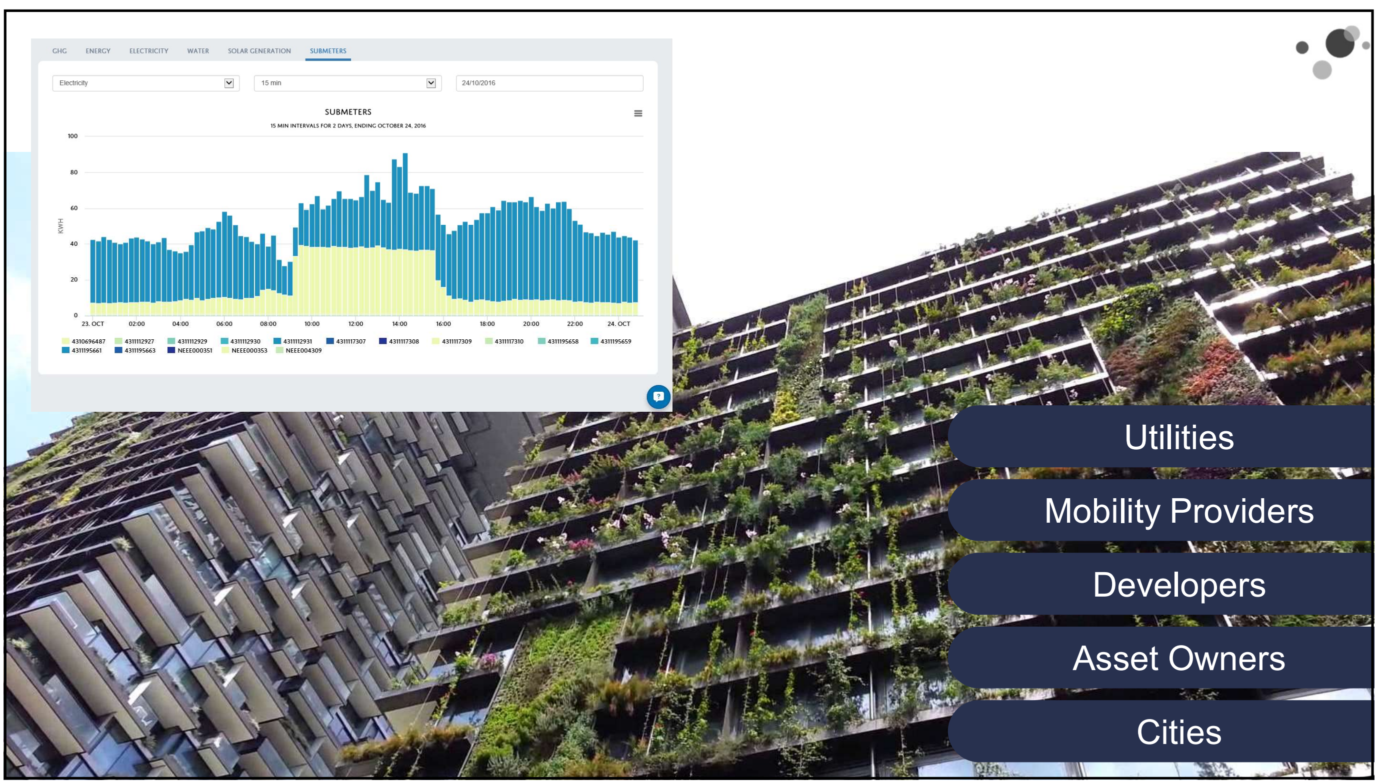
www.kinesis.org

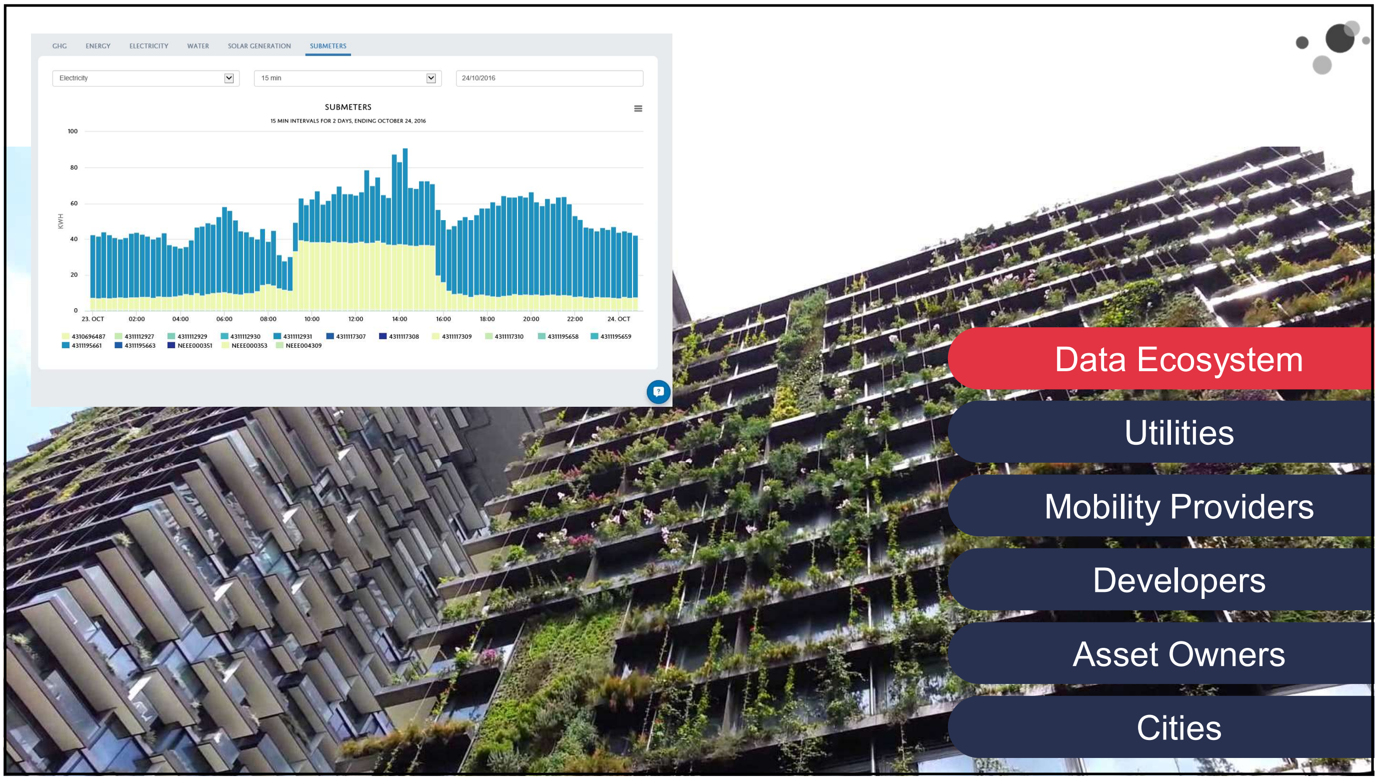



REPORTS
EXPLORE
SELECTIONS
DATA TYPES
1 selected
INTENSITY METRIC
Disabled
PERIODS
13 years
AREAS
All selected
SECTORS
All selected
LABELS
Not filtered
OPTIONS
View Type
Primary Group By
Area - Point
New
Save
BBP BUILDINGS
2017-18
Append
Auto-Centre
Lock Map
LEGEND
DEXUS
Lend Lease
Investa Property Group
Mirvac
AMP Capital
Stockland
GPT
Brookfield
Asset Owners
Cities


ASSETS
VIEW MINE
central
Central Park Retail Centre
FCT, NSW
ADD NEW ASSET
CENTRAL PARK RETAIL CENTRE
28 Broadway, Chippendale NSW 2008 - FCT - NSW
SUMMARY
DETAILS
SURVEYS
SUSTAINABILITY
KEY PERFORMANCE INDICATORS
GREEN STAR RATINGS
CARBON
ENERGY
GREEN STAR - DESIGN & AS BUILT
68 Points Score
5 STARS
Australian Excellence
GREENHOUSE INTENSITY
September 30, 2016
24.15
kg CO2e/m2
ELECTRICITY INTENSITY
ENERGY INTENSITY
ENVIRONMENTAL PERFORMANCE
GHG
ENERGY
ELECTRICITY
WATER
SOLAR GENERATION
SUBMETERS
Developers
Asset Owners
Cities


REPORTS
EXPLORE
SELECTIONS
DATA TYPES
1 selected
INTENSITY METRIC
None selected
PERIODS
5 years
AREAS
All selected
SECTORS
All selected
LABELS
Not filtered
OPTIONS
View Type
Primary Group By
Area - Point
New
Save
ALL SECTORS - ALL AREAS - GOGET BAYS - 2015-16
2015-16
Auto-Centre
Lock Map
LEGEND
Dedicated on-street
Development or Partnership
Floating on-street
Carpark
Sydney
Mobility Providers
Developers
Asset Owners
Cities
© Mapbox © OpenStreetMap Improve this map


GHG
ENERGY
ELECTRICITY
WATER
SOLAR GENERATION
SUBMETERS
Electricity
15 min
24/10/2016
SUBMETERS
15 MIN INTERVALS FOR 2 DAYS, ENDING OCTOBER 24, 2016
KWH
Utilities
Mobility Providers
Developers
Asset Owners
Cities

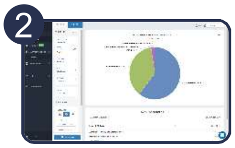


A Platform For NGOs, Governments & Investors

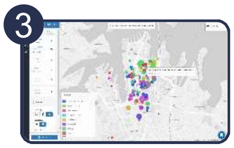
Kinesis Platform + C40 Partnership

1

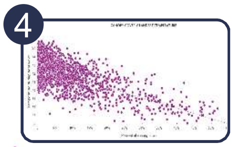

Data Management
- Single source of truth
- Data transformations

2


Reporting
- Automated GPC reports
- Performance tracking

3


Programs
- C40 Programs
- Member city programmes

4


Analytics
- Comparative benchmarking
- Correlation analysis

C40 Global Dashboard

- Measure Impact
- Member City Engagement
- Programme Management e.g. Deadline 2020

\+

Individual City Dashboards

- Simplified Reporting
- Programme Management
- Policy & Governance

C40 CITIES CLIMATE LEADERSHIP GROUP

C40 Global Dashboard

C40 Global Dashboard

Member City Dashboards

C40 Global Dashboard

Member City Dashboards

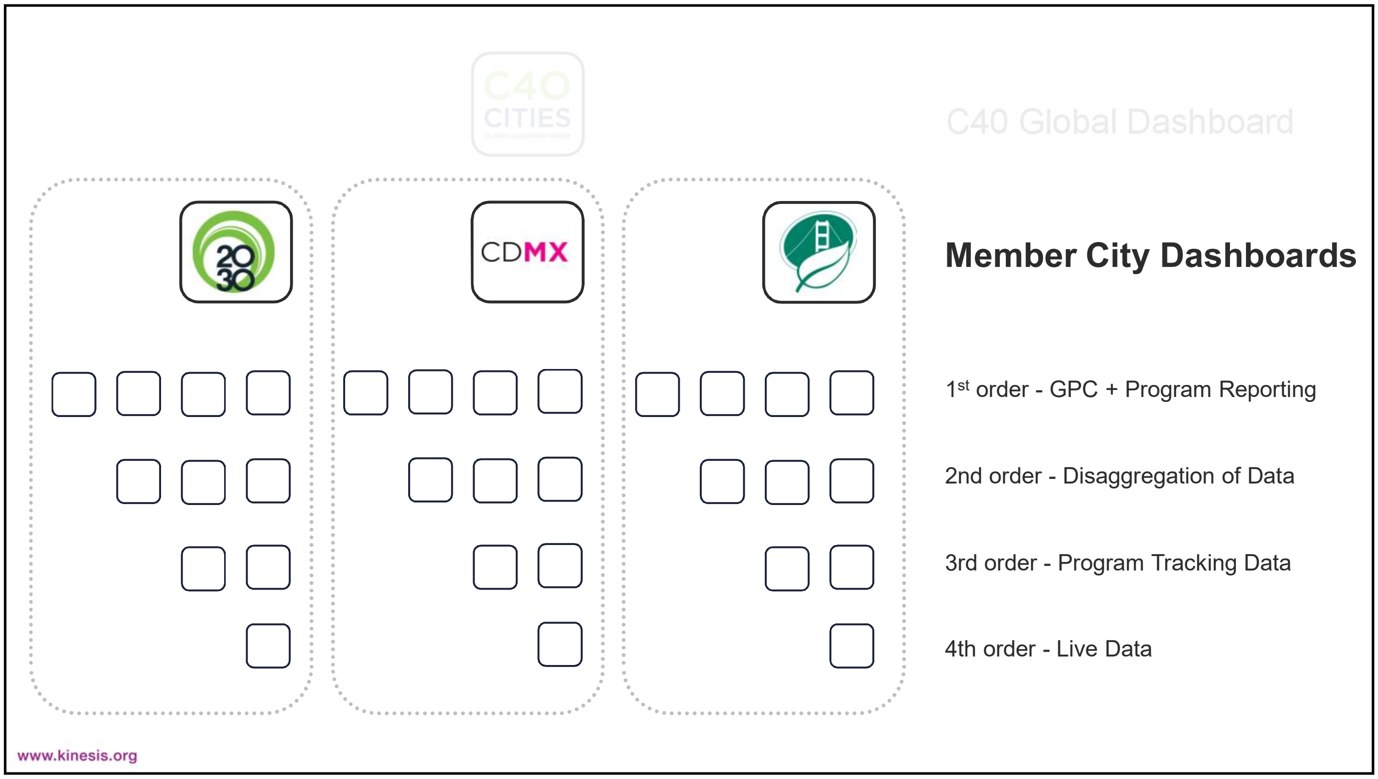
1st order - GPC + Program Reporting

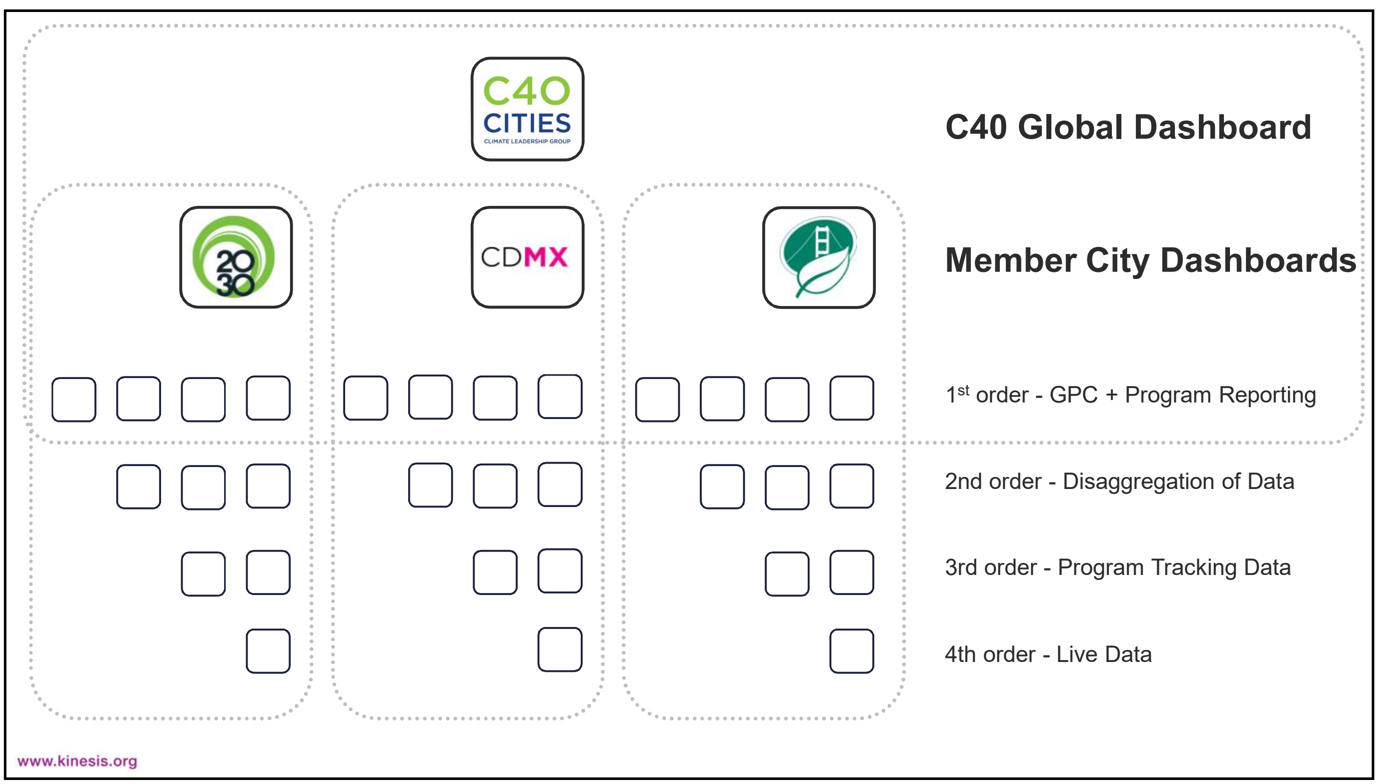
2nd order - Disaggregation of Data

3rd order - Program Tracking Data

4th order - Live Data

www.kinesis.org


C40 CITIES
C40 Global Dashboard
CDMX
Member City Dashboards
1st order - GPC + Program Reporting
2nd order - Disaggregation of Data
3rd order - Program Tracking Data
4th order - Live Data
www.kinesis.org


C40 CITIES
CLIMATE LEADERSHIP GROUP
C40 Global Dashboard
CDMX
Member City Dashboards
1st order - GPC + Program Reporting
2nd order - Disaggregation of Data
3rd order - Program Tracking Data
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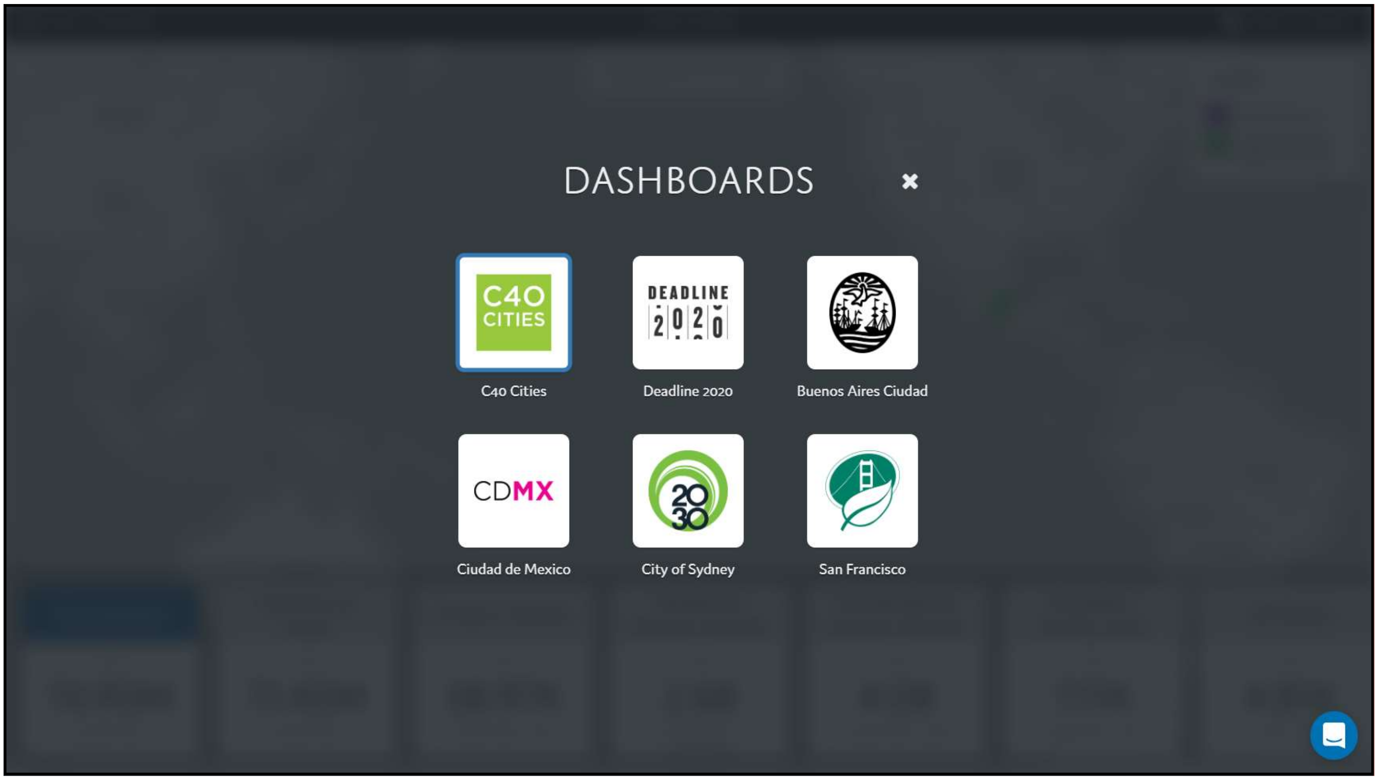
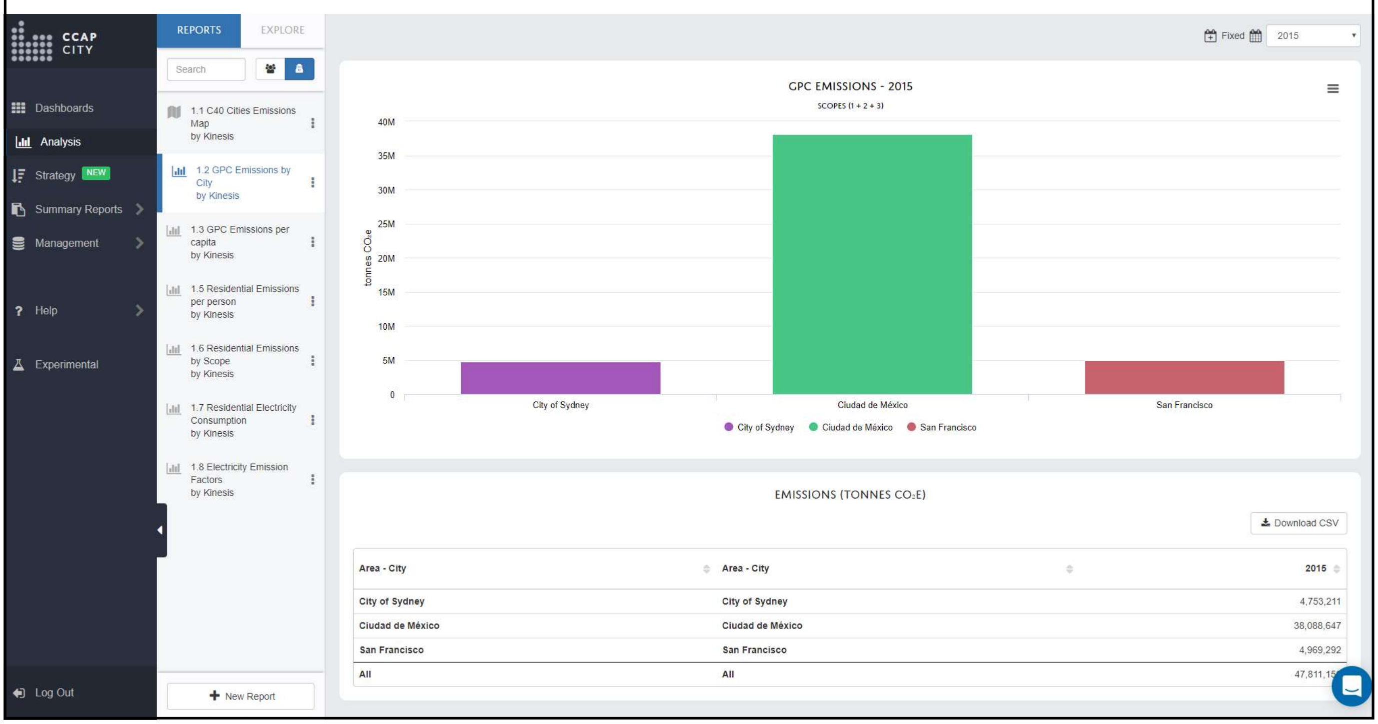
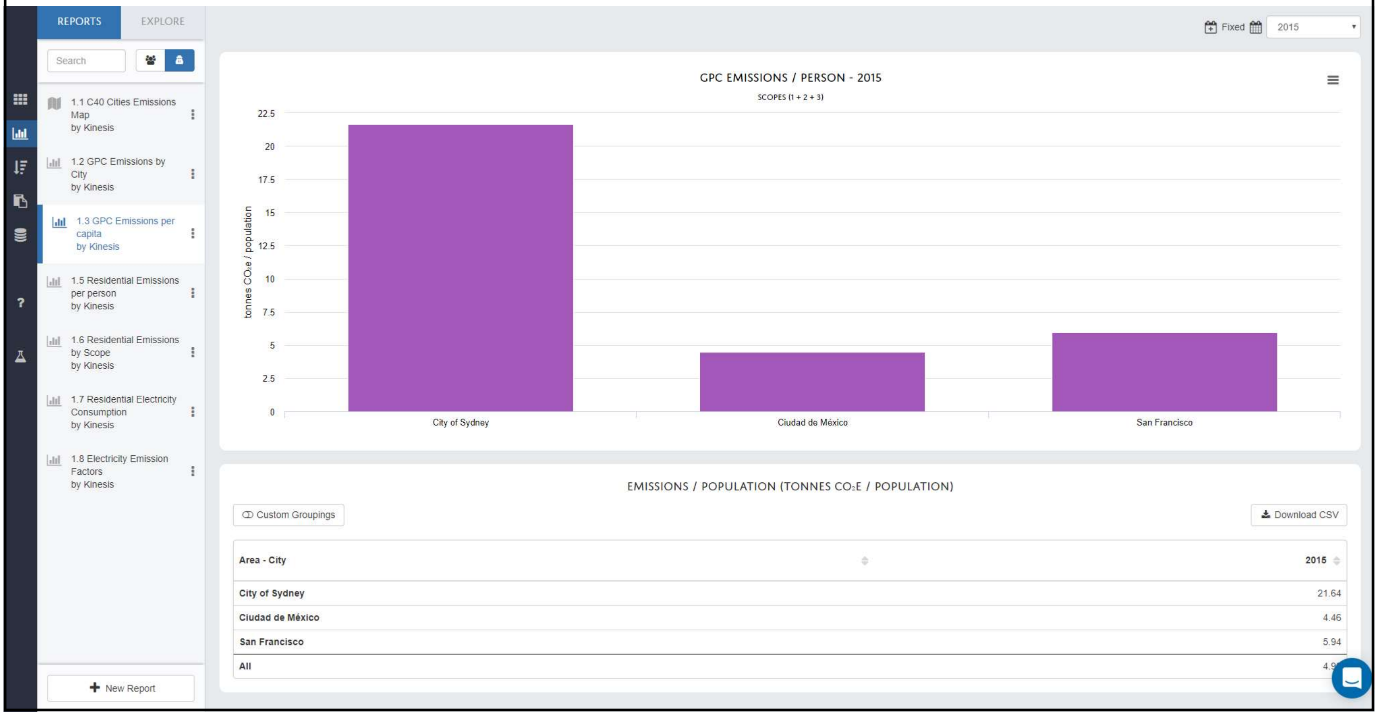


Comparing Cities

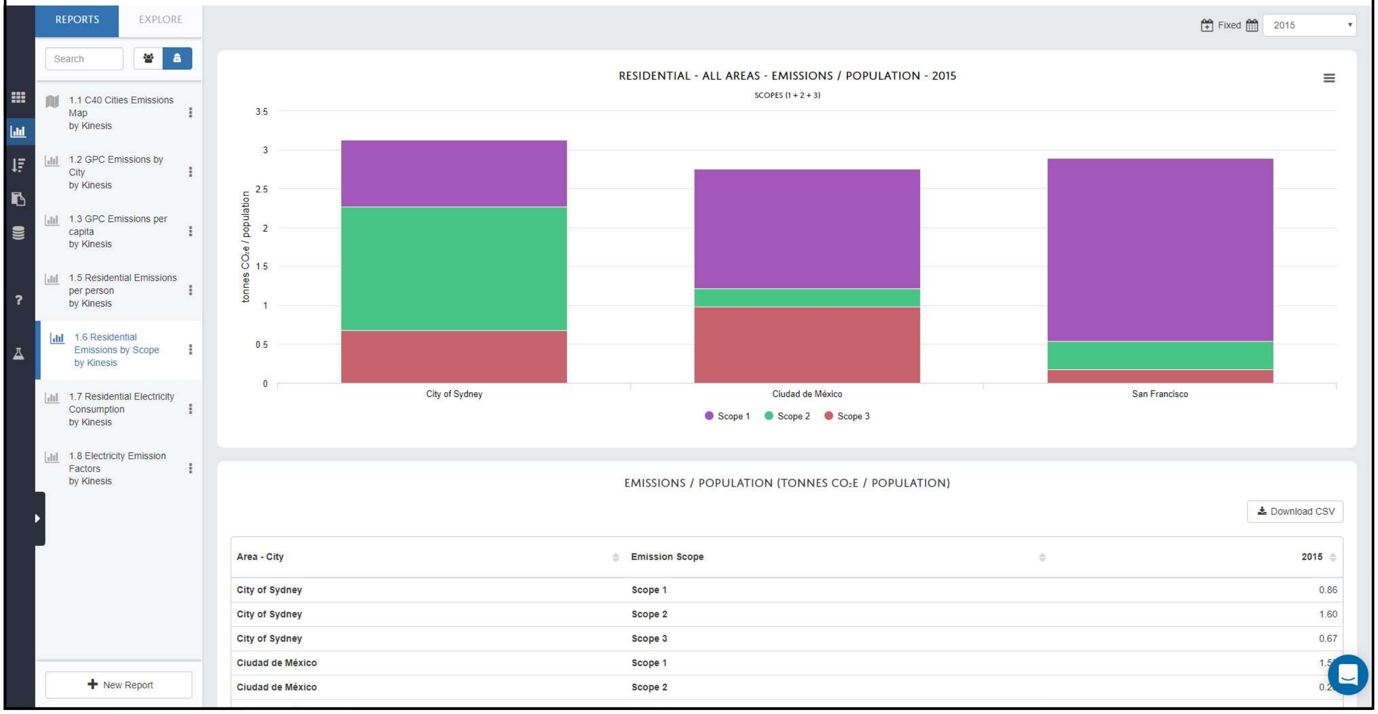


Comparing Cities

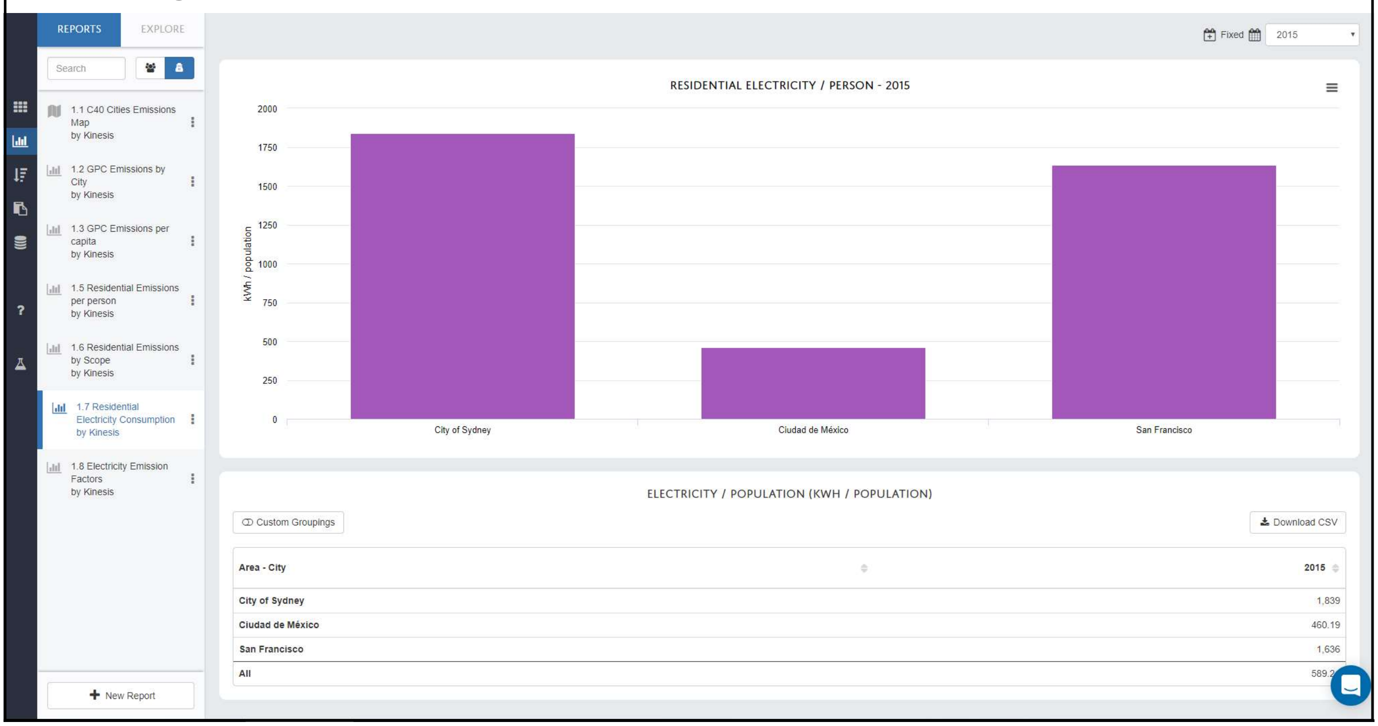


Comparing Cities

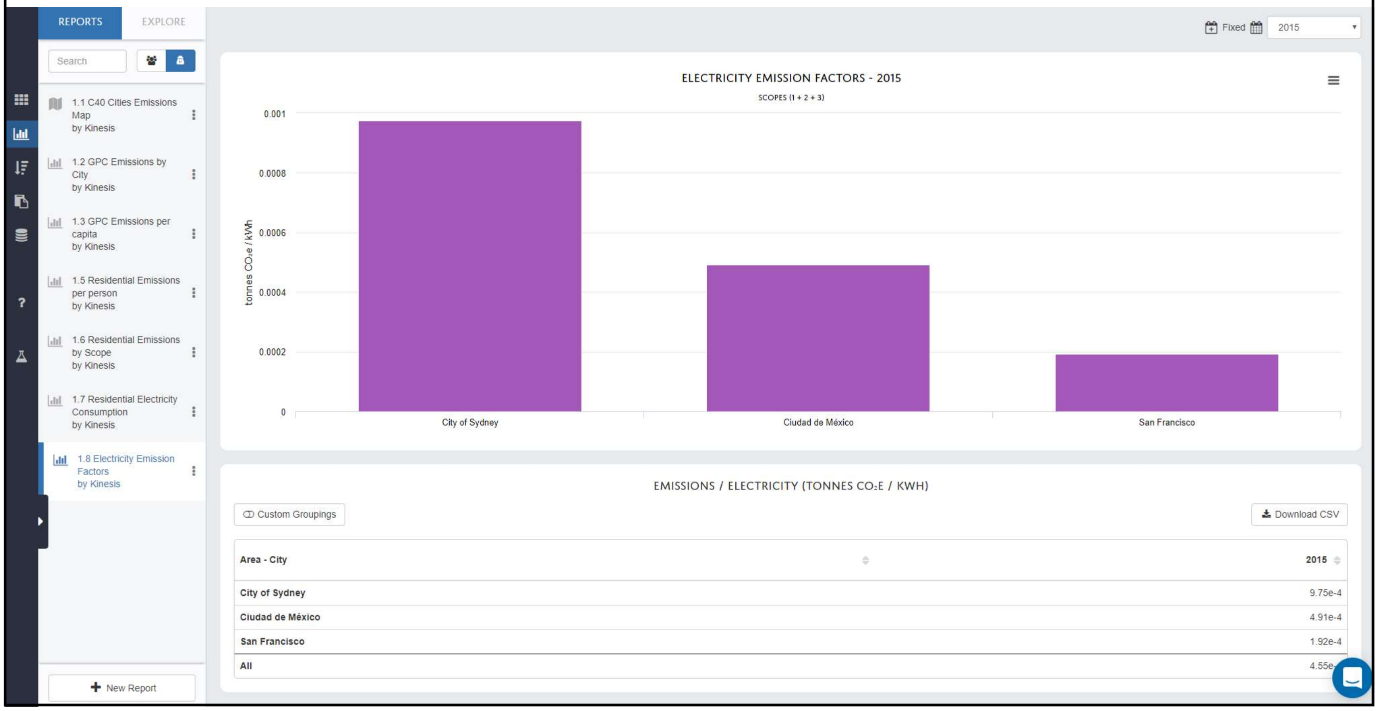
Comparing Cities

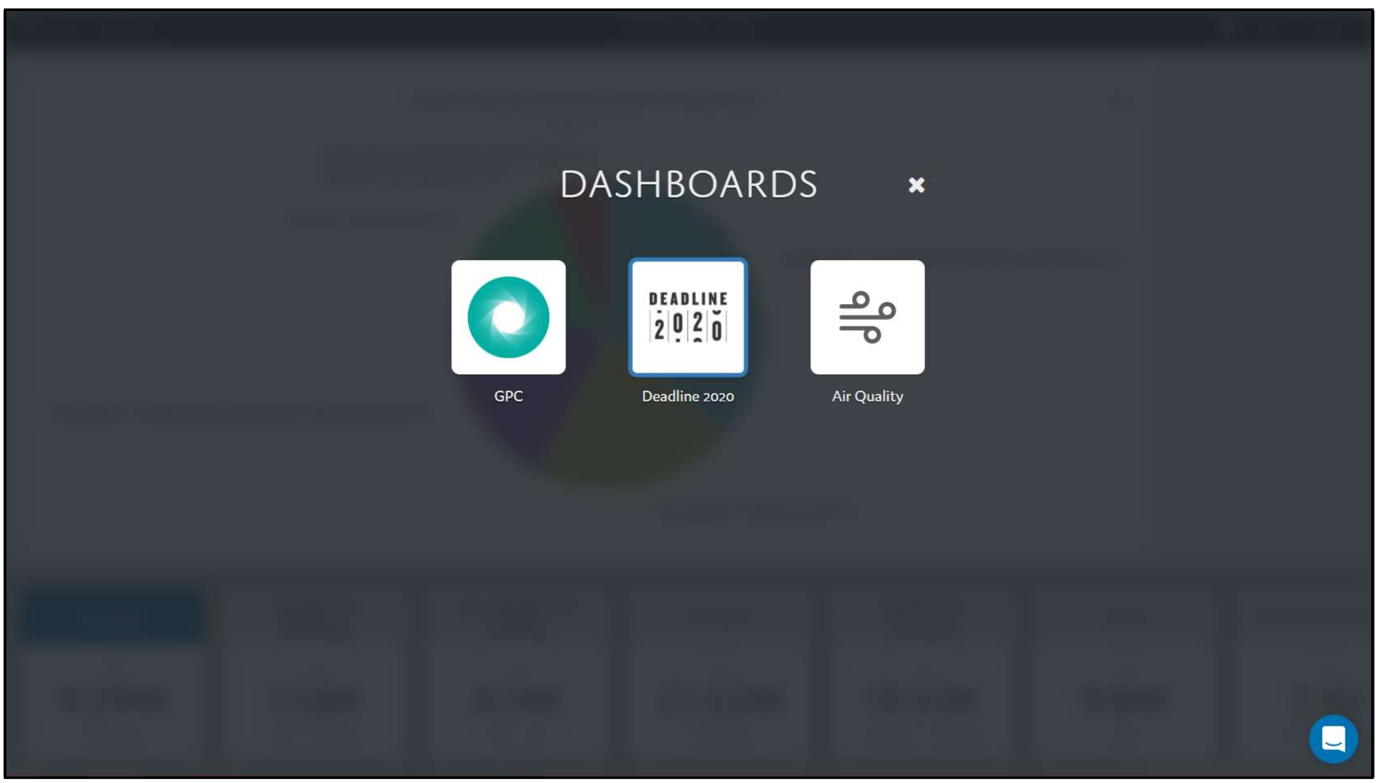


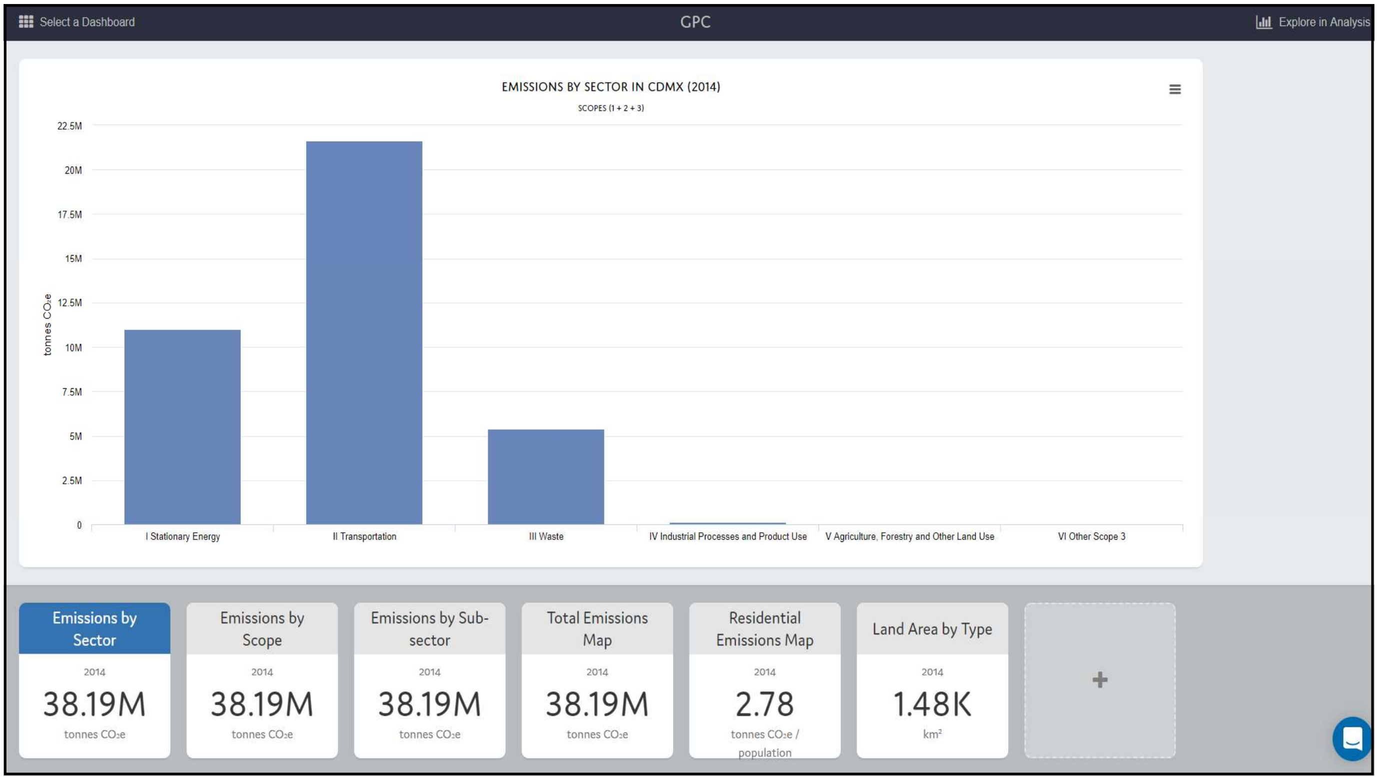
Comparing Cities



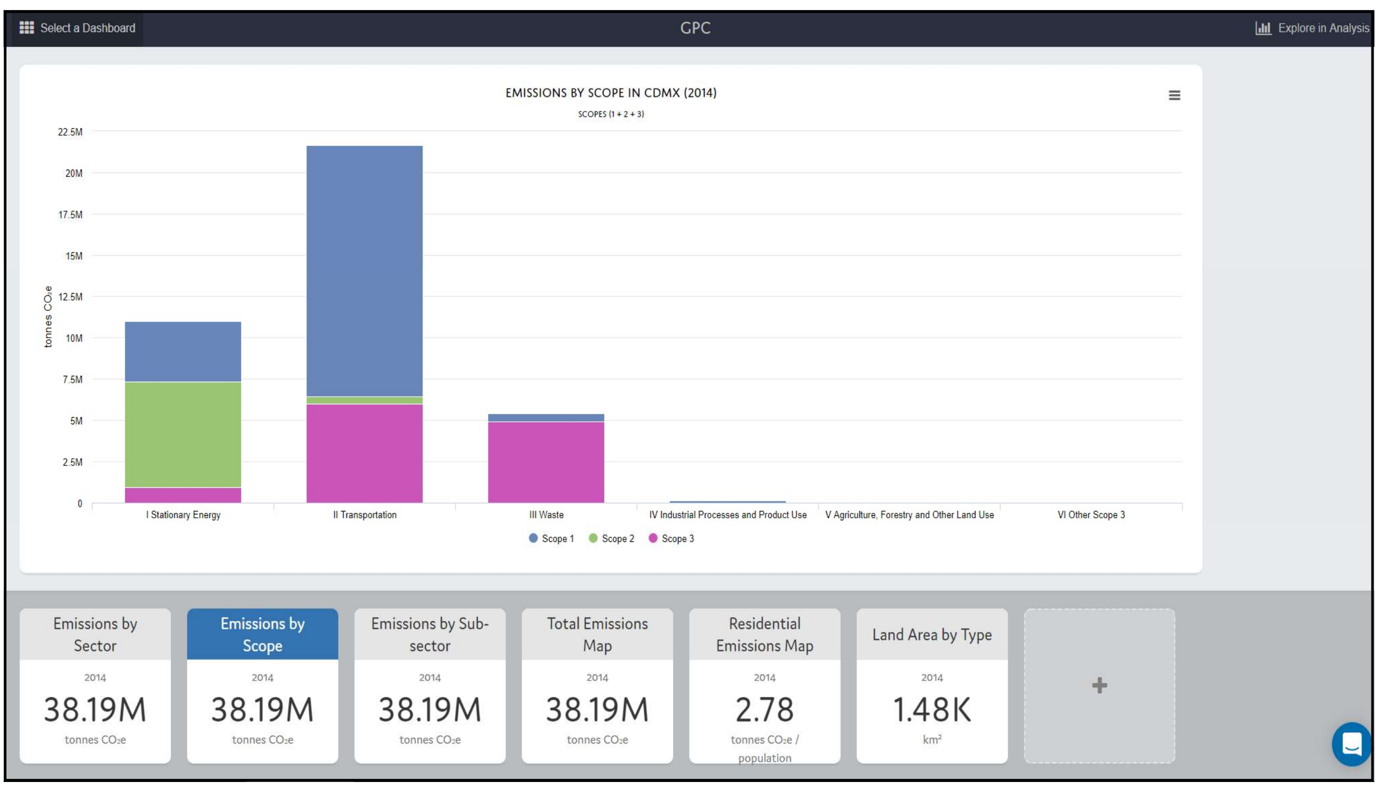
Comparing Cities



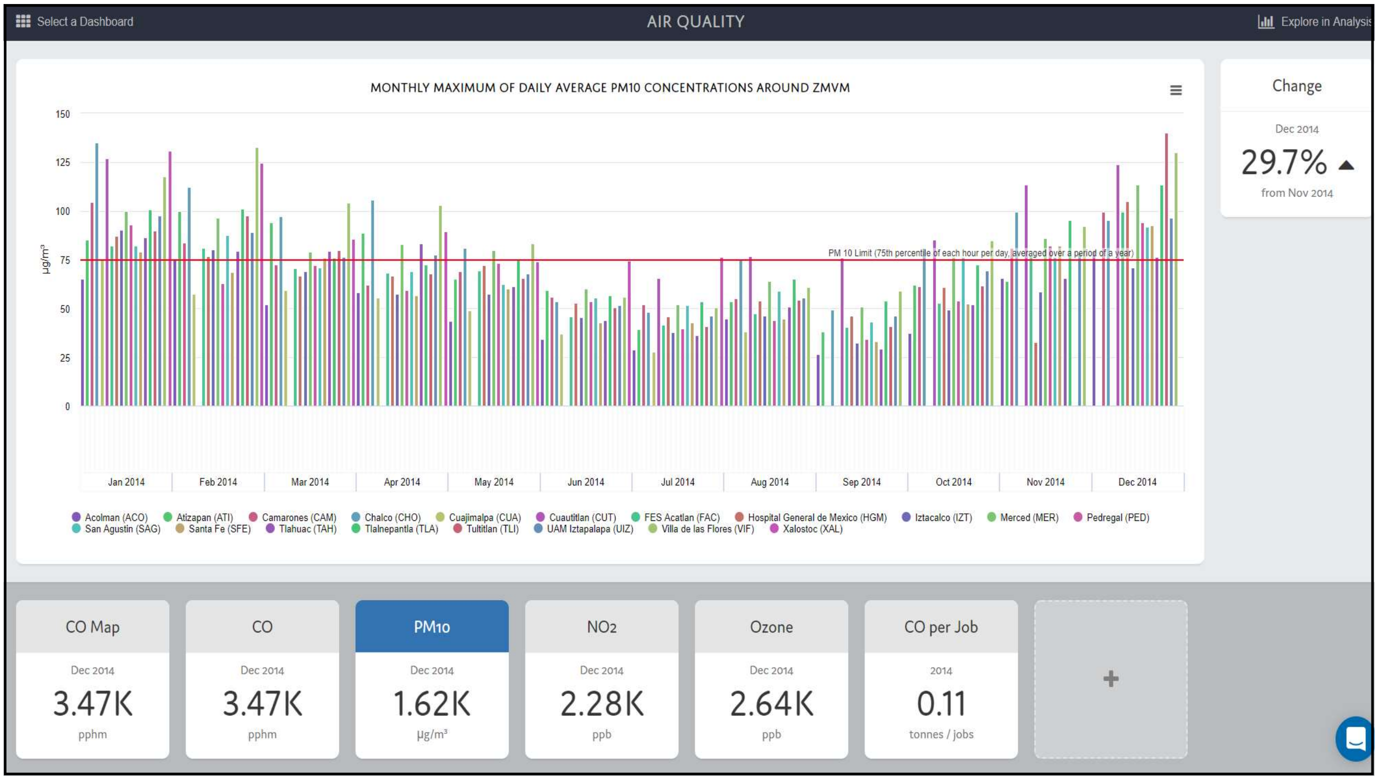




Select a Dashboard
GPC
Explore in Analysis
EMISSIONS BY SECTOR IN CDMX (2014)
SCOPES (1 + 2 + 3)
tonnes CO₂e
22.5M
20M
17.5M
15M
12.5M
10M
7.5M
5M
2.5M
0
I Stationary Energy
II Transportation
III Waste
IV Industrial Processes and Product Use
V Agriculture, Forestry and Other Land Use
VI Other Scope 3
Emissions by Sector
2014
38.19M
tonnes CO₂e
Emissions by Scope
2014
38.19M
tonnes CO₂e
Emissions by Sub-sector
2014
38.19M
tonnes CO₂e
Total Emissions Map
2014
38.19M
tonnes CO₂e
Residential Emissions Map
2014
2.78
tonnes CO₂e / population
Land Area by Type
2014
1.48K
km²

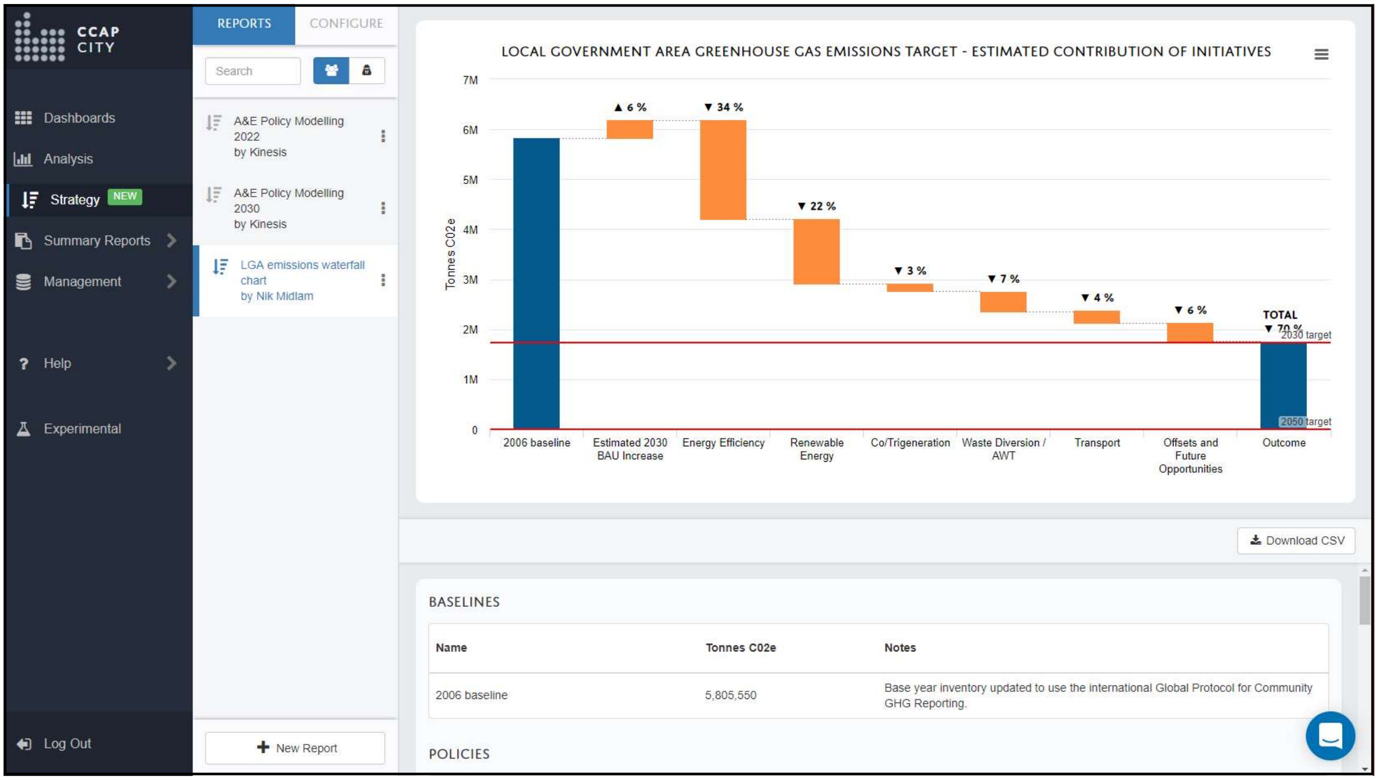


Select a Dashboard
GPC
Explore in Analysis
EMISSIONS BY SCOPE IN CDMX (2014)
SCOPES (1 + 2 + 3)
tonnes CO₂e
22.5M
20M
17.5M
15M
12.5M
10M
7.5M
5M
2.5M
0
I Stationary Energy
II Transportation
III Waste
IV Industrial Processes and Product Use
V Agriculture, Forestry and Other Land Use
VI Other Scope 3
Scope 1
Scope 2
Scope 3
Emissions by Sector
2014
38.19M
tonnes CO₂e
Emissions by Scope
2014
38.19M
tonnes CO₂e
Emissions by Sub-sector
2014
38.19M
tonnes CO₂e
Total Emissions Map
2014
38.19M
tonnes CO₂e
Residential Emissions Map
2014
2.78
tonnes CO₂e / population
Land Area by Type
2014
1.48K
km²

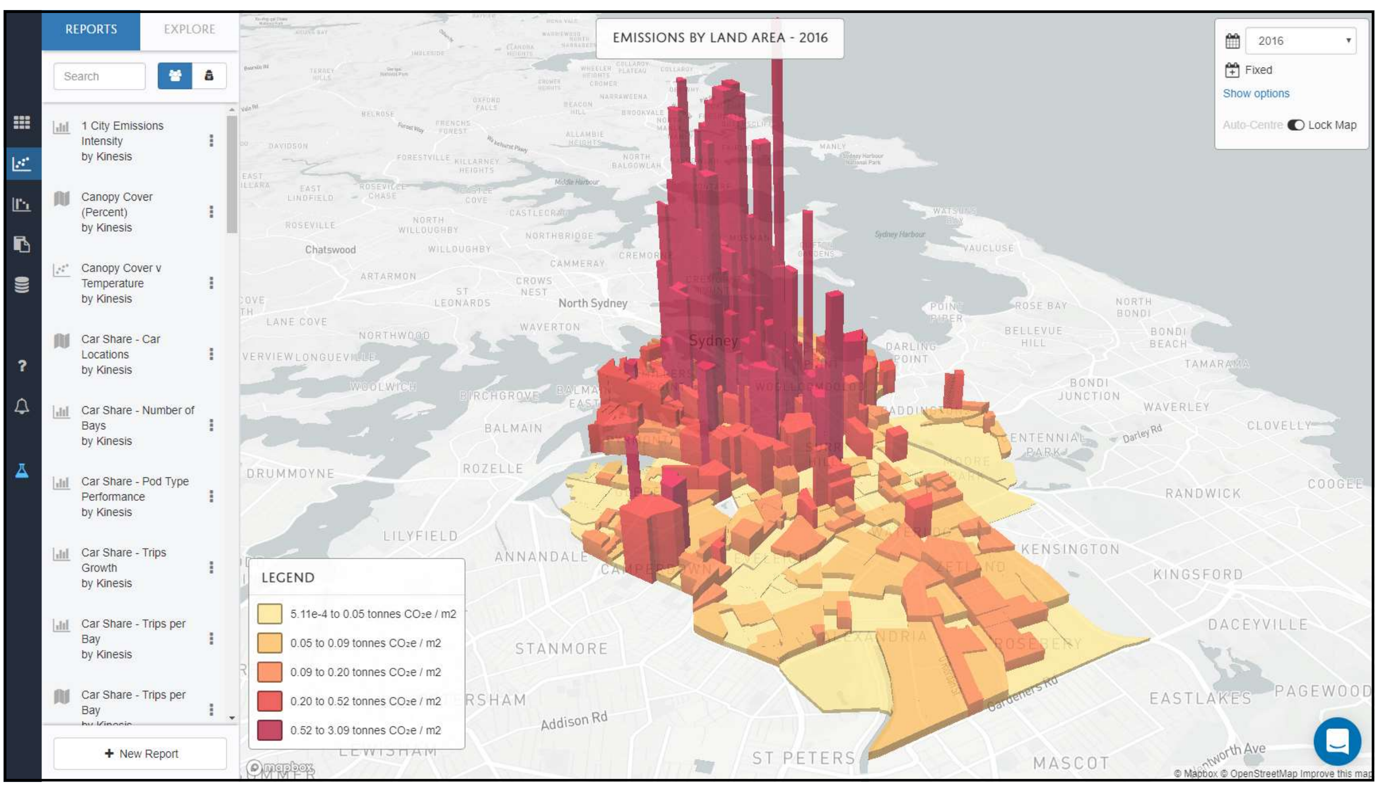


Select a Dashboard
AIR QUALITY
Explore in Analysis
MONTHLY MAXIMUM OF DAILY AVERAGE PM10 CONCENTRATIONS AROUND ZMVM
150
125
100
75
50
25
0
µg/m³
PM 10 Limit (75th percentile of each hour per day, averaged over a period of a year)
Jan 2014
Feb 2014
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Acolman (ACO)
Atizapan (ATI)
Camarones (CAM)
Chalco (CHO)
Cuajimalpa (CUA)
Cuautitlan (CUT)
FES Acatlan (FAC)
Hospital General de Mexico (HGM)
Iztacalco (IZT)
Merced (MER)
Pedregal (PED)
San Agustin (SAG)
Santa Fe (SFE)
Tlahuac (TAH)
Tlalnepantla (TLA)
Tultitlan (TLI)
UAM Iztapalapa (UIZ)
Villa de las Flores (VIF)
Xalostoc (XAL)
Change
Dec 2014
29.7%
from Nov 2014
CO Map
Dec 2014
3.47K
pphm
CO
Dec 2014
3.47K
pphm
PM10
Dec 2014
1.62K
µg/m³
NO2
Dec 2014
2.28K
ppb
Ozone
Dec 2014
2.64K
ppb
CO per Job
2014
0.11
tonnes / jobs
+

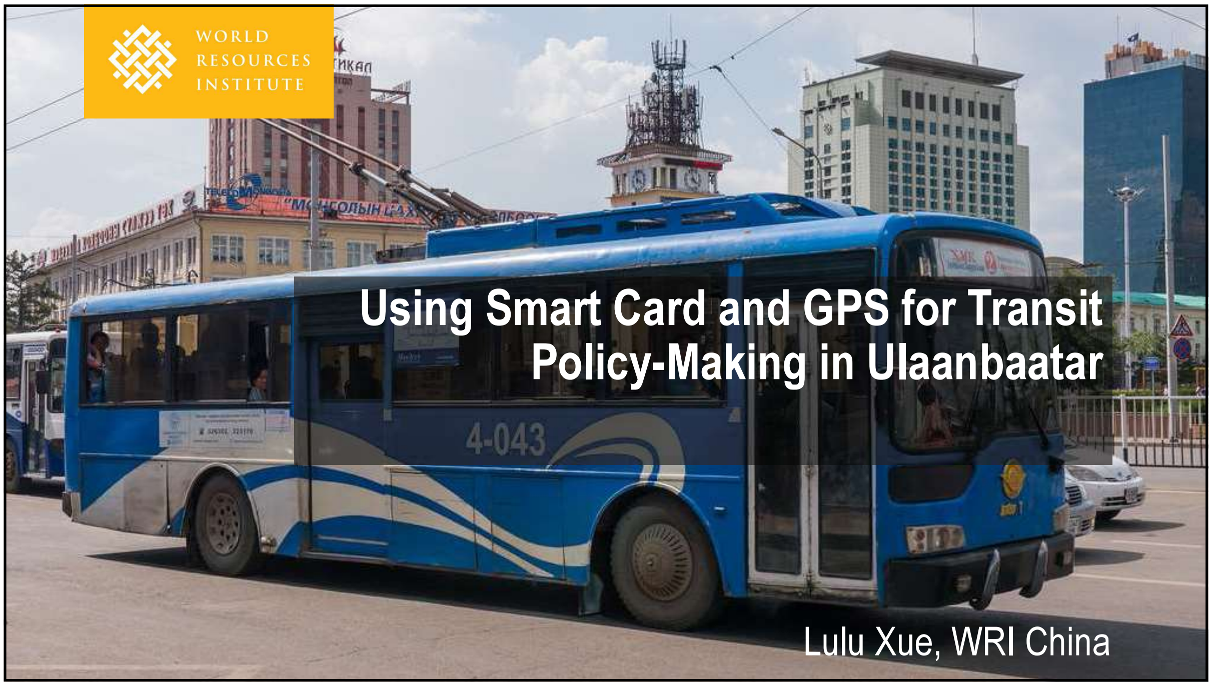
REPORTS
EXPLORE
Fixed
2014
FILTERS
Reset
DATA TYPES
12 selected
INTENSITY METRIC
Disabled
PERIODS
2 selected
AREAS
75 selected
SECTORS
24 selected
LABELS
Not filtered
OPTIONS
View Type
Primary Group By
Label - Vehicles - I
Secondary Group By
Data Type
Other options
Show data notes
Save Report
YEAR OF MANUFACTURE OF VEHICLES IN 2014
350k
300k
250k
200k
150k
100k
50k
0
vehicles
1984 y ant.
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Autobuses
Combis and light trucks
Metrobuses
Microbuses
Motorcycles
Pick Ups
Private Cars
SUV Trucks
Taxis
Tractors
Vehicles greater than 3.8 tonnes
Vehicles up to 3.8 tonnes
VEHICLES (VEHICLES)
Download CSV
Label - Vehicles - Model Year
Data Type
2014
1984 y ant.
Autobuses
1,796
1984 y ant.
Combis and light trucks
187.00
1984 y ant.
Microbuses
15.00
1984 y ant.
Pick Ups
1984 y ant.
Private Cars



CCAP CITY
REPORTS
CONFIGURE
Dashboards
Analysis
Strategy NEW
Summary Reports
Management
Help
Experimental
Log Out
A&E Policy Modelling 2022 by Kinesis
A&E Policy Modelling 2030 by Kinesis
LGA emissions waterfall chart by Nik Midlam
New Report
LOCAL GOVERNMENT AREA GREENHOUSE GAS EMISSIONS TARGET - ESTIMATED CONTRIBUTION OF INITIATIVES
Tonnes C02e
▲ 6 %
▼ 34 %
▼ 22 %
▼ 3 %
▼ 7 %
▼ 4 %
▼ 6 %
TOTAL ▼ 70 %
2030 target
2050 target
2006 baseline
Estimated 2030 BAU Increase
Energy Efficiency
Renewable Energy
Co/Trigeneration
Waste Diversion / AWT
Transport
Offsets and Future Opportunities
Outcome
Download CSV
BASELINES
Name | Tonnes C02e | Notes
2006 baseline | 5,805,550 | Base year inventory updated to use the international Global Protocol for Community GHG Reporting.
POLICIES



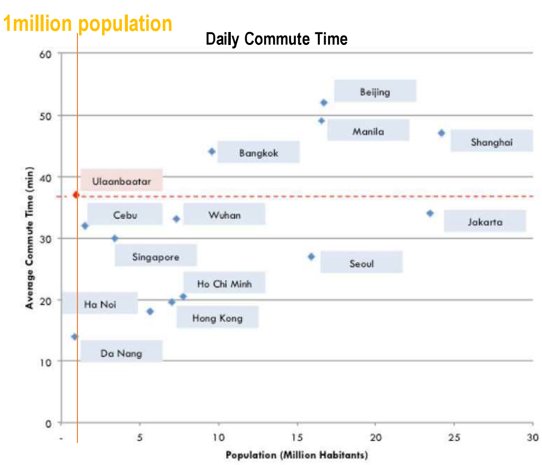
REPORTS
EXPLORE
1 City Emissions Intensity by Kinesis
Canopy Cover (Percent) by Kinesis
Canopy Cover v Temperature by Kinesis
Car Share - Car Locations by Kinesis
Car Share - Number of Bays by Kinesis
Car Share - Pod Type Performance by Kinesis
Car Share - Trips Growth by Kinesis
Car Share - Trips per Bay by Kinesis
New Report
EMISSIONS BY LAND AREA - 2016
2016
Fixed
Show options
Auto-Centre Lock Map
LEGEND
5.11e-4 to 0.05 tonnes CO₂e / m2
0.05 to 0.09 tonnes CO₂e / m2
0.09 to 0.20 tonnes CO₂e / m2
0.20 to 0.52 tonnes CO₂e / m2
0.52 to 3.09 tonnes CO₂e / m2
© Mapbox © OpenStreetMap Improve this map

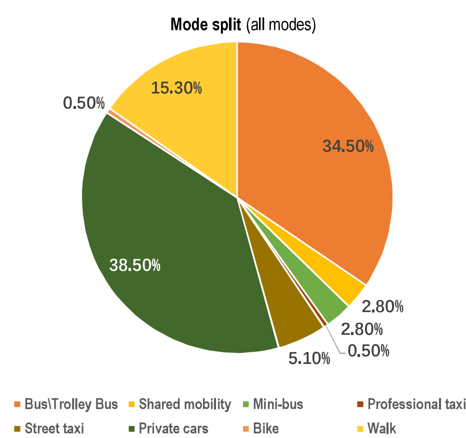


Public Transit in UB

- Commute time by car: 10-30 mins
- Commute time by bus: 30-40 mins

- Weekday bus trips: 638,975 trips
- Weekday bus passengers: 271,056 persons
- Mode share of formal transit service: 34.5%
  (paratransit service: 10.7%)





Source: WRI smart card study, UB household survey, World Bank 2015

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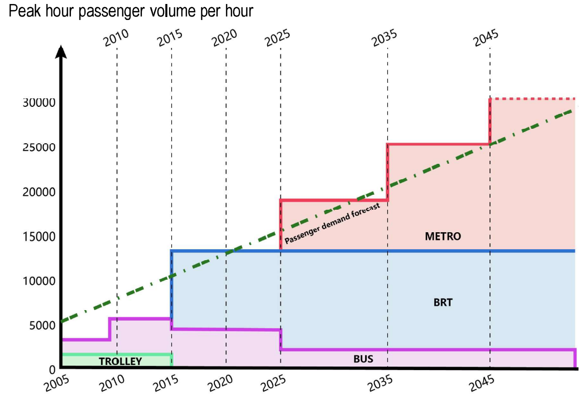
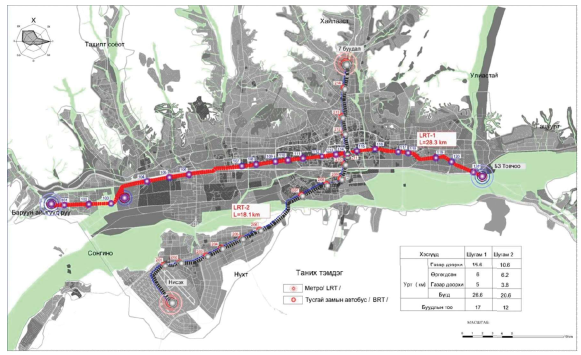
Public Transit in UB

• Public Transit Service in City Center





Source: ADB, ITDP

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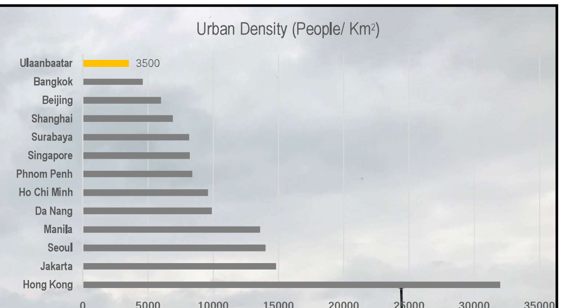
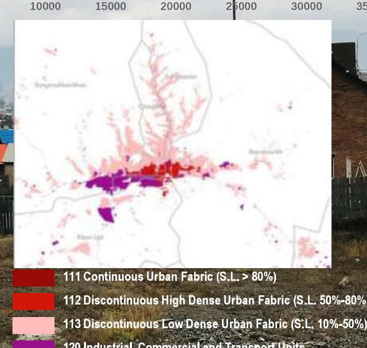
Public Transit in UB

• Public Transit Service in Ger Area:

Fragmented sprawl and unpaved local roads pose challenges to transit service provisions.





Source: World Bank 2015

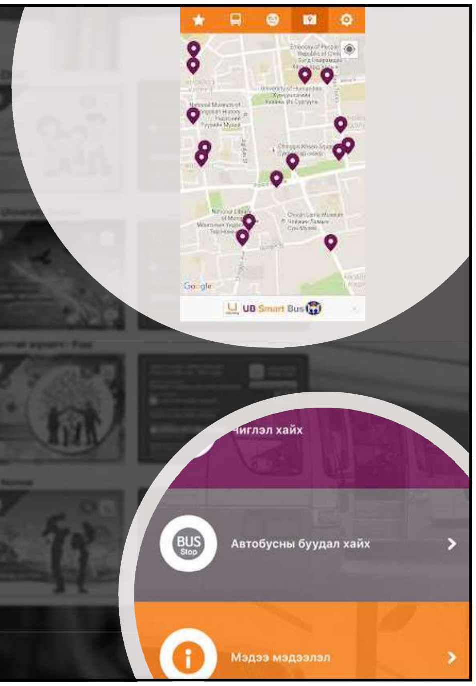
Bus management and E-ticketing system in UB

Automatic Fare Collection System in UB

- Cash payment is no longer accepted from April 1st 2017
  (nearly 100% penetration vs. China's average 61%)
- Both tap-in and tap-out are required
  (30% trips with tap-outs)

Automatic Vehicle Location System in UB

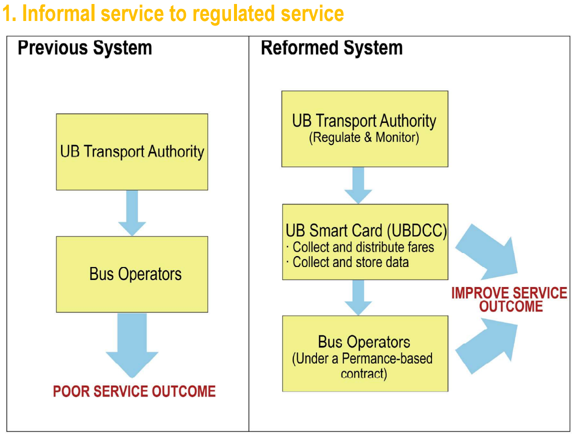
- All the buses are equipped with GPS systemwide to enhance transit operation in real time
- Mobile-based user information system put into operation



Bus Reform in UB

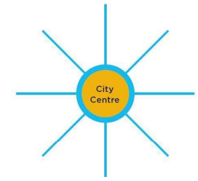
- E-ticketing (AFC) shouldn't be seen as a process of simple replacement for traditional ticketing. It is also an opportunity to reform the bus sector.

1. Informal service to regulated service

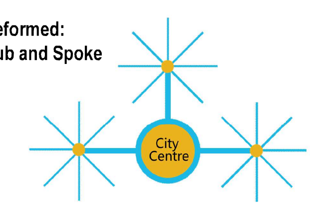


2. Route structure optimization

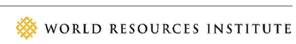
Previous: Radial



Reformed: Hub and Spoke



Source: Adapted from ADB 2009



3. Proposed: Using Smart Card and GPS data for policy and planning

UB Transport Authority
(Regulate & Monitor)

UB Smart Card (UBDCC)
· Collect and distribute fares
· Collect and store data

Bus Operators
(Under a Permance-based contract)

Transit Planning: Unravel travel demand and optimize transit service provision accordingly

- Spatial coverage and infrastructure investments
- Service & fleet optimization

Smart Card | GPS

Daily Operation: Provide real-time data to support the monitoring of bus operation

- Daily operation monitor and contract enforcement
- Service interventions (dynamic dispatching)

Infer transit destinations

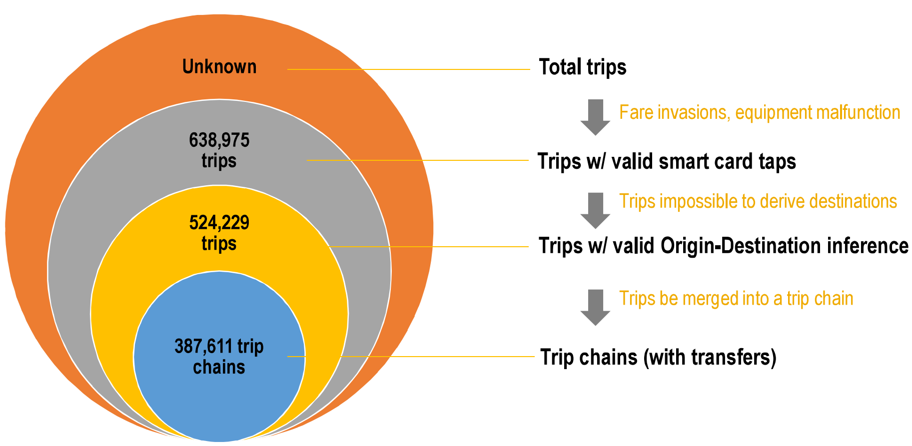
Cascade trips by transfers

Construct OD matrix

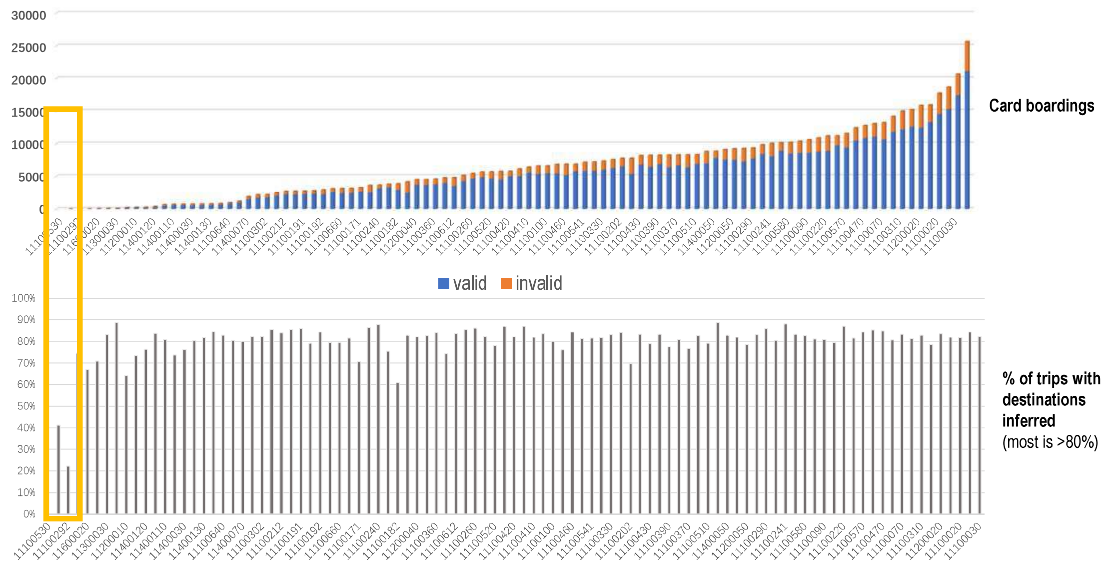
Validation

3. Proposed: Using Smart Card and GPS data for policy and planning

- Model inputs: smart card and GPS records on Sept 4, 2018(Tuesday)
- Model results:

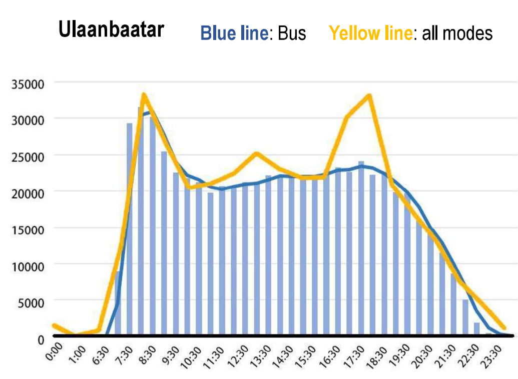


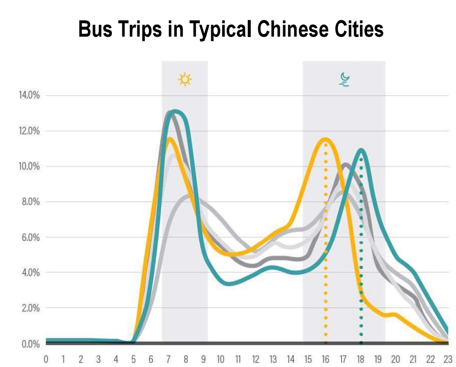
- Bus Passenger Origin-Destination Estimation: OD Inference Rate by Route



Transit Travel Demand

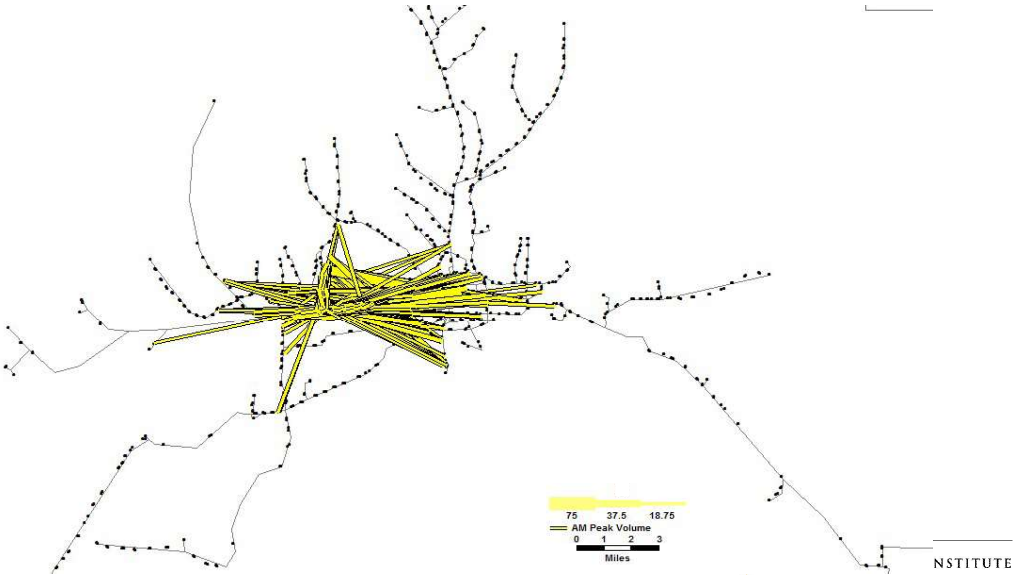
- **Trip distribution by time of day**



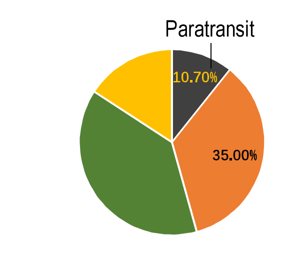


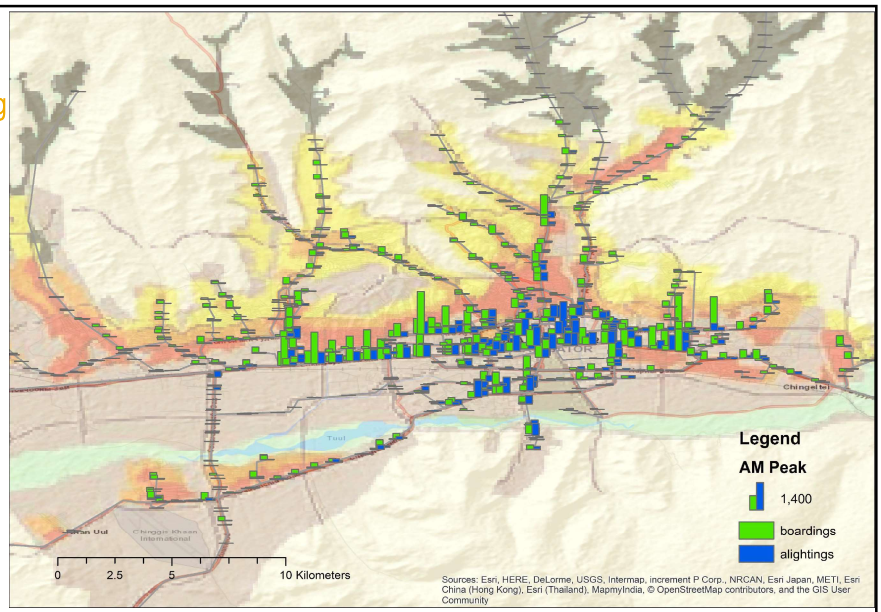
Based on buses departure time
Source: trip distribution for all modes is from UB Household survey; trip distribution for typical Chinese cities is from WRI

Transit Travel Demand: AM Peak Hour-Bus Journey Origins and Destinations



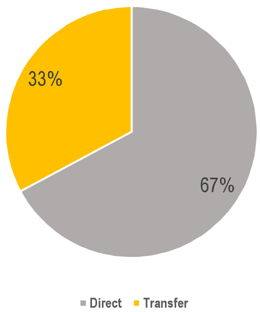
Travel Demand:
Bus Boarding and Alighting at AM Peak



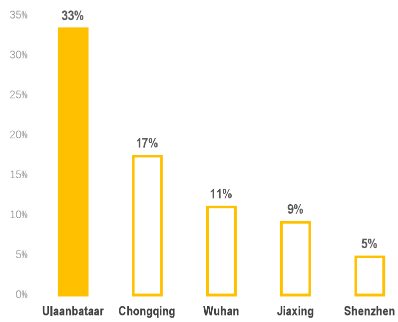


Travel Demand: Bus-to-Bus Transfers

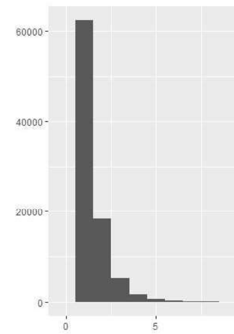
Weekday bus ridership: 271,056 persons/day
Riders with transfers: 88,896 persons/day



UB-Percentage of riders who transfer



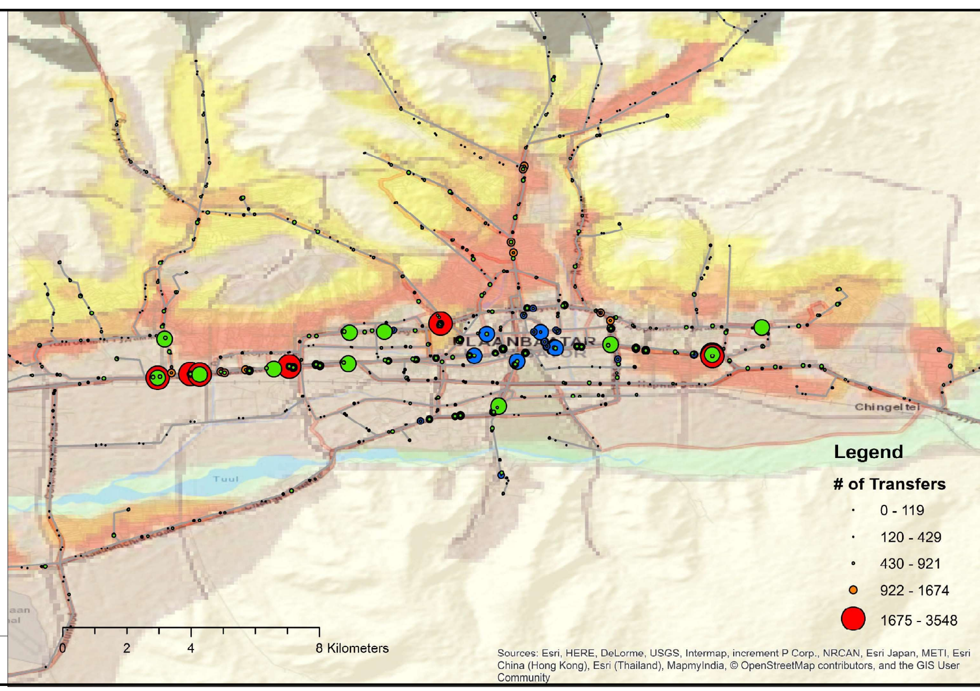
Comparisons with typical Chinese cities



UB-Number of transfers per journey

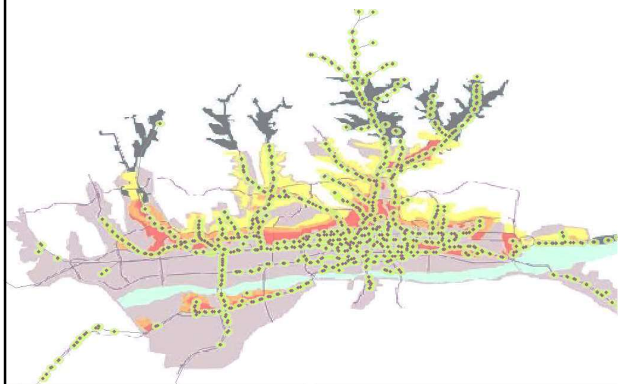
Source: WRI Chinese Cities Transit Big Data Analysis

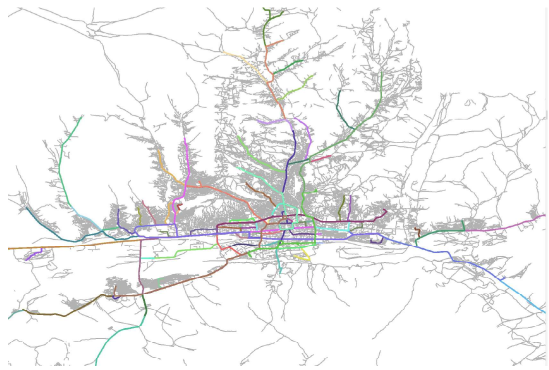
WORLD RESOURCES INSTITUTE



Transit Accessibility

Outside the 638,975 bus trips, there is potentially a large, unserved latent transit demand in mid and fringe Ger Area.





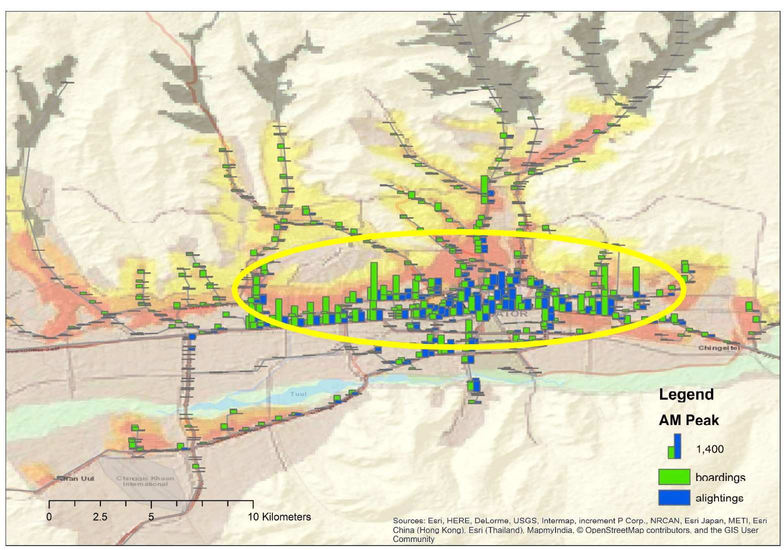
Built-up area within 300m straight-line distance to bus stations:
44%

Length of streets\roads served by bus service:
25%

Transit Accessibility

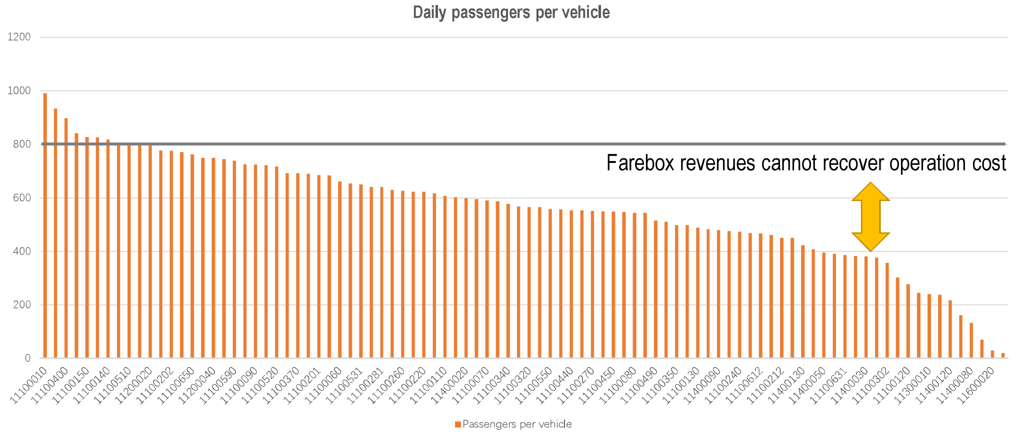
- **City Center & High-density Ger Area**: Improve service coverage, quality, & last-mileage connectivity
- **Low-density Ger Area**(mid or fringe): Low frequency, on-demand transit services or shared-ride services

- **Optimize urban form** and increase affordable housing provisions



Transit Operation and Oversight

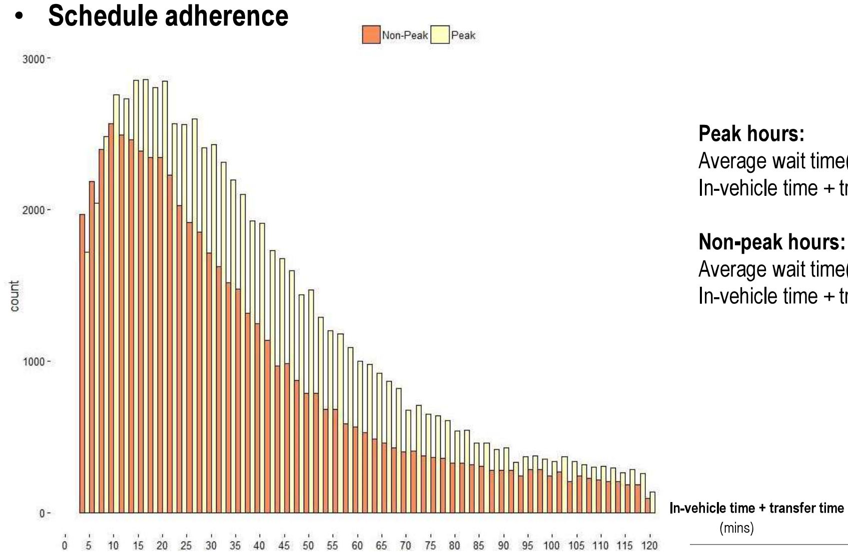
- **Operation efficiency and financial sustainability**
  - Bus companies were in a dire financial situation, total industry losses of MNT 17 billion (US$ 9 million) per year
  - UB government provided MNT 53 million (US$29 million) annual subsidy, without knowing the exact number of riders eligible for subsidies (students, the elderly and disabled).



Assume avg. operating cost per vehicle= daily mileage (150km) * 1USD/km

Transit Operation and Oversight

- **Schedule adherence**



Peak hours:
Average wait time(AWT): 8 mins
In-vehicle time + transfer time: 15-20 mins

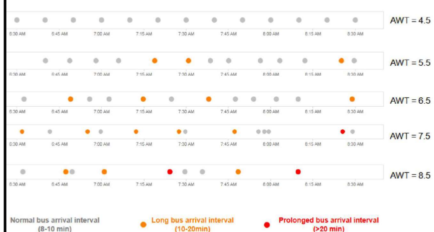
Non-peak hours:
Average wait time(AWT): 12 mins
In-vehicle time + transfer time: 10-15 mins

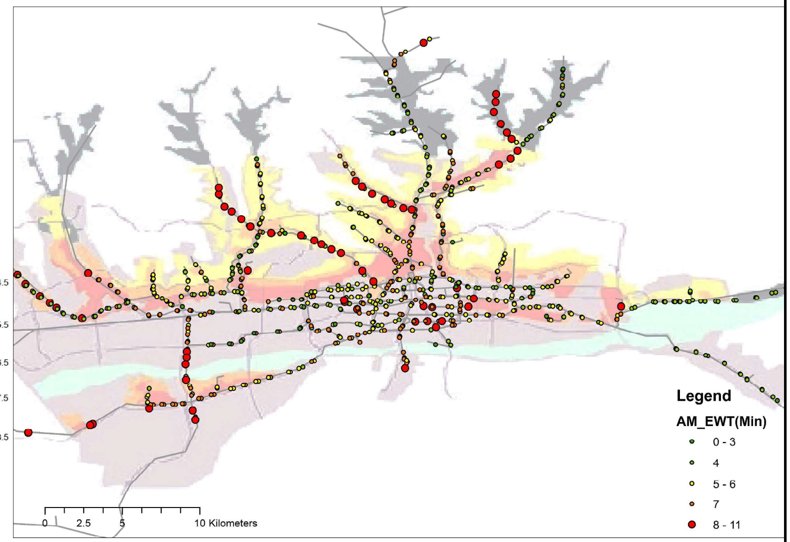
Transit Operation and Oversight

- **Schedule adherence**

Average Wait Time (AWT)

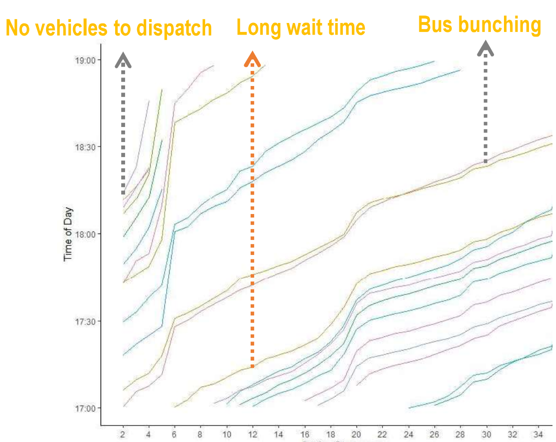
$$AWT = \frac{\sum_n \text{actual headway}_n^2}{2 \times \sum_n \text{actual headway}_n}$$





Transit Operation and Oversight

- **Schedule adherence**

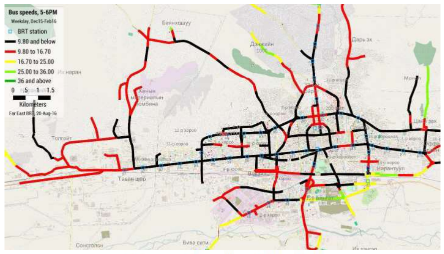


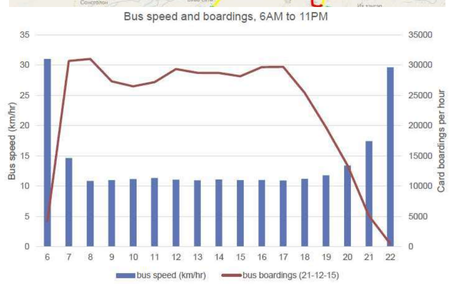
Space-time diagram of Route No.3 at PM Peak, Sept 4
(Route length: 20.8 kilometre per direction)

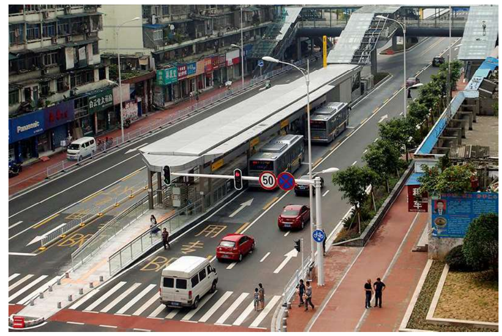
- **Operational interventions**: Smart scheduling and dynamic dispatching
- **Performance-based contracts**: Cash rewards or penalties on schedule (in)adherence

Transit Operation and Oversight

- **Speed profile:** Throughout the day, speed of buses operated in city center is around 10km/h (**cycling speed**)





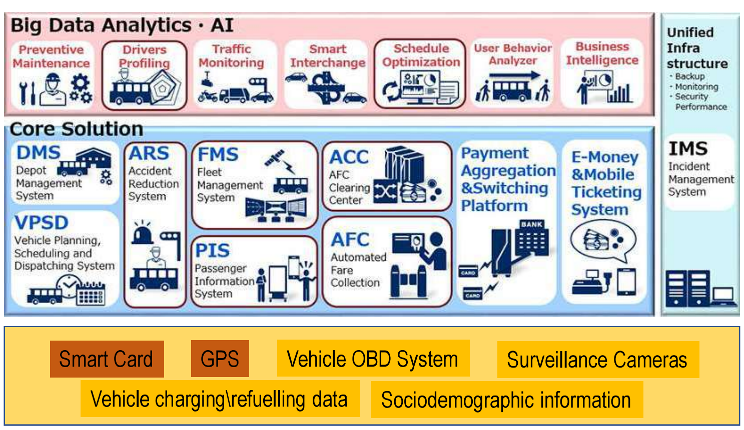


Bus priority measures & infrastructure investments

- Bus-only lanes and signal optimization at key intersections
- BRT corridor choice and implementation

Source: ITDP, 2017 Photo credit: ITDP

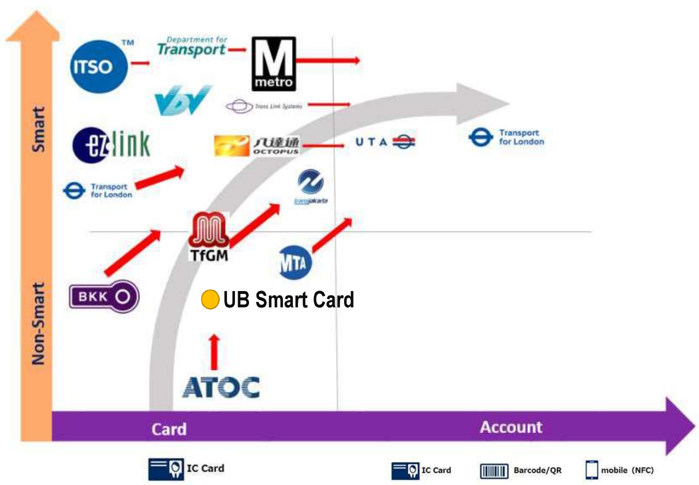
Conclusions



- Dedicated technical arm for data mining and support transit planning
- Institutionalized policy-making feedback loops
- Data quality assurance and open data protocols

Source: adapted from NEC

Automatic Fare Collection System: A Global Overview



Advanced payment system

- Rio de Janeiro: it will become the first city in Brazil to launch a pilot programme enabling mobile NFC-based ticketing for public transport.
- Over 200 Chinese cities: have **mobile payments** on buses and provided compatible devices for a variety of payment channels (QR codes, NFC, IC Card)

Multi-modal integration

- Mexico City: A multimodal transit fare smart card, Tarjeta DF (Federal District Card) enables riders to seamlessly transfer from the metro to the BRT. It is proposed to be used for **regular buses, taxis, and parking metres**.

Source: World Bank

Business perspectives on Green Procurement

International Forum on Low Carbon Development for Central Asia Regional Economic Cooperation Program Cities "The Cities of Tomorrow: Sharing Low Carbon Experiences for Green, Competitive, Resilient, and Inclusive Cities"

Beijing, December 4-6th, 2018

Philipp Tepper

Senior Expert, ICLEI's Global Sustainable Procurement Capacity Centre

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ICLEI – Local Governments for Sustainability

- ICLEI is the leading global network of 1,500+ cities, towns and regions committed to building a sustainable future. Through our collective efforts, we impact more than 25 percent of the global urban population.
- Work on Climate Mitigation, Adaptation, Energy, Urban Governance, Resource Efficiency, Transport, Water, Natur-based Solutions, Cultural Heritage, Sustainable Economy
- Since 1996 a key programme of ICLEI has been Public Procurement
- >900 projects, >5000 staff trained, >3 million tons CO_2eq saved

© ICLEI 2018

GLOBAL LEAD CITY NETWORK ON SUSTAINABLE PROCUREMENT

One planet handle with care

PROCURING SUSTAINABLY, LEADING GLOBALLY

Auckland, Budapest, Buenos Aires, Cape Town, Denver, Ghent, Helsinki, Montreal, Oslo, Quezon City, Rotterdam, Seoul, Tswane, Warsaw

ICLEI Local Governments for Sustainability

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ICLEI Local Governments for Sustainability

PROCURA+ NETWORK CHAIR

"The Procura+ Network highlights the strategic potential of procurement and provides a platform for exchange amongst public authorities. Membership of Procura+ gives each participant a network of peers to exchange with and learn from, and a collective voice on the European stage."

Katrin Stjernfeldt Jammeh, Mayor of Malmö

PROCURA+ NETWORK

Procura+ European Network

47 public authorities, established 2004

Connect. Exchange. Act on Sustainable Public Procurement

Procura+ East Asia Network

6 public authorities, established 2018

Connect. Exchange. Act on Green Public Procurement

© ICLEI 2018

"Public procurement has a huge power. It represents 12% of GDP and 1/3 of government expenditures in OECD countries, of which 2/3 are at the subnational level. It is also a selling argument for the financial markets and their conscience."

– Paulo Magina, Head of Public Procurement Unit,OECD

ICLEI Local Governments for Sustainability

"Public procurement (to stimulate sustainable business) is much smarter than subsidizing. Linear risks are real and governments and businesses also have interest to prevent them."

– Frido Kraanen, Director Cooperative and Corporate Sustainability, PGGM

REYKJAVIK

The story of GPP driving Green Business to certify their cleaning services

- Making good use of the Procura+ criteria for cleaning services
- Using Award Criteria to drive environmental management schemes (15%)
- Result: all major suppliers having certified their cleaning services with the Nordic Swan ecolabel within one year = the power of procurement

GREATER LONDON AUTHORITY

Transport for London (TfL) part of Greater London Authority (GLA) driving low carbon procurement

- Aim: reducing the whole life-cycle cost associated with lighting the London Underground network.
- Calculation of external costs as well as unit price, including installation, maintenance, energy use, carbon and cleaning costs.
- Results suggest a 25% saving on whole life-cycle costs, and significant reductions in energy consumption.
- Recommendation: Do not be afraid to engage the market early. The industry usually has information that can be used to strengthen your business case.

Procura+ Network Awards 2016

Transport for London is the winner in the category 'Innovation Procurement of the Year'

Seoul Metropolitan Government

- 2007: Seoul Metropolitan Government Ordinance. Obligation to Purchase Green Products if available
- By 2017, 42% of all products purchased were green, representing spending of 122 billion Korean Won (over $100 million).

© ICLEI 2018

Seoul Metropolitan Government (SMG) targets and programmes for sectors

GLOBAL LEAD CITY NETWORK
ON SUSTAINABLE PROCUREMENT

- **Renewable energy:** installing photovoltaic (PV) solar power systems on schools and other public buildings, with a goal of installing 243.6 MW by 2022 (74.1MW achieved by 2017)
- **Lighting:** replace all lighting in public buildings with LEDs by 2020 – as of 2018, 84% have been replaced
- **Electric vehicles:** 100,000 EVs on the city streets by 2025. All new public vehicles purchased must be EVs, if an appropriate model is available on the market. By December 2017, 6,273 EVs were in operation in the public and private sectors.
- **Construction:** By 2020 newly constructed and renovated public buildings (larger than 3,000 m2 in total floor area) should acquire the best-in-class green building certification incl. energy efficiency.

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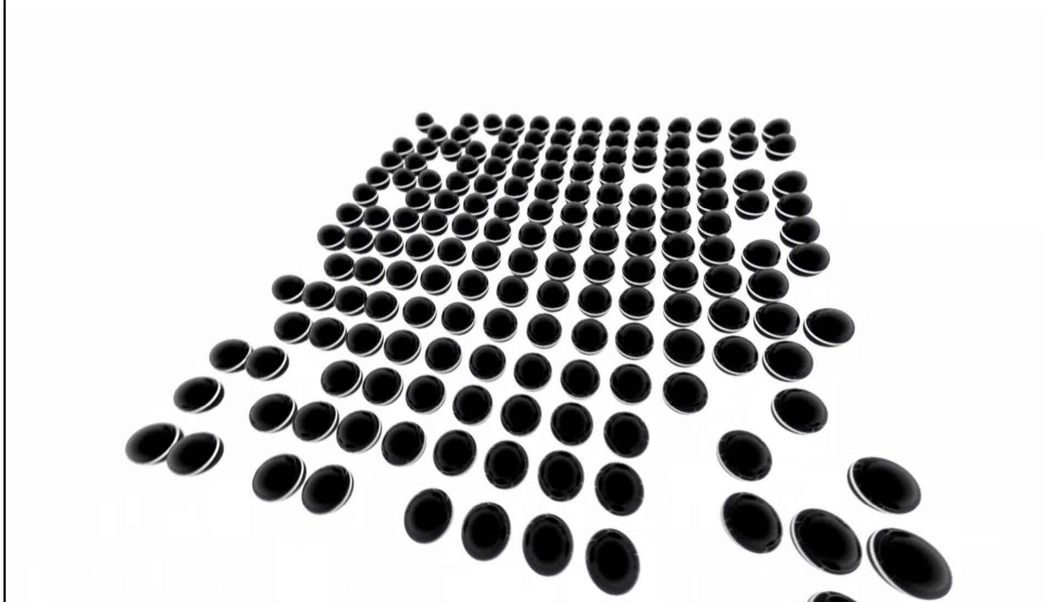

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BARCELONA CITY COUNCIL

Step by step towards sustainable public procurement since 2001

- Municipal Decree that makes Sustainable Public Procurement (SPP) mandatory. >50,000 tenders annually, covering a spend of €1.1bn
- The SPP objectives are geared toward four key aspects:
  - to improve social and labour conditions,
  - to promote the participation of SMEs and the social economy,
  - to protect the environment, and
  - to foster innovation.
- The strategic use of procurement has resulted in improved working conditions in newly awarded contracts, a significant reduction of resource and electricity consumption, and not least annual savings of more than 36,000 tons of CO_2 (100% renewable energy)

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Procura+ Network Awards 2018

Barcelona wins with implementing a city-wide compulsory sustainable procurement

Thank you

Philipp Tepper

Senior Expert, ICLEI's Global Sustainable Procurement Capacity Centre

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www.glcn-on-sp.org

www.procuraplus.org

www.sustainable-procurement.org

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Challenges of Implementing Green Public Procurement in the PRC

International Forum on Low Carbon Development for Central Asia
Regional Economic Cooperation Program Cities

5th December 2018 Beijing, China

Haiping, YU
ICLEI—Local Governments for Sustainability
East Asia Secretariat
Program Officer

THE POWER OF PUBLICPROCUREMENT

In 2016, China spent over RMB¥2.57 trillion (USD$370 billion) on procurement, increasing 22.1% from 2015. This makes up 11% of the country's fiscal expenditure, and the proportion is projected to soar to about 30% with greater inclusion of state-owned enterprises.

WHAT DO WE PROCURE?







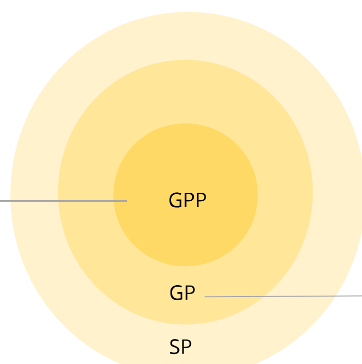
DEFINE GREEN PUBLIC PROCUREMENT

Green Procurement (GP)

A branch of SP that organizations integrate environmental aspects of sustainability into purchasing decisions to increase value for money comparing with conventional alternatives.

Green Public Procurement (GPP)

Public organizations consider environmental performance of products, services, and construction projects in procuring activities with fiscal funding .



Sustainable Procurement (SP)

Optimizing the value for money and benefits for economy, environment, and society, when organizations - public and private - procure products, services, construction projects

WHY GREEN PUBLIC PROCUREMENT?

I.C.L.E.I Local Governments for Sustainability East Asia

"Green Public Procurement is an effective tool for the government to achieve energy conservation and environmental protection policies, increase energy efficiency, curb pollutants emission, demonstrate leadership, and therefore enhance green consumption behaviors across the society."

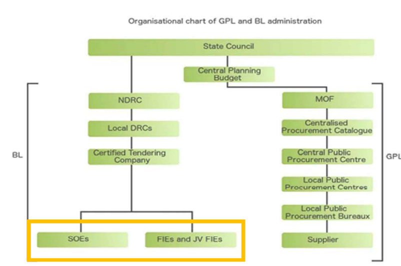
---- *Gang Zhai, Former Director-General for Treasury Department of Chinese Finance Ministry*

PUBLIC PROCUREMENT LEGAL FRAMEWORK IN CHINA

I.C.L.E.I Local Governments for Sustainability East Asia

	Government Procurement Law	Tendering and Bidding Law
Time of Enforcement	January 1, 2003 2003年1月	January 1, 2000 2000年1月
Central Regulatory Authorities	Ministry of Finance (MOF)	National Development and Reform Commission (NDRC)
Application Scope	All governmental departments, institutions and public organizations excluding state-owned enterprises when they conduct procurement activities with fiscal funds. For construction works, goods and services listed in certain catalogues or above certain threshold.	All public or private entities including foreign enterprises All tendering and bidding activities happening on the territory of mainland China, no matter it is compulsory or voluntary
Procurement Methods	Public tender; Tender by invitation; Competitive negotiation; Single-source procurement; Inquiry; competitive consultation etc.	Public tender; Tender by invitation

In China, public procurement is primarily regulated under two national laws: the Government Procurement Law (GPL) and the Tendering and Bidding Law (BL).



GPP RELATED POLICIES IN CHINA

2002
<Clean Production Promotion Law>
Government at all levels required to give preferential consideration in its procurement for energy-conservation, water-conservation and Recyclable products

2003
<China Government Procurement Law>
Government Procurement shall contribute to national political targets in economic and social development including environmental protection

2004
<Enforcement Advice on Implementation of Government Procurement of Energy Conservation Products> ;
<Regulation for Prevention and Control of Solid Waste Contamination>

2005
<State Council Opinions on Accelerating Circular Economy Development>
<State Council Decision on Implementing the Scientific Approach of Development and Enhancing Environmental Protection>

2006
<Enforcement Advice on Government Procurement of Environmental Labeled Products>

2007
<National Energy Conservation Law> Amendments;
<State Council Notice of Issuing Energy Conservation and Emission Reduction Comprehensive Work Plan>

2008
<Circular Economy Promotion Law>

2015
<Government Procurement Law Implementation Guidelines>

2016
<Atmospheric Pollution Prevention Law> Amendments;

2002 2003 | 2004 2005 | 2006 2007 2008 | 2015 | 2016

ECOLABELLING AND GPP IN CHINA

	Energy Conservation Products List (ECPs List)	Environmental Labelling Products List (ELPs List)
Started from	2004	2006
Update Frequency	Twice a year	Twice a year
Stringency Degree	Mandatory and non-mandatory combined	Non-mandatory
Certification Body	China Quality Certification (CQC)	China Environmental United Certification Center (CEC)
Supporting Ministries	Ministry of Finance; National Development and Reform Commission; State General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ)	Ministry of Finance; Ministry of Ecology and Environment
Label		

The two distinctive and independent ecolabelling schemes serve as the fundamental policy instrument for implementing GPP in China.

CHALLENGES TO GPP IMPLEMENTATION IN CHINA

ICLEI Local Governments for Sustainability East Asia

- Imperfect Public Procurement and GPP laws and Regulations
- Excessive Resilience on Two Product Lists: ECPs and ELPs
- Lack of Uniformed Green Product, Service or Construction Project Evaluation Criteria
- Absence of Central Coordination Organ and Inter-departmental Cooperation Mechanism
- Failure to Gain Political Commitment and Secure Mandate for Action
- Lack of Knowledge on the Costs and Benefits of GPP Activities
- Need for Greater Awareness and Understanding of the Urgency of Green Consumption

PROCURA+ GPP SERVICE PACKAGE: AN ICLEI SOLUTION

ICLEI Local Governments for Sustainability East Asia

Capacity Building & Awareness Raising

Full access to Procura+ and ICLEI resource pool (SP1)

Free GPP Seminars, workshops and conferences (SP1)

Onsite consultation supported by leading experts (SP2)

Tailored made GPP operation manual and handbook (SP3)

Technical Consulting & Strategy Planning

Full Access to ICLEI dedicated liaison for consultation on GPP (SP1)

Priority Analysis on product or service groups (SP2)

Customized specifications, criteria and verification approaches (SP2)

Data collection, monitoring, and quantification of environmental impacts (SP2)

Dedicated GPP Advisory Expert Group (SP3)

Baseline Assessment Report of current GPP practices and market readiness (SP3)

Formulate GPP 5-Year Strategy and Action Plan (SP3)

Communication & Promotion

Showcase GPP commitments through ICLEI and Procura+ (SP1)

Opportunities to win Procura+ Awards (SP1)

Tailored bilingual case study highlighting qualified achievements (SP2)

Online GPP center and database (SP3)

Dedicated social media campaign for GPP information sharing (SP3)

PROCURA+ NETWORK

ICLEI GPP Implementation and Impact Monitoring

Pilot 1: Recycled Asphalt Concrete Procurement in Suwon, S. Korea

In 2017 alone,

33,627 tons of Recycled Asphalt Concrete (RAC) were procured.

More than 20% of asphalt concrete procured from recycled source

Generated Eco and Envir benefits worth more than 800 million KRW

1,280 KRW/ton CO_2 mitigation benefits from Reduced Use of Oil Extracts

UN 10YFP SPP Programme Working Group No.1a

SPP Tender Implementation and Impact Monitoring

Suwon, Republic of Korea

SUMMARY

Selected as a city for the "SPP Tender Implementation and Impact Monitoring" that is currently being carried out in Asia under the UN 10YFP(The 10 Year Framework of Programmes on Sustainable Consumption and Production Patterns). Suwon kicked off the project in March 2017 and set the target for increasing the ratio of the annual Green Public Procurement(GPP) to over 40% and that of Recycled Asphalt Concrete(RAC) to more than 20% through such a project. To this end, the city engaged in a variety of activities such as training of public servants, workshops and distribution of the guideline on the green public procurement. In particular, it put in place a cooperative procurement system within the city to promote the green public procurement.
As a result, Suwon achieved its target ratios of green public procurement and recycled asphalt concrete purchased. On top of that, it reaped environmental and economic benefits worth more than 800 million KRW by using 33,627 tons of recycled asphalt concrete from Jan 2017 to Jun 2018.

10YFP on SPP Working Group 1A| 10YFP

ICLEI GPP Implementation and Impact Monitoring

Pilot 2: Green Furniture Procurement in Binhai, Tianjin, China

In 2018 alone,

6,160 set green school desks and chairs were procured

Formulated domestic green evaluation scheme based on GSC management

Pioneering practice of lifting environmental performance weighting to 15% out of 100%

2018 China Government Procurement Award "Innovation of the Year" Winner

Reported by various media authorities

财政部唯一指定政府采购信息网络发布媒体 国家级政府采购专业网站

中国政府采购网
中国政府购买服务信息平台
www.ccgp.gov.cn

首页 政采法规 购买服务 监督检查 信息公告

当前位置：首页 » 政府采购动态

天津滨海新区创新绿色政府采购评价体系引导企业绿色发展综述

2018年10月30日 09:32 来源：中国政府采购报 【打印】 扫码访问

今年秋季开学时，首次以绿色评价体系完成采购的6160套课桌椅类家具亮相在天津滨海新区新建学校的师生们面前。新课桌椅在质量、耐用、环保和安全等方面都比传统课桌椅都有很大提高，受到该区40多所学校师生的普遍好评。

China Government Procurement Newspaper reported 10YFP Binhai Project

ICLEI GPP CASE STUDY: SHENZHEN CITY

ICLEI Local Governments for Sustainability East Asia

Through the successful application of GPP, Shenzhen has greatly reduced the use of products that contain Ozone Depleting Substances (ODS). Going beyond the requirement set by national authorities, the Shenzhen Municipal Government introduced more stringent regulations on public purchases and promoted newer, more environmentally friendly technology, providing a model for other cities to emulate in combating ozone depletion and climate change.

Figures:

Population: 11,908,400 (2016)
Land area: 1,997.27 km^2
2016 Public budget expenditure:
RMB¥417.8 billion (65.2 billion USD)

ICLEI GPP CASE STUDY: SHENZHEN CITY

ICLEI Local Governments for Sustainability East Asia

Promotion of the low GWP, climate-friendly R290 refrigerant

Many air conditioners today use HFCs as ODS alternatives due to their zero Ozone Depletion Potential (ODP). For instance, many vehicles use R134a, while many air conditioners in Japan use R32. However, although HFCs have zero ODP, they still have a high GWP, hence they remain significant contributors to climate change.

Properties of different refrigerants

Refrigerant	R12	R22	R134a	R32	R290 (Propane)
Type	CFC	HCFC	HFC	HFC	Hydrocarbon
ODP	1	0.05	0	0	0
GWP	10900	1810	1430	675	3

In 2015, the Shenzhen EPB in cooperation with municipal procurement departments prompted Shenzhen University to pioneer the procurement and installment of 243 air conditioners with R290 refrigerants.

ICLEI GPP CASE STUDY: SHENZHEN CITY

Reduction of ODS and GHG Emissions

Since Shenzhen began implementing GPP in 2006, the city has eliminated **150.9 tons** of ODS, as well as greenhouse gases equivalent to **1,360,863 tons** of carbon dioxide (CO_2).

Substance	Amount Reduced	Equivalent in CO_2 in terms of GWP
CFC-11, CFC-12	128 tons	1,001,600 tons
CFC-113	28.6 tons	175,318 tons
HCFC-22	0.5 tons	905 tons
Total ODS	**150.9 tons**	**1,177,823 tons**
HFC-134a	128 tons	183,040 tons
Total CO_2 Equivalent	**-**	**1,360,863 tons**

To replicate Shenzhen's success

GPP has the potential to change entire industries
Other cities should take note of the relative size of the public to private sector. The Shenzhen's Municipal Government has a high public expenditure, making it more able to exert pressure on goods and services providers.

Good leadership and communication key to making GPP a success
Municipal governments must likewise establish clear lines of communication across different government departments, either by forming a special ODS committee (like Shenzhen) or otherwise. They must also have a strong leader dedicated to the phasing out of ODS, who has the responsibility to ensure that GPP measures are being properly carried out across all related government departments.

THANK YOU

Haiping YU

ICLEI East Asia Secretariat Program Officer

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МОНГОЛ УЛСЫН
ХӨГЖЛИЙН БАНК

"DBM ASSET MANAGEMENT SC" LLC

ECO-DISTRICT AND AFFORDABLE HOUSING FUND

ADB

GREEN AFFORDABLE HOUSING AND RESILIENT URBAN RENEWABLE PROJECT

Presentation | November 5th of 2018

I. PROJECT SCOPE

AHURP

Housing demand – Offer

RESULTS ON AFFORDABLE HOUSING

HOUSING DEMAND IN ULAANBAATAR CITY 144,600 HH's

Demand in GER areas

98,800 HH's – loan
29,600 HH's– without loan
16,200 HH's– swap

Total: 144,600 HH's

OFFER
Up to MNT1.5million/sqm
20 housing projects
2,100 HH's

AFFORDABLE HOUSING SHORTAGE IN GER AREA

144,600 HH's

- High and Medium real-estate market saturated
- According to studies conducted by the ADB 60% of households want to buy apartments with 8% mortgage loan at MNT1.2 million/m2 in average.
- Prefer to stay within their communities.

AHURP

Ger area development investment program

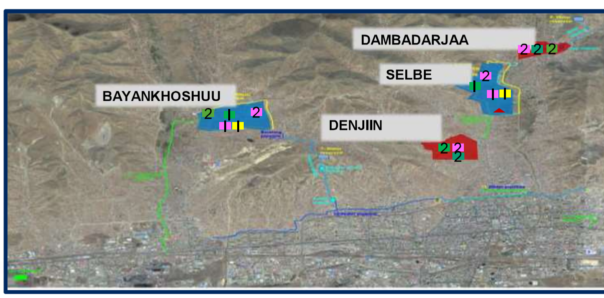
Ger area development investment program objectives

- **Priority infrastructure**
- **Socio-economic facilities**
- **Block Development/Densification**
- **Community participation**
- **Sub center business and redevelopment plans**
- **Improvement of USUG operations and local CWWTP rehabilitation**

Project funding

The project financing scheme was approved by the Parliament on the 23rd of May 2014. The first tranche was approved for disbursement on the 24th of September of 2014. The second tranche has also been approved.

Funding sources			
	Tranche 1	Tranche 2	Total
ADB	53.7	66.35	120.05
MUB	22.44	35.15	57.59
EIB	28.38	19.64	177.64
Total	104.52	121.14	355.28



Tranche 1:
Bayankhoshuu, Selbe
Tranche 2:
Denjiin, Dambadarjaa
+ Tranche 1 Subcenters

Business incubator
Kindergarten
Park
Sport complex
Community center
Transition house

GREEN AFFORDABLE HOUSING AND RESILIENT URBAN RENEWABLE PROJECT

МОНГОЛ УЛСЫН ЗАСГИЙН ГАЗАР

ADB Asian Development Bank

МОНГОЛ УЛСЫН ХӨГЖЛИЙН БАНК

PROJECT OBJECTIVE

The project will reduce pollution and greenhouse gas emissions by redeveloping the ger-area districts and constructing affordable eco-housing in Ulaanbaatar city.

TOTAL PROJECT FINANCING
USD542 MILLION

(SELBE EAST)
MAIN TRUNK INFRASTRUCTURES

MAIN ROADS
NETWORKS
Water, heating, sewage
PUBLIC AMENITIES
Kindergarten
Business incubator

BLOCK DEVELOPMENT

AFFORDABLE HOUSING
Housing units
Shops / offices
SECONDARY INFRASTRUCTURE
URBAN RENEWAL
Basic urban services
Local public amenities
Parks/public space

10'000 AFFORDABLE HOUSING UNITS BUILT

=

15% SOCIAL HOUSING UNITS
/MONTHLY RENT 125'000 TUGRIKS/

+

55% AFFORDABLE HOUSING UNITS
/M2 PRICE 1'200'000 TUGRIKS/

+

30% MARKET RATE HOUSING UNITS

Institutional and capacity component

I. Establish mechanisms for delivery of affordable housing units stock;
II. Improved urban redevelopment process and standards; and
III. Strengthened project management, and institutions for urban redevelopment and AH.

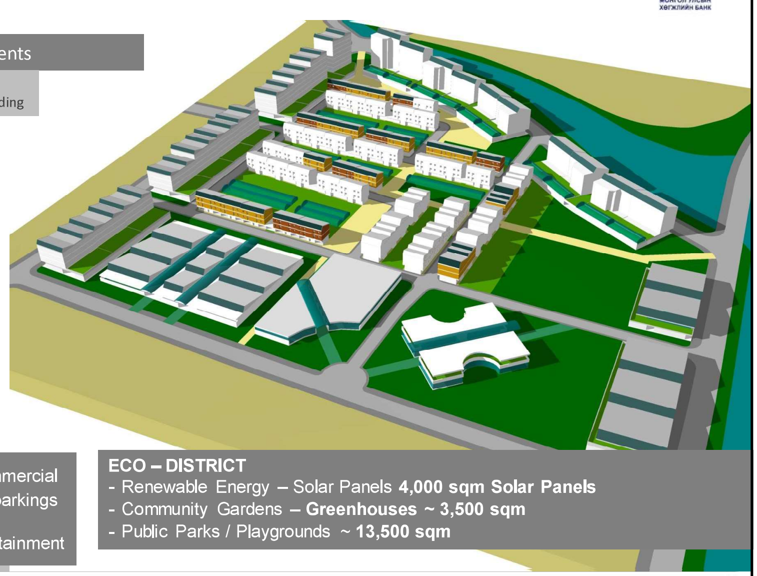
Core Component – Selbe East

6.4 ha of Ger areas redeveloped into eco-districts

МОНГОЛ УЛСЫН ХӨГЖЛИЙН БАНК

584 Apartments

262 Townhouses
322 Lowrise building



2,420 sqm Commercial
584 Covered parkings
1470 sqm SME
750 sqm Entertainment

ECO – DISTRICT
- Renewable Energy – Solar Panels **4,000 sqm Solar Panels**
- Community Gardens – **Greenhouses ~ 3,500 sqm**
- Public Parks / Playgrounds ~ **13,500 sqm**

МОНГОЛ УЛСЫН ЗАСГИЙН ГАЗАР

ECO-DISTRICT AND AFFORDABLE HOUSING FUND

Asian Development Bank

МОНГОЛ УЛСЫН ХӨГЖЛИЙН БАНК

GREEN CLIMATE FUND

FINANCING APPROVED FROM THE GREEN CLIMATE FUND
USD 145 MILLION

USD 50 MILLION GRANT	USD 95 MILLION CONCESSIONAL LOAN

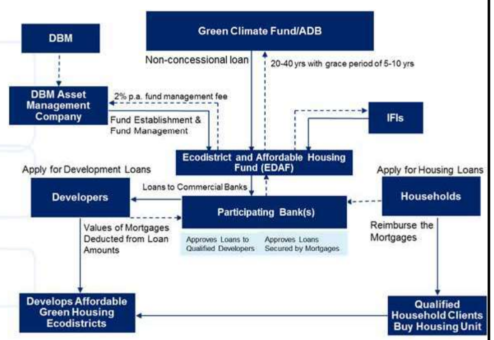
TECHNICAL ASSISTANCE
USD 2 MILLION

TOTAL INVESTMENT INTO THE FUND
USD 75.7 MILLION

ESTABLISH GREEN FINANCING MECHANISM IN MONGOLIA

COMPONENT 1	• Support in the establishment and management of the EDAF
COMPONENT 2	• Capacity building and institutional strengthening
COMPONENT 3	• Establishment of the Green financing mechanism

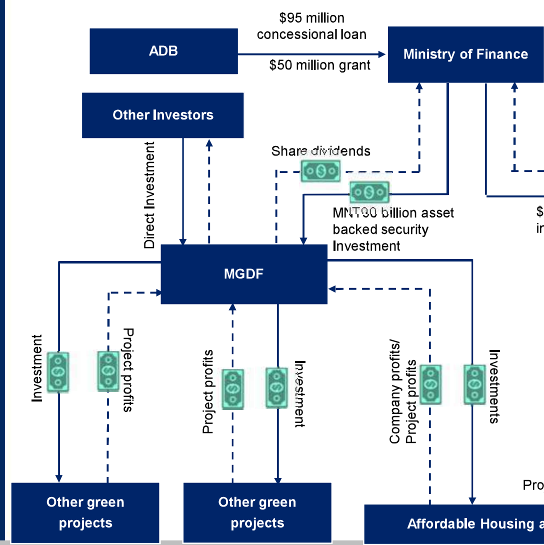
IMPLEMENTATION SCHEME OF THE EDAF



II. SUSTAINABLE GREEN FINANCE DESIGN

AHURP

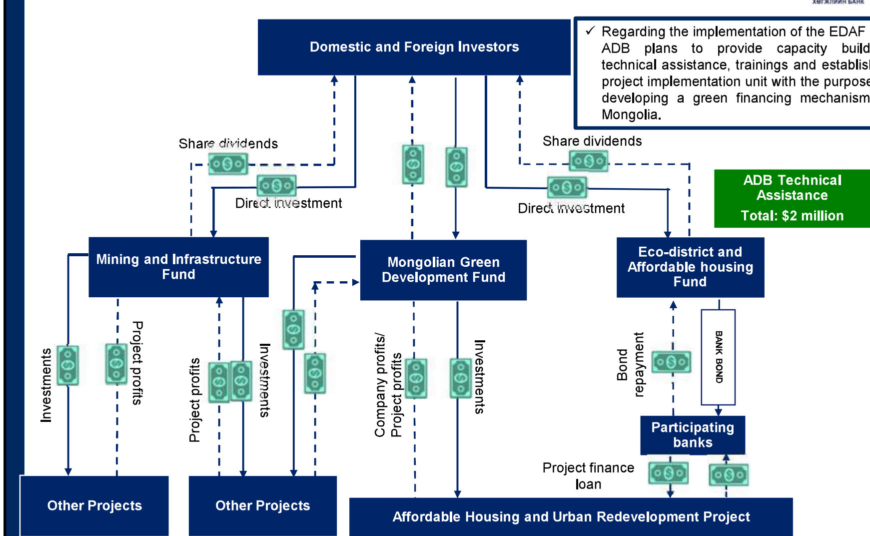
Current implementation arrangements



- ✓ Will provide a simple and risk free mechanism for domestic and foreign investors to invest in the Mongolian economy.
- ✓ Developing the investment fund market will allow for the financing of large scale projects strategically important to the economy without increasing the budget deficit by attracting private investment.

AHURP

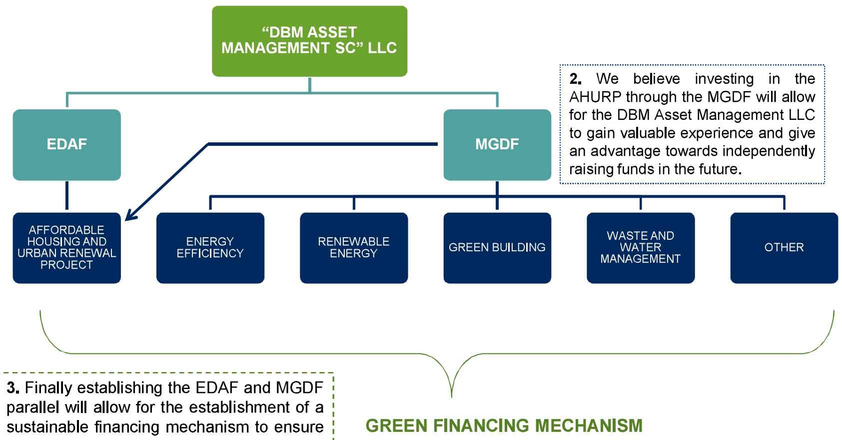
Target implementation arrangements



- ✓ Regarding the implementation of the EDAF the ADB plans to provide capacity building technical assistance, trainings and establish a project implementation unit with the purpose of developing a green financing mechanism in Mongolia.

DEVELOPMENT OF A GREEN FINANCING MECHANISM

1. Since the EDAF is focused more on the housing sector it is necessary to establish the MGDF in order to allow the sustainable growth of other sectors and ensure the establishment of an all-encompassing green financing mechanism. Furthermore, in the long term the MGDF can replace green housing finance function of the EDAF.



2. We believe investing in the AHURP through the MGDF will allow for the DBM Asset Management LLC to gain valuable experience and give an advantage towards independently raising funds in the future.

3. Finally establishing the EDAF and MGDF parallel will allow for the establishment of a sustainable financing mechanism to ensure growth of the green economy by securing local and foreign investment.

THANK YOU FOR YOUR ATTENTION!

AHURP

Impact, outcome, outputs.

The project impact is in line with the Ulaanbaatar City Master Plan, Ulaanbaatar 2020 Master Plan and Development Approaches for 2030, the Green Development Strategic Action Plan for Ulaanbaatar 2020, the National Program for Reducing Air and Environment Pollution 2017–2025, and the Affordable Housing Strategy of Ulaanbaatar. The project outcome will be an increased access to low carbon and resilient eco-district and green affordable housing in ger areas.

100’000

The direct beneficiaries are expected to reach 100,000 people that will directly benefit from living in low carbon and climate resilient affordable housing units, living and working in improved and better adapted urban environment, and more resilient and healthiest urban areas.

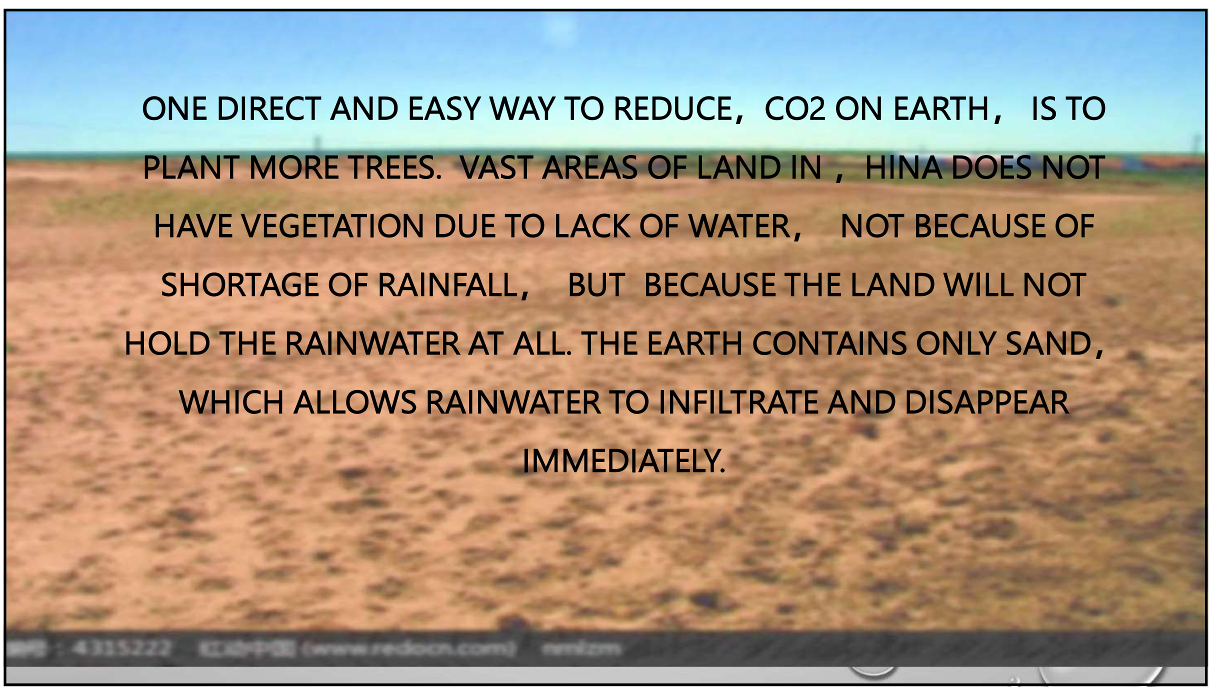
900’000

The indirect beneficiary are estimated to 900,000 people in Ulaanbaatar that will also benefit in the short term through replication investments triggered by the supportive enabling framework created by the project and improved access to services, urban climate resilience, and decrease in air pollution.

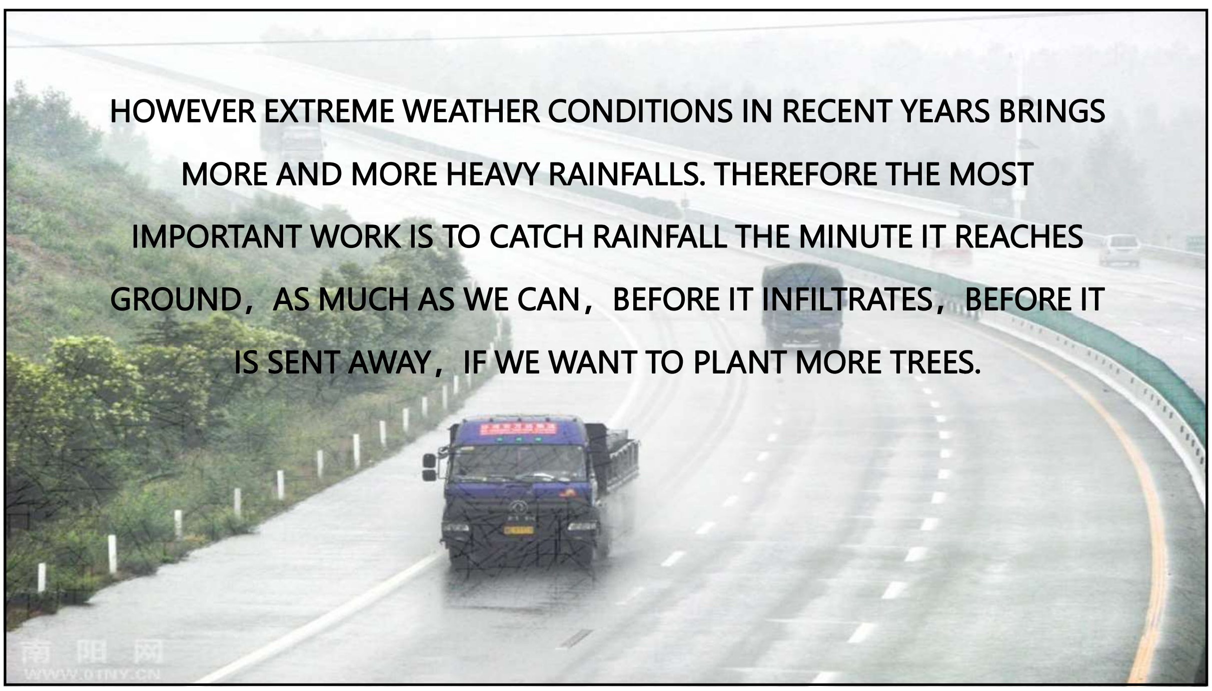
1.4 million

The co-beneficiaries from the greenhouse gas mitigation, improved climate resilience of the city, and reduced air pollution, are the residents of Ulaanbaatar, that is 1.4 million people (forecasted to reach 2.7 million by 2050) or 45% of the population of Mongolia.


SCHULUNGSZENTRUM
REGENWASSERNUTZUNG
KEFENROD
Y.T. Tzeng, Director, China District


ONE DIRECT AND EASY WAY TO REDUCE，CO2 ON EARTH， IS TO PLANT MORE TREES. VAST AREAS OF LAND IN ，HINA DOES NOT HAVE VEGETATION DUE TO LACK OF WATER， NOT BECAUSE OF SHORTAGE OF RAINFALL， BUT BECAUSE THE LAND WILL NOT HOLD THE RAINWATER AT ALL. THE EARTH CONTAINS ONLY SAND， WHICH ALLOWS RAINWATER TO INFILTRATE AND DISAPPEAR IMMEDIATELY.

IN CITIES，FOR MORE THAN 50 YEARS，ENGINEERS TRIED VERY HARD TO DRAIN RAINWATER QUICKLY FROM STREETS，INTO WASTEWATER PLANTS OR RIVERS.



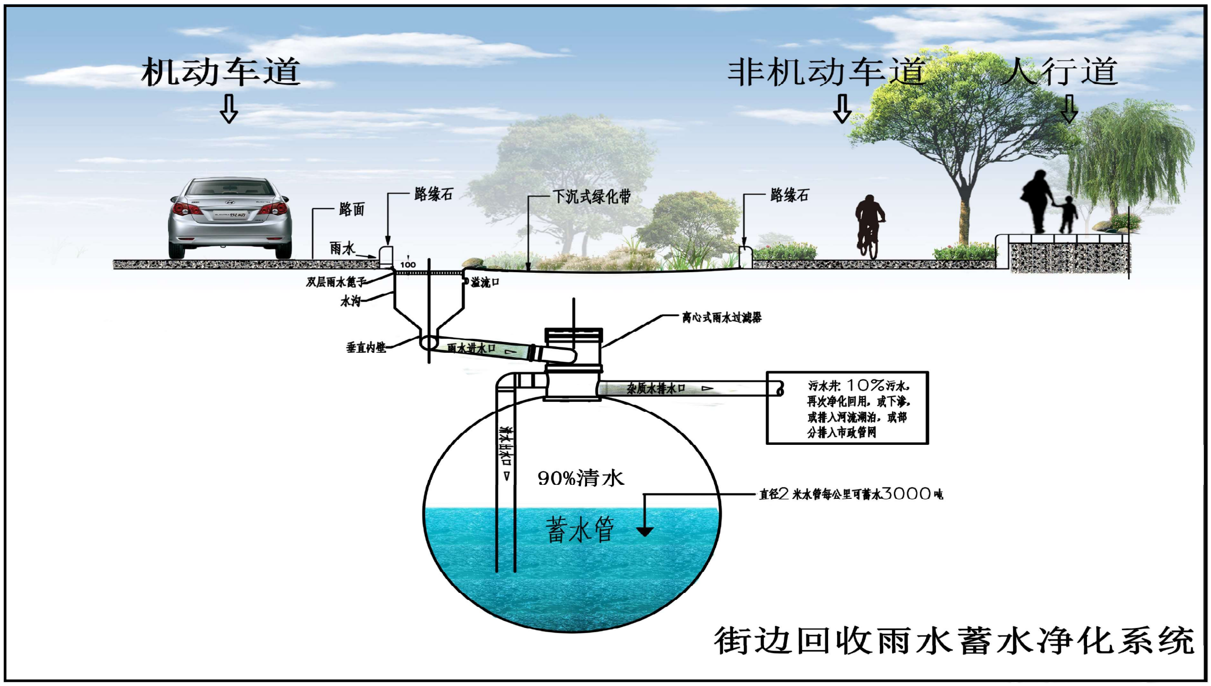
HOWEVER EXTREME WEATHER CONDITIONS IN RECENT YEARS BRINGS MORE AND MORE HEAVY RAINFALLS. THEREFORE THE MOST IMPORTANT WORK IS TO CATCH RAINFALL THE MINUTE IT REACHES GROUND，AS MUCH AS WE CAN，BEFORE IT INFILTRATES，BEFORE IT IS SENT AWAY，IF WE WANT TO PLANT MORE TREES.

CHINA HAS 5 MILLION KM OF HIGHWAYS AND FREEWAYS，AND THE MILEAGE GROWS EVERYDAY. THE SLOPE AUTOMATICALLY DRAINS RAINWATER TO ROADSIDE DITCHES. ALL WE HAVE TO DO IS TO CATCH RAINWATER IN THE DITCHES.

LATEST RAINWATER HARVESTING TECHNOLOGIES PERMIT UNDERGROUND CATCHMENT WITH AUTOMATIC FILTRATION OF RAINWATER， TO A CONDITION SUITABLE FOR STORAGE FOR A LONG TIME， WITH NO NEED FOR HUMAN CARE， NO LABOR NEEDED， NO ELECTRIC POWER NEEDED. IT ALL HAPPENS NATURALLY. THE SYSTEMS ARE SELF-CLEANING. FTER EVERY HEAVY RAINFALL， OR ONCE A YEAR， A CHECKUP MAY BE NEEDED.

WITH A LITTLE MINIMUM ELECTRIC POWER INPUT，THE TECHNOLOGIES PERMIT INTELLIGENT MANAGEMENT OF RAINWATER. THANKS TO THE INTERNET AND CLOUD STORAGE CALCULATION，YOU CAN CHECK SYSTEM EFFICIENCIES ON YOUR MOBILE，TO HELP GOVERNMENTS ORGANIZE THEIR SPONGE CITY EFFORTS，SUCH AS FLOOD PREVENTION，DISASTER FORECAST，VILLAGE EVACUATION OR POLLUTION CONTROL.

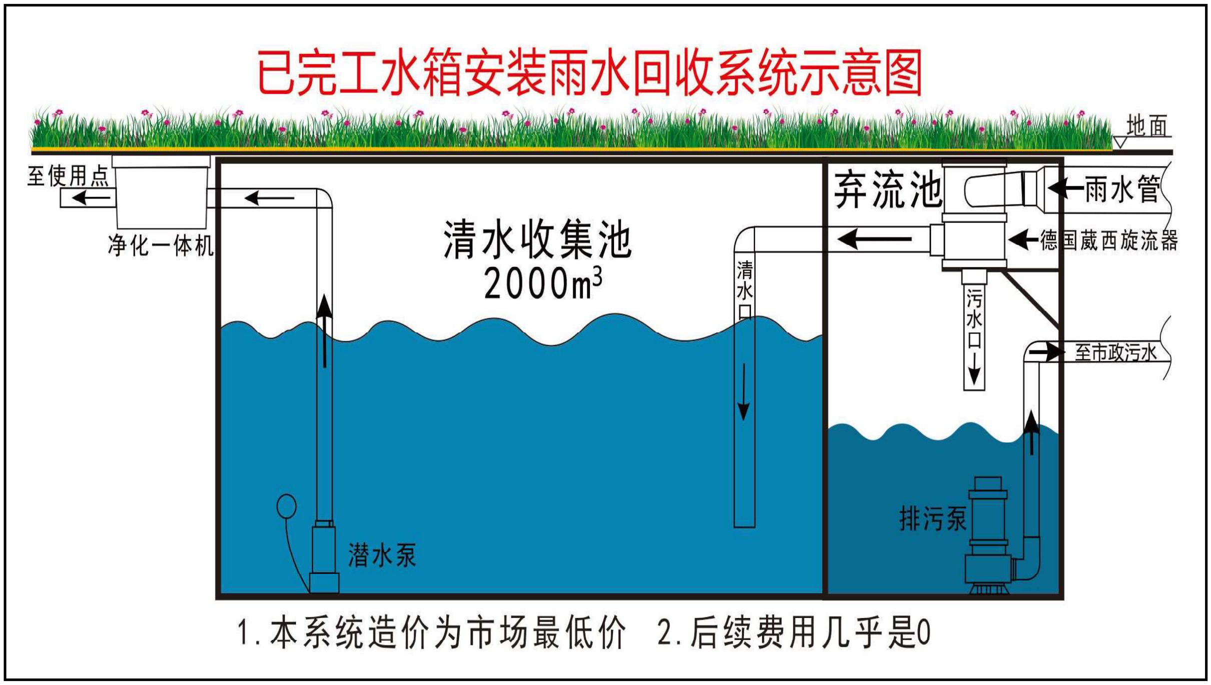
MOST IMPORTANT OF ALL， RAINWATER MANAGEMENT HELPS BUILDING OUR CITIES OF TOMORROW，THE VIRTUALLY MOST RESILIENT CITIES，BECAUSE HEAVY RAINFALLS ARE NO LONGER DISASTERS， BUT ARE TAMED FOR USE. RAINWATER HARVESTING HELPS TO CREATE MORE REASONABLE/RATIONAL DISTRIBUTION OF HUMAN SETTLEMENTS TO MUCH WIDER AREAS IN CHINA. OLD CITIES THEN CAN CATCH THEIR BREATH TO REBUILD STREETS AND COMMUNITIES TO ACHIEVE LOW CARBON TARGETS.

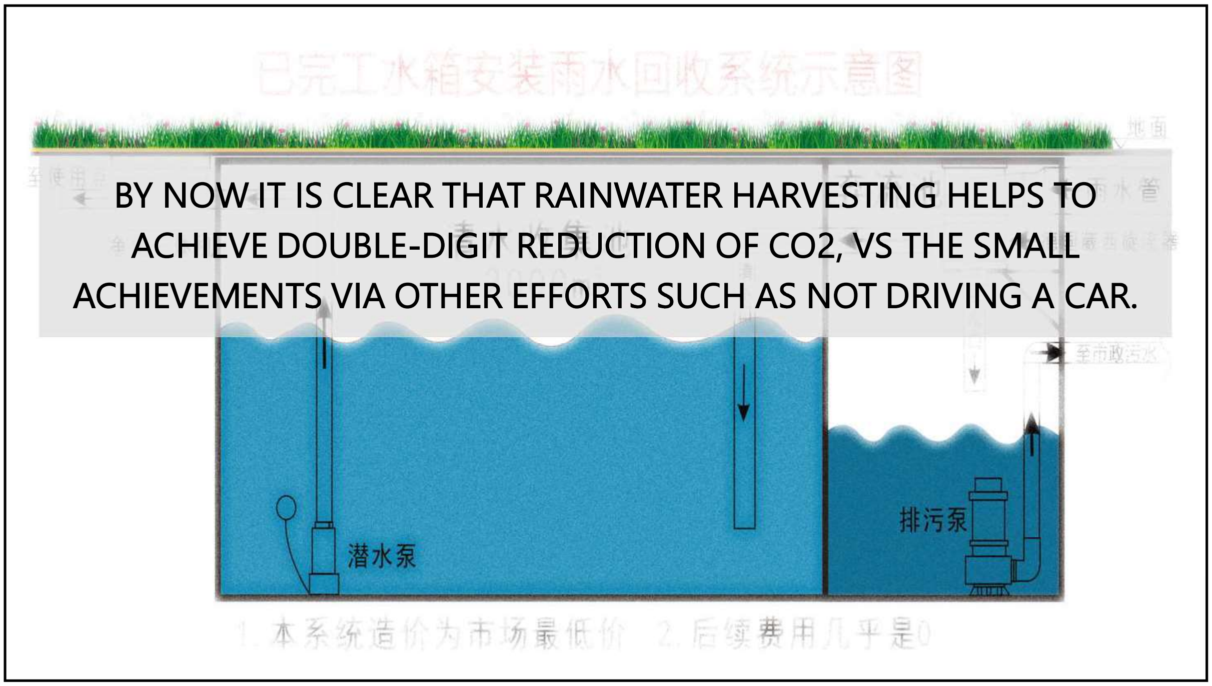


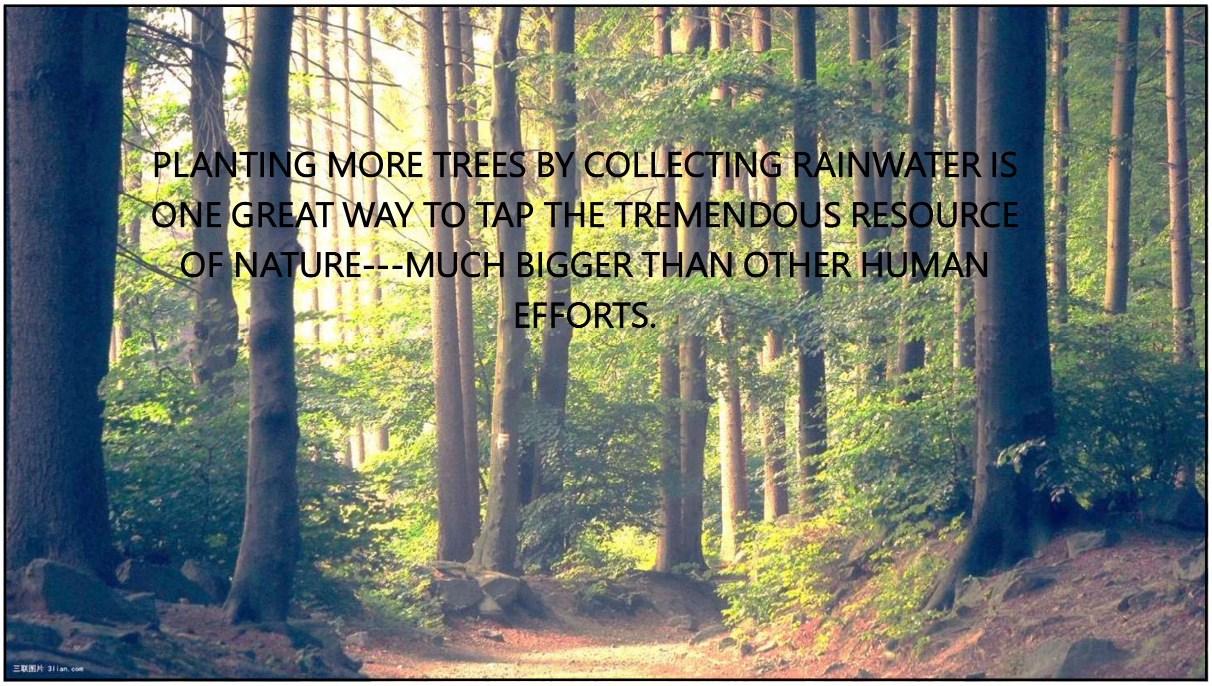
STORAGE OF RAINWATER IS AN IMPORTANT PART OF RAINWATER HARVESTING TECHNOLOGIES. RAINWATER DRAINING PIPES AS BIG AS 1-2 METERS DIAMETER ARE EXCELLENT CHOICES FOR STORAGE WHEN YOU SEAL BOTH ENDS TO CREATE A STORAGE SPACE. TRUCKS WITH SUCTION PIPES COME TO PICK UP STORAGE OF RAINWATER FOR VARIOUS APPLICATIONS. WITH A SMALL PUMP INSIDE, RAINWATER CAN BE SENT TO WHEREVER YOU NEED IT.

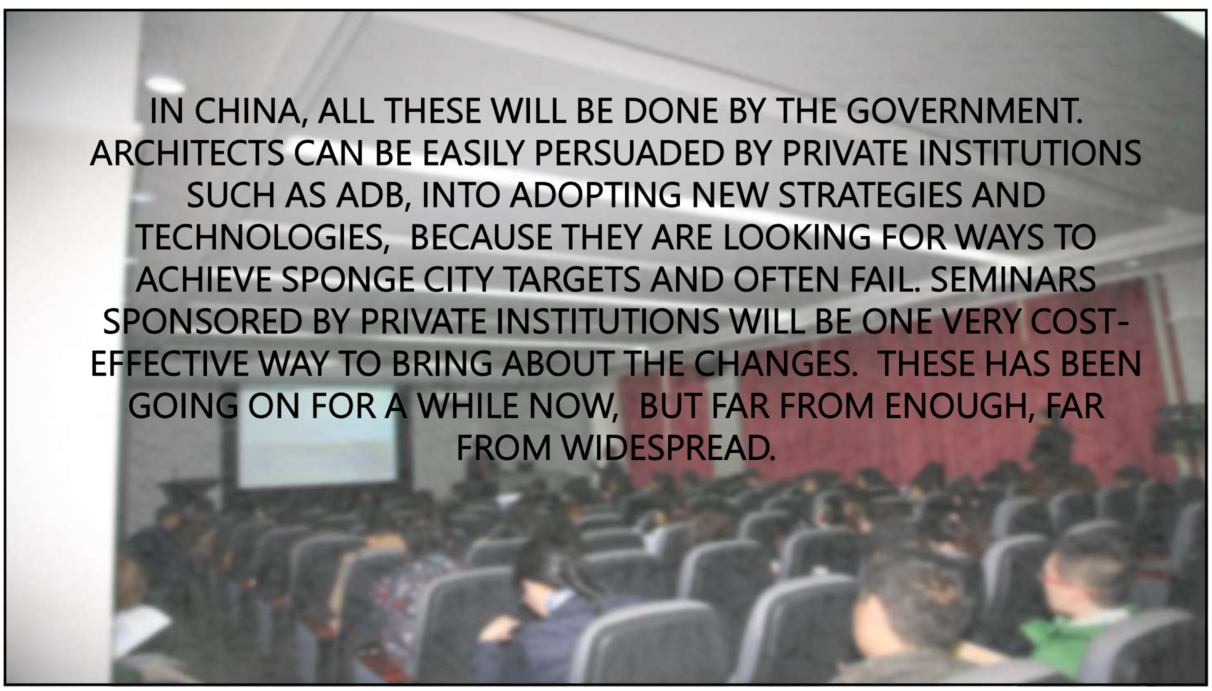
EXAMPLE: 1.6M DIAMETER PIPES BURIED 2 METERS UNDERGROUND ON ROADSIDE COSTS ROUGHLY 317,500RMB TO BUILD, HOLDS 2,000 CUBIC METERS OF WATER, SO WE SPEND 158.75RMB PER CBM, AND IT LAST FOR MANY YEARS. EACH KM OF FREEWAY COSTS ROUGHLY 50 MILLION RMB TO BUILD, WHILE EACH KM OF 1.6M PIPES COSTS 317,500RMB, REPRESENTING 0.635%, OR LESS THAN 1% OF TOTAL CONSTRUCTION COSTS. THE INVESTMENT IS VERY SMALL.

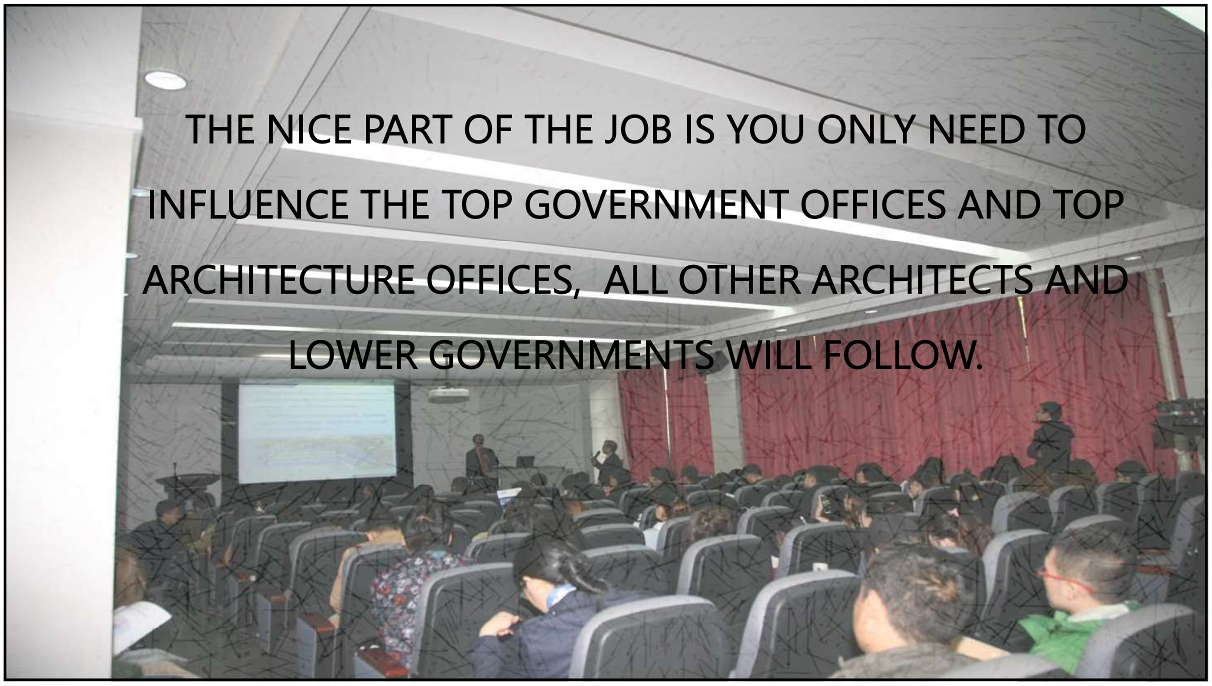
GERMAN FAMILIES CAN REPLACE AVERAGE 50% OF THEIR CITY WATER SUPPLY WITH RAINWATER, BECAUSE THE WATER BILL MORE THAN DOUBLES IF YOU DO NOT HAVE A RAINWATER HARVESTING SYSTEM IN YOUR HOUSE. AT THE SAME TIME, STATISTICS IN USA SHOWS TOTAL POWER CONSUMPTION OF CITY WATER SUPPLY REPRESENTS 13% OF THE NATIONAL POWER CONSUMPTION.


已完工水箱安装雨水回收系统示意图
地面
至使用点
净化一体机
清水收集池
2000m³
清水口
弃流池
雨水管
德国葳西旋流器
污水口
至市政污水
排污泵
潜水泵
1.本系统造价为市场最低价 2.后续费用几乎是0


BY NOW IT IS CLEAR THAT RAINWATER HARVESTING HELPS TO ACHIEVE DOUBLE-DIGIT REDUCTION OF CO2, VS THE SMALL ACHIEVEMENTS VIA OTHER EFFORTS SUCH AS NOT DRIVING A CAR.
排污泵
潜水泵


PLANTING MORE TREES BY COLLECTING RAINWATER IS ONE GREAT WAY TO TAP THE TREMENDOUS RESOURCE OF NATURE---MUCH BIGGER THAN OTHER HUMAN EFFORTS.

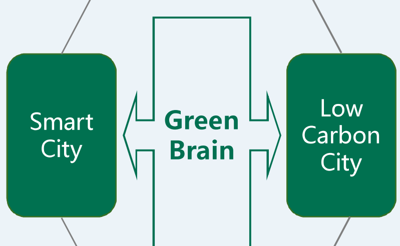

IN CHINA, ALL THESE WILL BE DONE BY THE GOVERNMENT. ARCHITECTS CAN BE EASILY PERSUADED BY PRIVATE INSTITUTIONS SUCH AS ADB, INTO ADOPTING NEW STRATEGIES AND TECHNOLOGIES, BECAUSE THEY ARE LOOKING FOR WAYS TO ACHIEVE SPONGE CITY TARGETS AND OFTEN FAIL. SEMINARS SPONSORED BY PRIVATE INSTITUTIONS WILL BE ONE VERY COST-EFFECTIVE WAY TO BRING ABOUT THE CHANGES. THESE HAS BEEN GOING ON FOR A WHILE NOW, BUT FAR FROM ENOUGH, FAR FROM WIDESPREAD.


THE NICE PART OF THE JOB IS YOU ONLY NEED TO INFLUENCE THE TOP GOVERNMENT OFFICES AND TOP ARCHITECTURE OFFICES, ALL OTHER ARCHITECTS AND LOWER GOVERNMENTS WILL FOLLOW.

“Green Brain” Enhances low carbon city development

IDEA

- Smart city comes from digitalization and informationization, which aims to optimize intelligently the operation management of a city
- IoT, cloud, big data, AI,...... are widely used in smart city
- Smart management promotes the city operation more efficiently and conveniently
- Smart city is infrastructure



- Low-carbon city reduces carbon and meets the essential needs of citizens
- The application of low carbon city includes GHG inventory, emission peak and emission reduction planning, implementation of low carbon project, performance evaluation, etc.
- Low-carbon and emission reduction make city more sustainable
- Low-carbon city is the top-down planning

PRACTICE

Jam eliminate

- Traffic situation analysis, intelligent decision-making, traffic signal control, parking management..... Intelligent measures eliminate widely traffic jam and improve vehicle speed
- Increased of vehicle speed, less start-to-stop and less time to find parking reduce energy consumption in the domain of transportation and related carbon emissions

Bus priority

- Real-time monitoring, bus route optimization, scheduling optimization......reduce passenger waiting time, improve bus utilization
- Higher bus utilization results less vehicle on road and energy consumption, contributes to emission reduction and green transportation

New energy

- Intelligent management and schedule of charging point convenient use of new energy vehicle, especially electric vehicle, improve new energy vehicle rate
- Comparing with traditional gasoline and diesel motors, new energy vehicle reduces significantly pollutions and carbon emissions

Environmental management

- IoT, GIS, Big Data help real-time environmental monitoring for entire city, provide early warning and response for environmental incident
- Environmental monitoring, disclosure, and pollution control improve city environment, reduce incidents, and improve public health

PRACTICE

Energy structure

- Real-time energy production, transfer, consumption monitoring and management dynamically percept the energy structure on both supply and demand, help the structure optimization
- Carbon emission is mainly from energy consumption. Structure optimization reduces significantly carbon emissions, especially the improvement of renewable energy

Smart grid

- Distributed renewable, load monitoring and modify, micro grid, etc. all require a powerful and smart grid
- Smart grid increases renewable rate and energy efficiency, reduces transmission loss, results in less carbon emissions

Industry structure

- Internet and new tech bring not only transformation and upgrading of traditional industries, but also create new industries, optimize the industry structure of city
- Optimization and upgrading of industry structure bring economic growth, improve energy efficiency and reduce emissions

Industrial brain

- Industrial brain is able to improve informationization capacity for an enterprise, optimize energy management, process, and product quality
- Industrial brain brings not only better production, but also higher energy efficiency and less carbon emission density

WHO WE ARE

中国石油

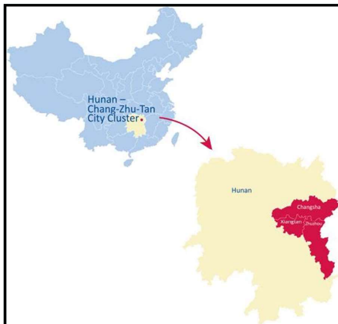
天津产权交易中心
Tianjin Property Rights Exchange

蚂蚁金服
ANT FINANCIAL

天津排放权交易所

- Joint venture set up in 2008 by China National Petroleum Corporation and Tianjin Property Rights Exchange, China's first comprehensive environmental rights trading organization
- In January 2018, Ant Financial Services Group made a strategic investment into TCX
- TCX is on a mission of motivating and releasing potentials of green development and innovations of all enterprises and individuals, through the use of technology and finance, TCX is determined to realize its goal of becoming a provider of innovative environmental solutions

地址：天津经济技术开发区
电话：022-66370690
传真：022-66370691
网址：www.chinatcx.com.cn



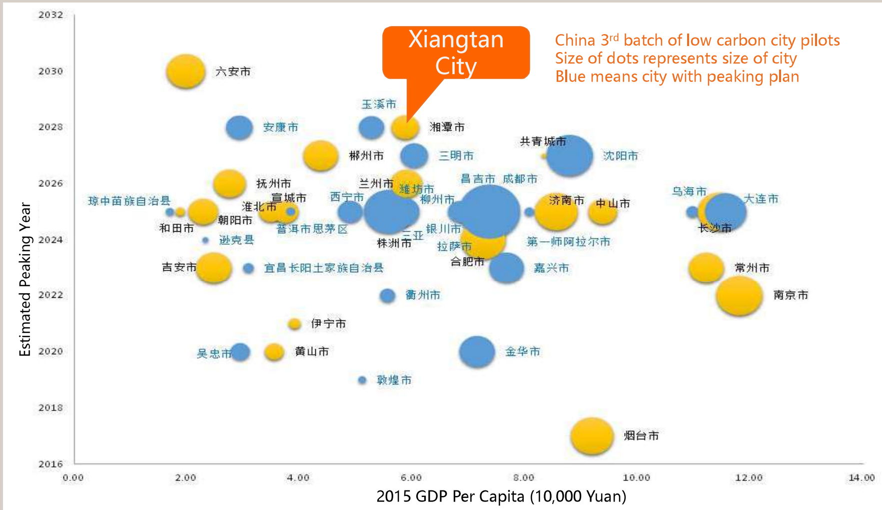
CZT City Emission Peaking Roadmap and Action Plan: The Case of Xiangtan

Achieving High Quality Development:
Low Emission,
Innovation & Inclusion

2018.12.05

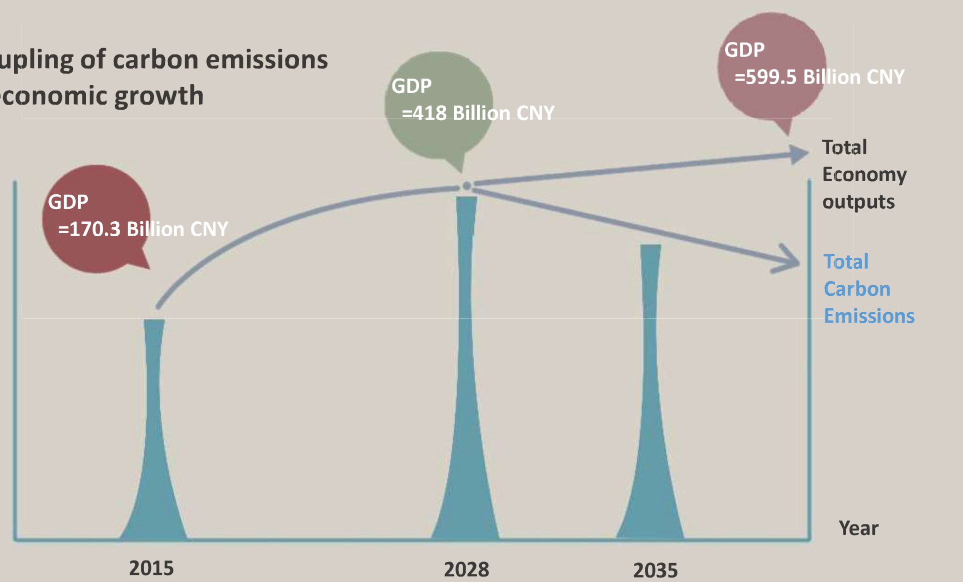
Table of Contents

Emission Peaking: Intended City Determined Contributions (ICDCs)

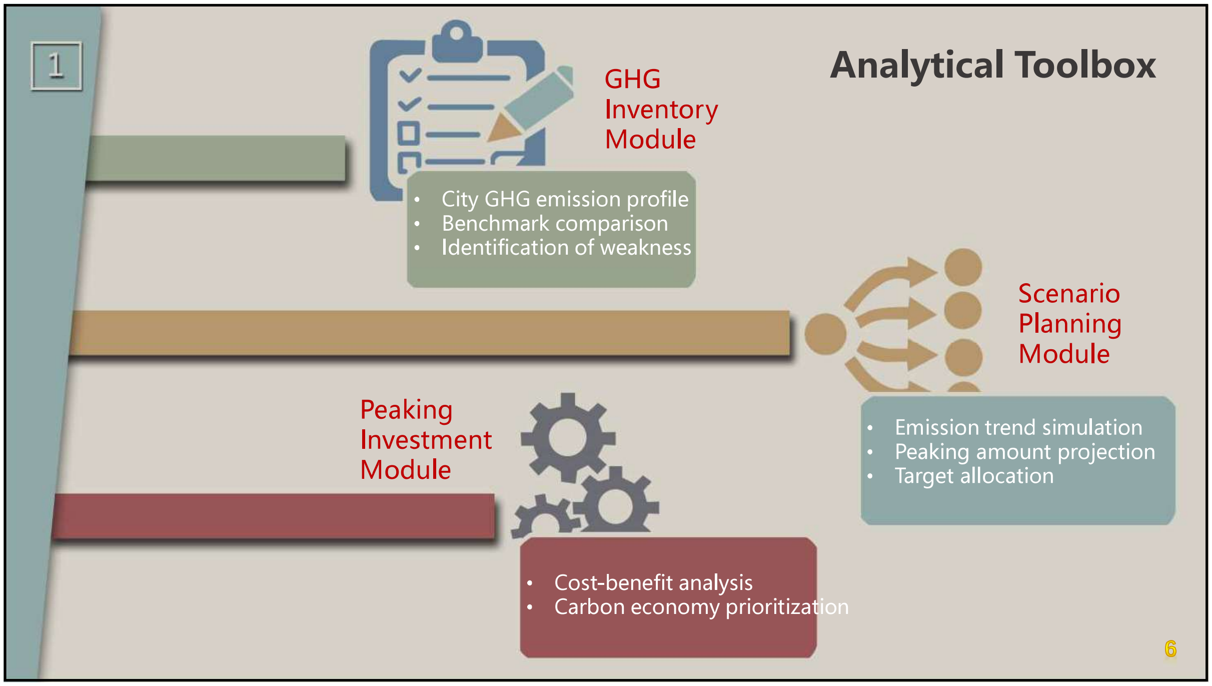


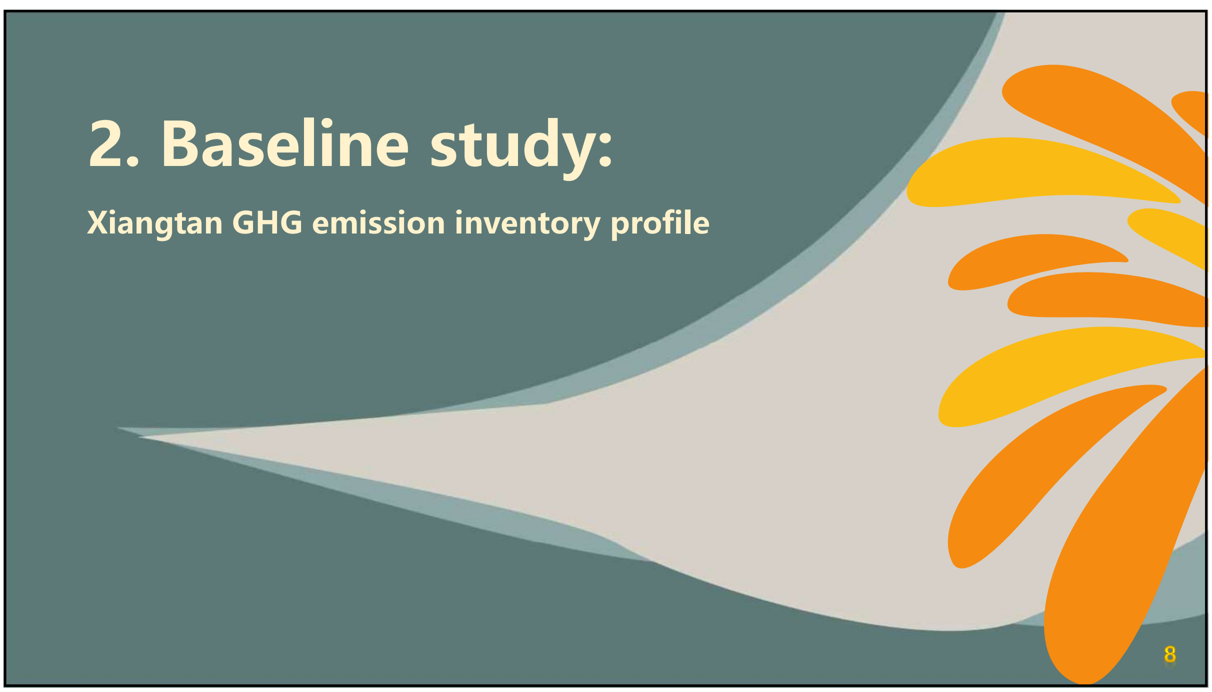
Note: Chart revised based on the NCSC report (2017)

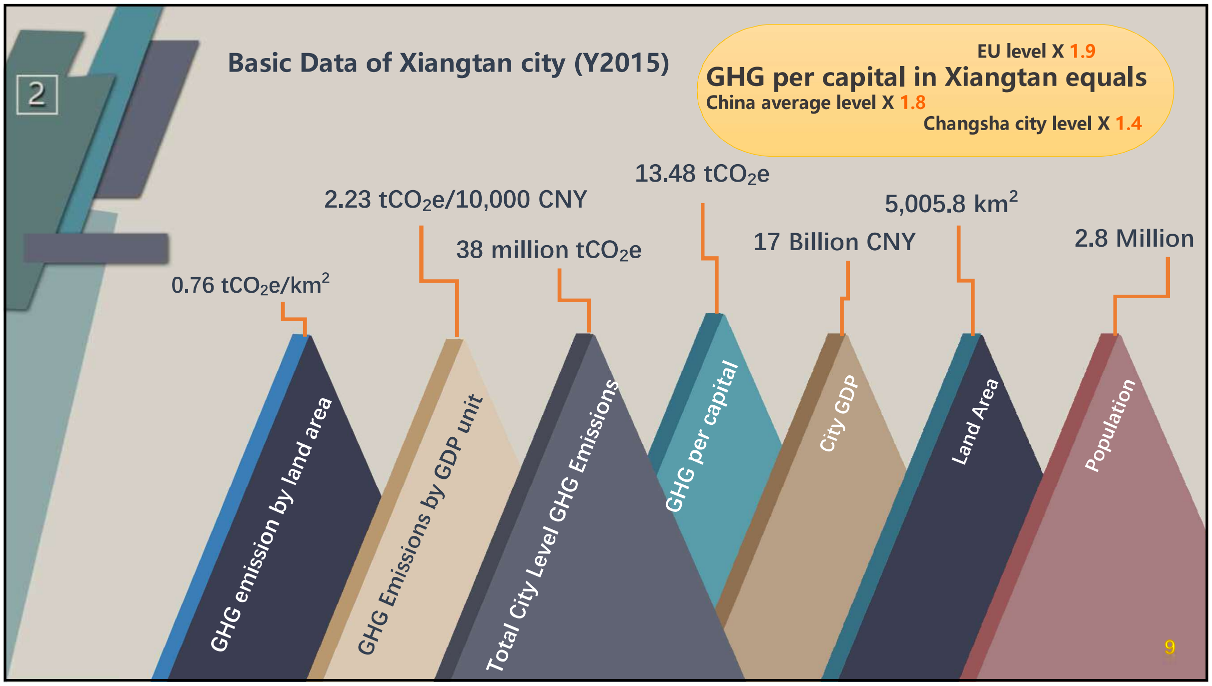
Decoupling of carbon emissions and economic growth

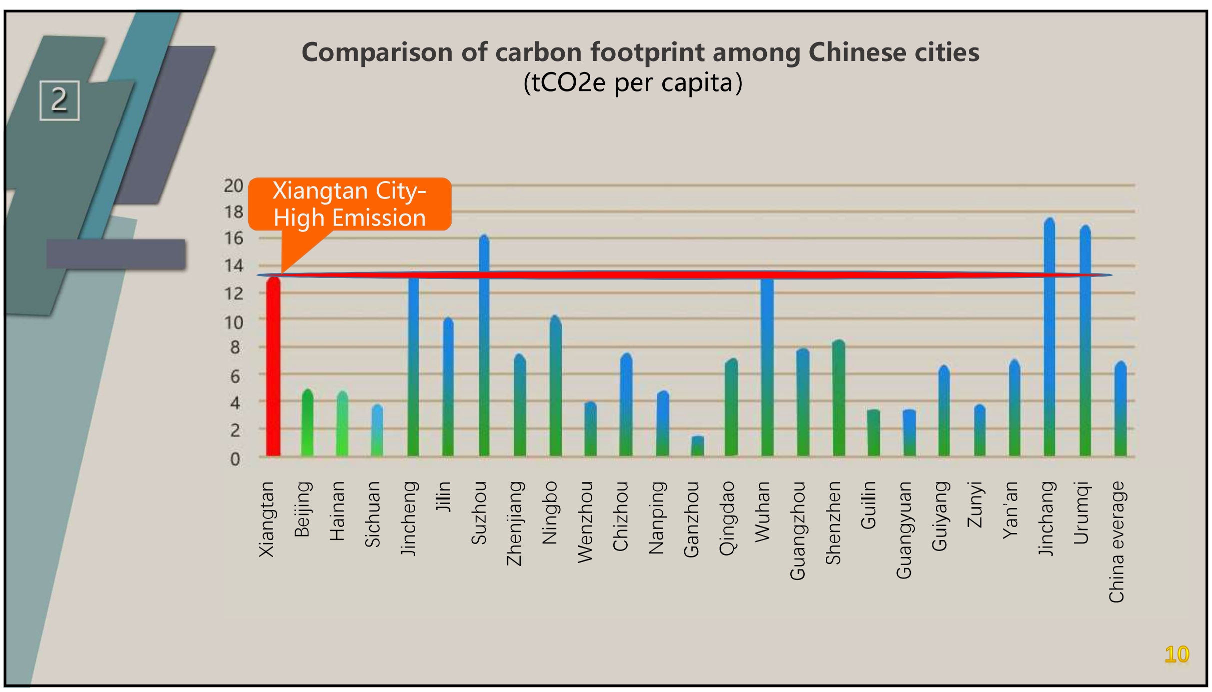


The Ideal Curves of Economics and Emission Peaking in Xiangtan city


1
Analytical Toolbox
GHG Inventory Module
City GHG emission profile
Benchmark comparison
Identification of weakness
Scenario Planning Module
Emission trend simulation
Peaking amount projection
Target allocation
Peaking Investment Module
Cost-benefit analysis
Carbon economy prioritization
6

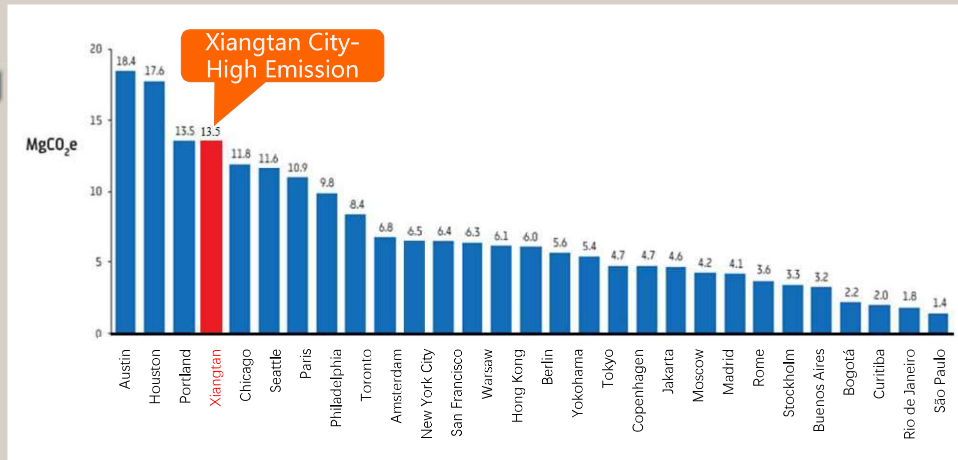

2. Baseline study:
Xiangtan GHG emission inventory profile
8


2
Basic Data of Xiangtan city (Y2015)
EU level X 1.9
GHG per capital in Xiangtan equals
China average level X 1.8
Changsha city level X 1.4
13.48 tCO2e
2.23 tCO2e/10,000 CNY
5,005.8 km2
38 million tCO2e
17 Billion CNY
2.8 Million
0.76 tCO2e/km2
GHG emission by land area
GHG Emissions by GDP unit
Total City Level GHG Emissions
GHG per capital
City GDP
Land Area
Population
9

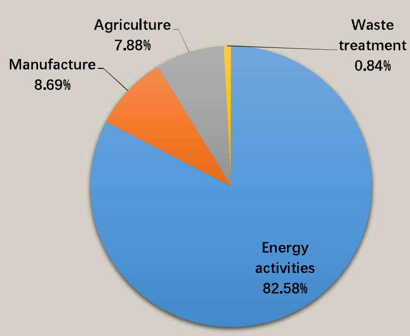

2
Comparison of carbon footprint among Chinese cities
(tCO2e per capita)
Xiangtan City-
High Emission
20
18
16
14
12
10
8
6
4
2
0
Xiangtan
Beijing
Hainan
Sichuan
Jincheng
Jilin
Suzhou
Zhenjiang
Ningbo
Wenzhou
Chizhou
Nanping
Ganzhou
Qingdao
Wuhan
Guangzhou
Shenzhen
Guilin
Guangyuan
Guiyang
Zunyi
Yan'an
Jinchang
Urumqi
China everage
10

2

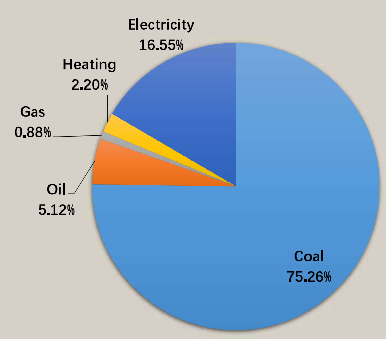
Comparison of carbon footprint among International cities
(tCO2e per capita)



2

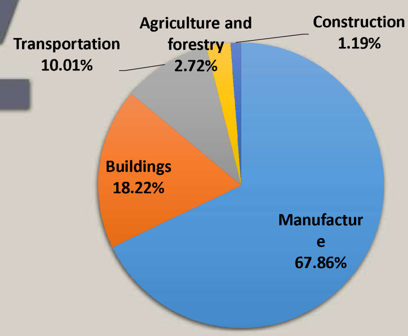


Emission Sources Category

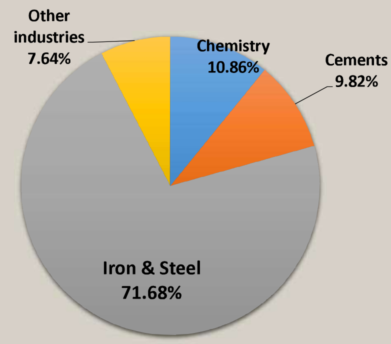


Energy related Emissions

2



Energy related Emissions by Sectors

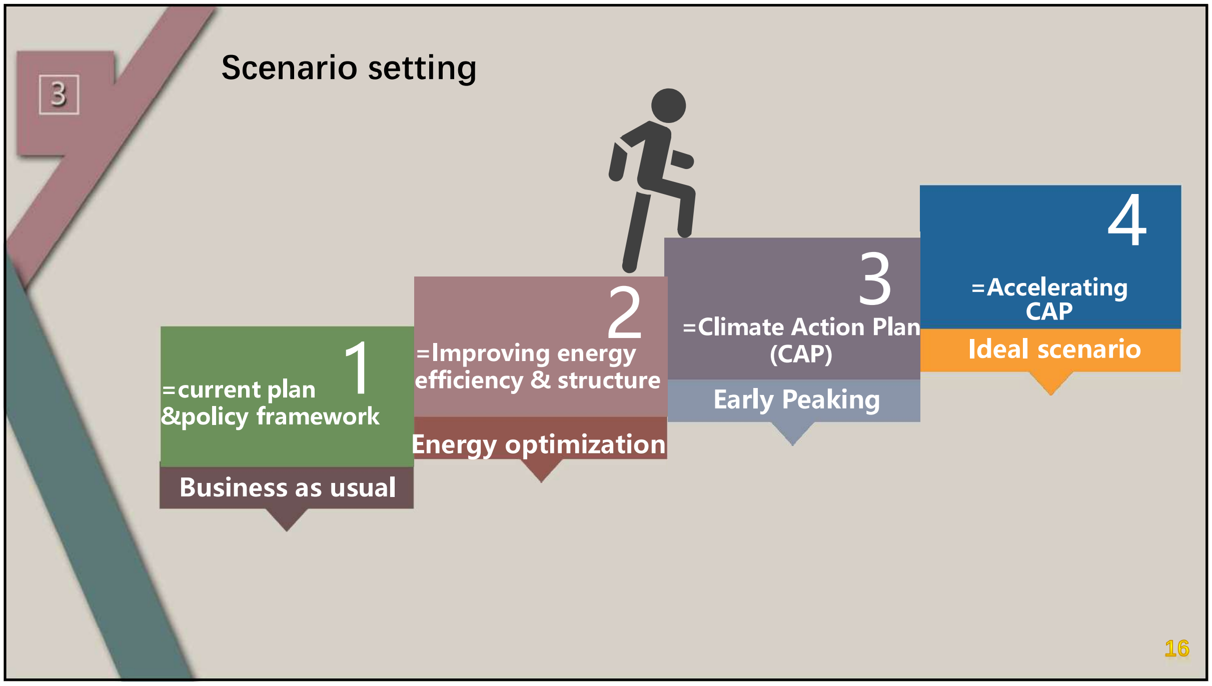


Manufacture-based Emission by company types

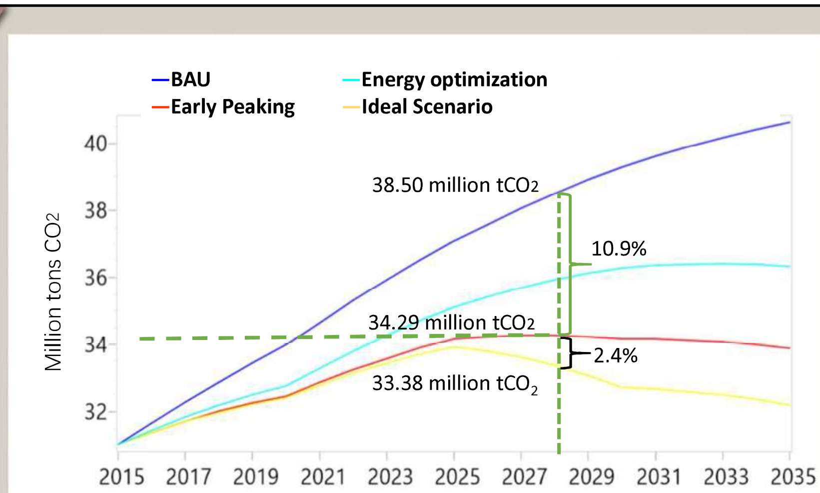
3. Scenario Planning:

Early peaking in 2028?

Scenario setting



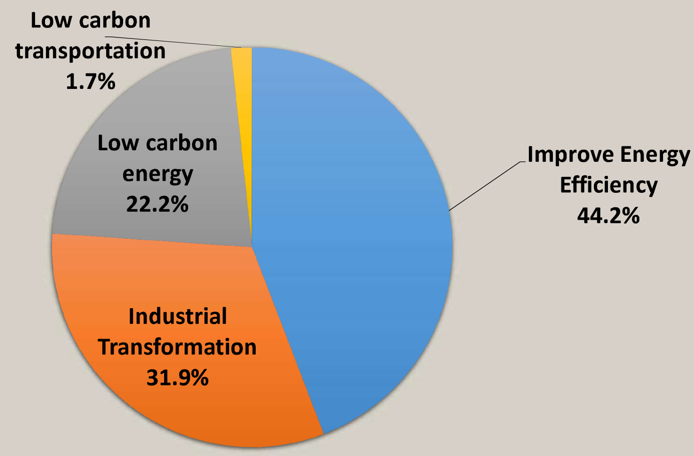
16



Peaking vs BAU scenario: Emission reduction of 4.21 million tons CO_2 annually by 2028

17

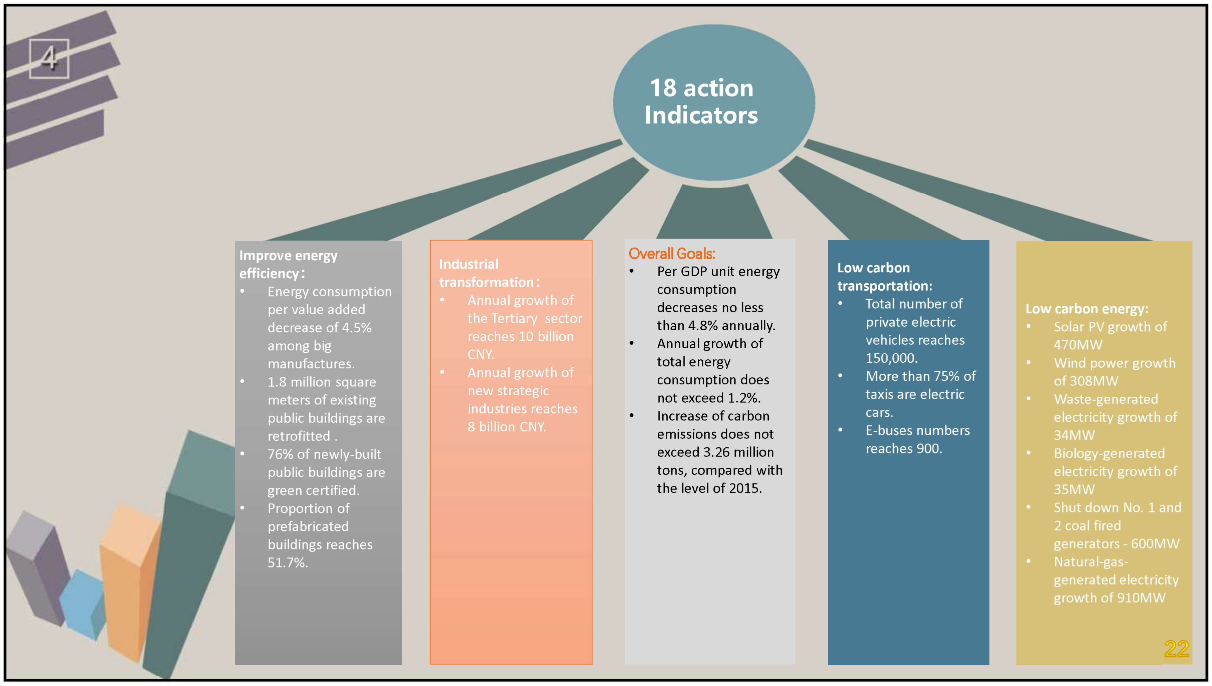
3



Peaking Contributions by action areas

4. Climate Action Roadmap:

4 Key Areas and 8 Programs



Carbon Economy Prioritization of Climate Programs

Key project clusters	Carbon investment intensity (CNY/Ton CO2e reduction)	Reduction (million tCO2)	Reduction Ratio (%)	Investment (Billion CNY)	Investment ratio (%)
Large Manufacture Energy Program	1600	10	38.5	16	7.1
Industrial Transformation	14049	13	50	182.637	80.8
Gas for All Program	10084	1.36	5.2	13.715	6.1
Zero-Waste City Program	4084	0.285	1.1	1.166	0.5
Zero-Carbon Energy Program	5693	0.95	3.7	5.409	2.4
Large Scale Green Building Program	27745	0.153	0.6	4.245	1.9
Prefabricated residential building Program	29569	0.093	0.3	--	--
E-mobility Program	18714	0.14	0.5	2.62	1.2
TOTAL	**8696**	**25.98**	**100**	**225.792**	**100**

24

5. Policy Recommendations:

Market-Driven and inclusive low carbon development

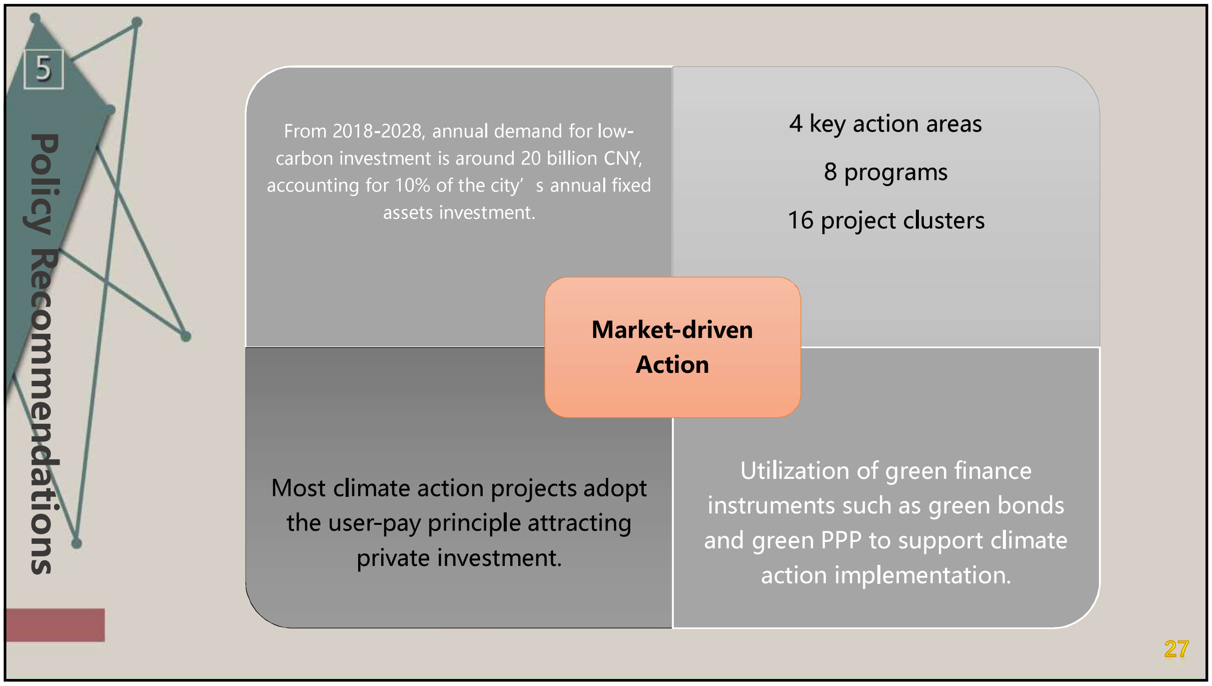
Peaking Target Oriented Climate Administration

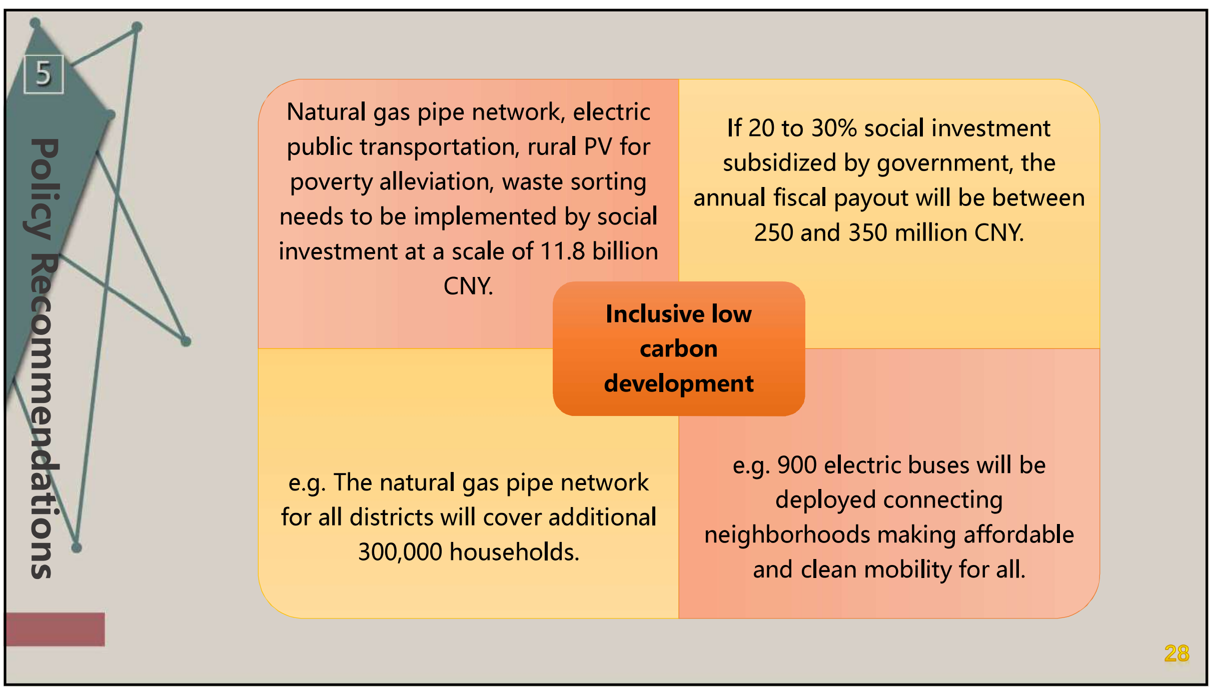
Allocation of peaking targets and key indicators to collaborative entities

21+ pro-climate policies

Carbon inventory, target allocation and 3rd party MRV as the 3 major components of Climate Administration

Integrating climate action into sustainability programs such as air quality management, smart city, sponge city, pro-public transportation, circular economy and ecological city development


5
Policy Recommendations
From 2018-2028, annual demand for low-carbon investment is around 20 billion CNY, accounting for 10% of the city' s annual fixed assets investment.
4 key action areas
8 programs
16 project clusters
Market-driven Action
Most climate action projects adopt the user-pay principle attracting private investment.
Utilization of green finance instruments such as green bonds and green PPP to support climate action implementation.
27


5
Policy Recommendations
Natural gas pipe network, electric public transportation, rural PV for poverty alleviation, waste sorting needs to be implemented by social investment at a scale of 11.8 billion CNY.
If 20 to 30% social investment subsidized by government, the annual fiscal payout will be between 250 and 350 million CNY.
Inclusive low carbon development
e.g. The natural gas pipe network for all districts will cover additional 300,000 households.
e.g. 900 electric buses will be deployed connecting neighborhoods making affordable and clean mobility for all.
28

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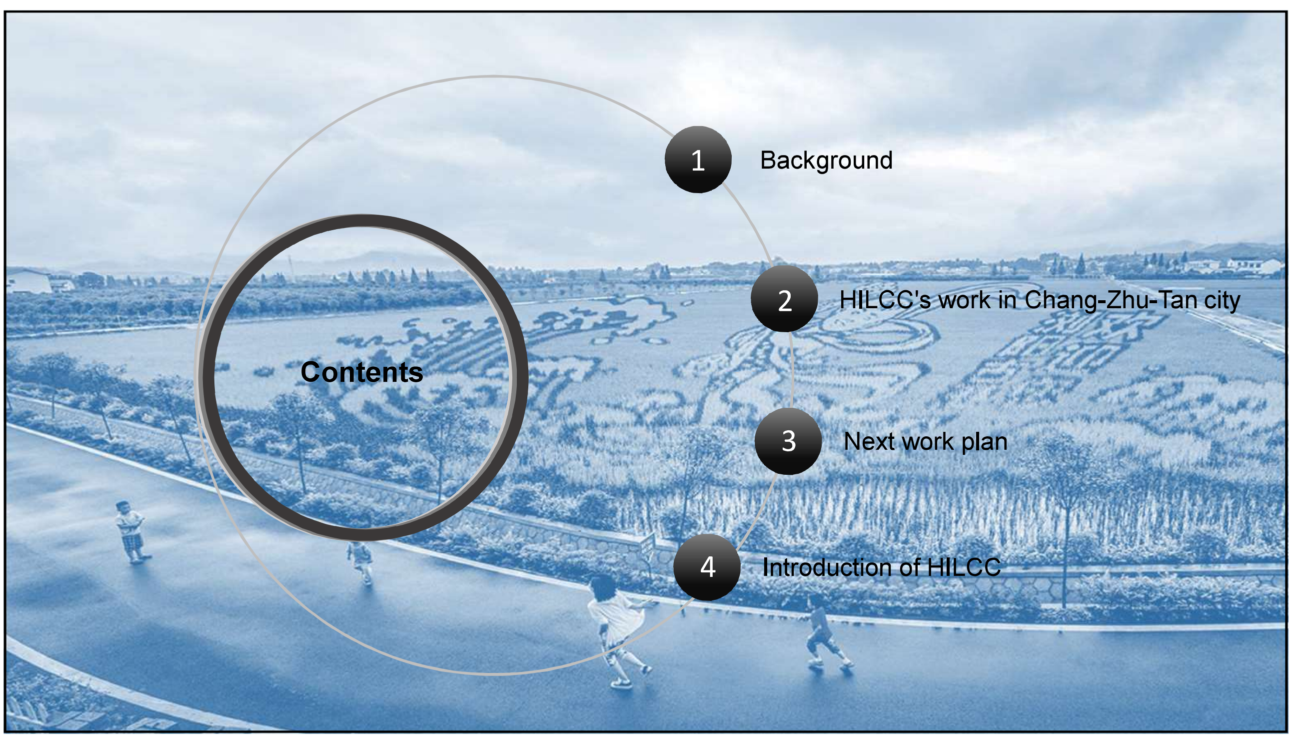
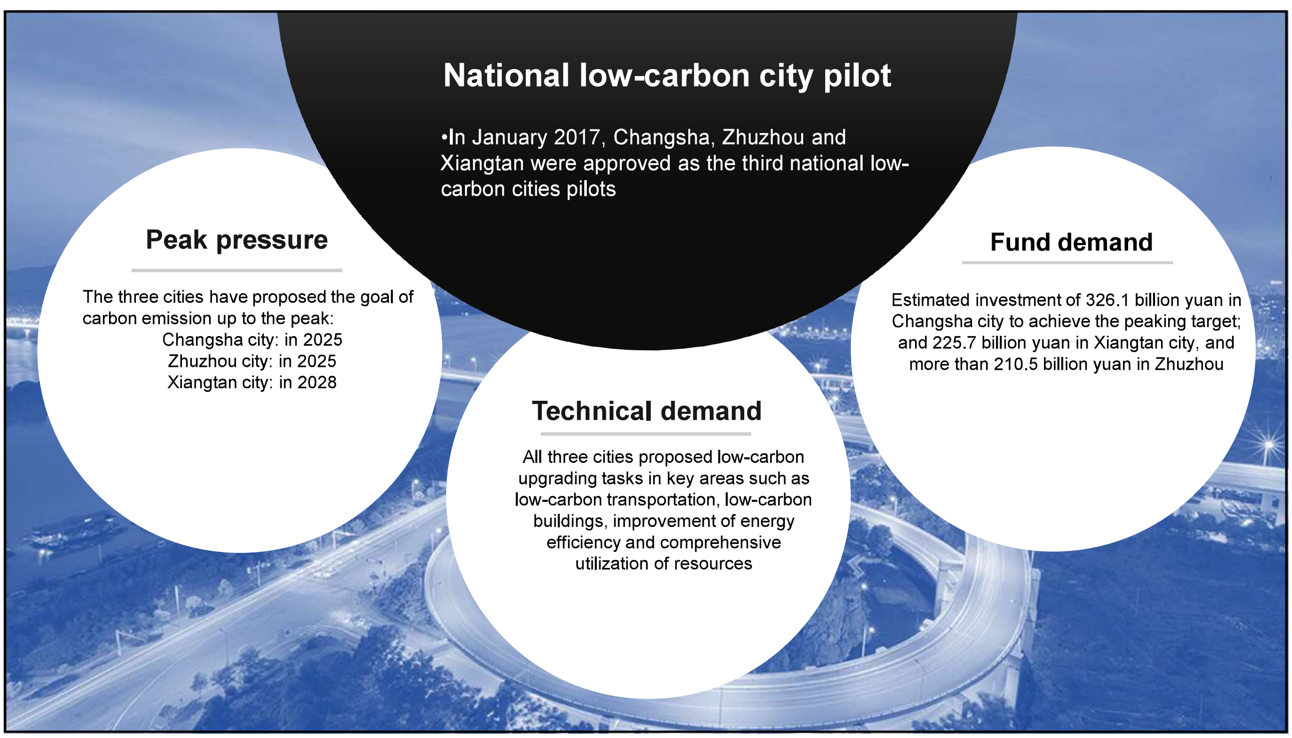
Thank you！


Chang-Zhu-Tan pilot city report
HILCC's work in Changsha-Zhuzhou-Xiangtan low-carbon city pilot


Contents
1 Background
2 HILCC's work in Chang-Zhu-Tan city
3 Next work plan
4 Introduction of HILCC


1
Background
Pilot City、Peaking Target


National low-carbon city pilot
•In January 2017, Changsha, Zhuzhou and Xiangtan were approved as the third national low-carbon cities pilots
Peak pressure
The three cities have proposed the goal of carbon emission up to the peak:
Changsha city: in 2025
Zhuzhou city: in 2025
Xiangtan city: in 2028
Technical demand
All three cities proposed low-carbon upgrading tasks in key areas such as low-carbon transportation, low-carbon buildings, improvement of energy efficiency and comprehensive utilization of resources
Fund demand
Estimated investment of 326.1 billion yuan in Changsha city to achieve the peaking target; and 225.7 billion yuan in Xiangtan city, and more than 210.5 billion yuan in Zhuzhou

Promote foundation work

Planning scheme ★★★★☆

- Changsha city low-carbon development plan (2014-2020)
- Changsha low-carbon city pilot implementation program
- Changsha city low-carbon development plan (2018-2025)

GHG inventory ★★★★★

- Changsha city 2015/2016 GHG inventory
- Zhuzhou city 2015/2016/2017 GHG inventory
- Xiangtan city 2015/2016 GHG inventory

GHG peak research ★★★★☆

- Changsha city GHG peaking research report
- Xiangtan city GHG peaking research report
- Zhuzhou city GHG peaking research (in progress)

Pay greater attention to capacity building

Low-carbon development, GHG emission accounting, data report, etc.

Talent cultivation and team building

Government departments, key enterprises and verification agencies

Introduction of international organizations

Give full play to the role as a bridge linking international institutions and local governments. In the past 14 to 18 years, it has cooperated with Strategic Prosperity Fund (SPF), Asian Development Bank (ADB), World Wide Fund For Nature (WWF), Institute for Sustainable Communities(ISC) and other international organizations to carry out relevant work in Changsha-Zhuzhou-Xiangtan cities.

SPF

To investigate the potential of low-carbon technology upgrading in Changsha-Zhuzhou-Xiangtan and other key cities in Hunan, initially establish the supply and demand mechanism of low-carbon technology, and build the capacity of key enterprises in energy efficiency provision and investment tools.

ISC

Low-carbon action plan development project of Changsha-Zhuzhou-Xiangtan urban cluster: research on GHG peaking of Changsha-Zhuzhou-Xiangtan cities and capacity building.

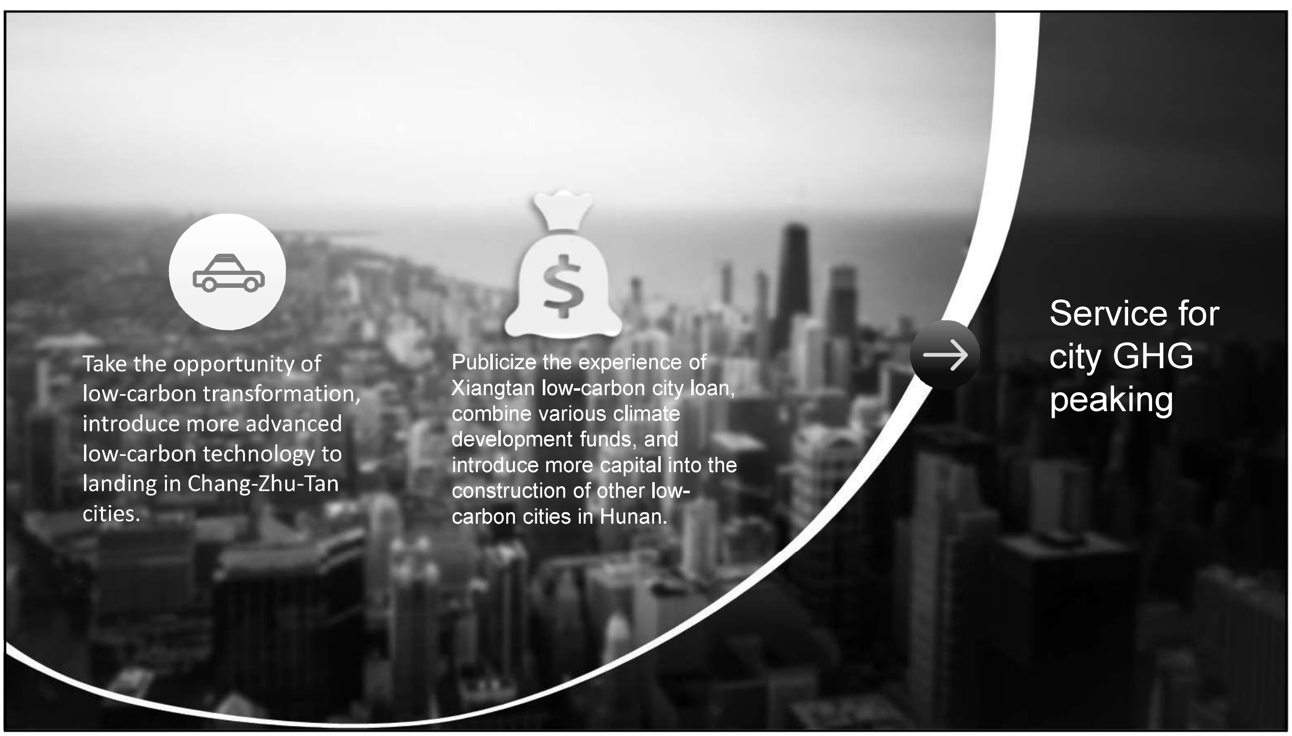
WWF

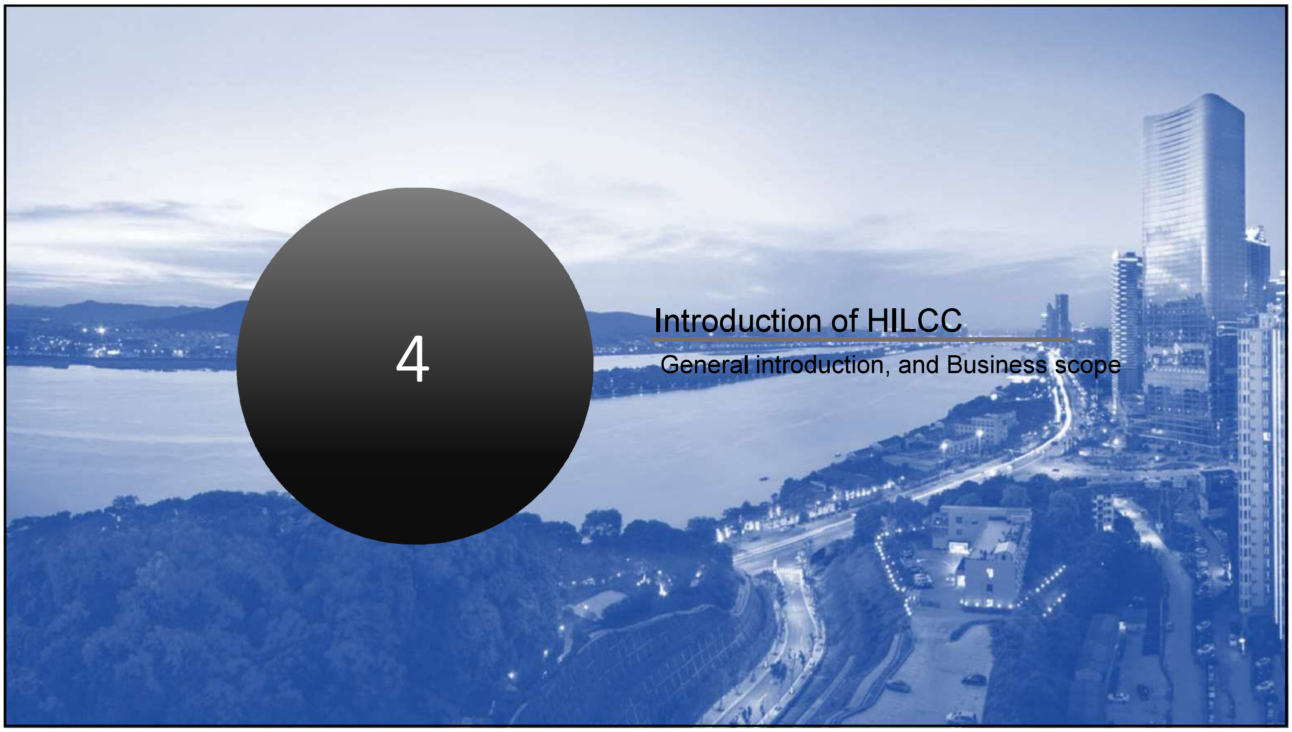
- Expert support for "Changsha low-carbon development plan (2014-2020)“
- Low-carbon city development leadership training course

ADB

- Technical assistance(TA) Mode Urban Low-Carbon Developme for Small to Medium Cities in China –Xiangtan Prefecture Municipality as a Pilot City
- TA: Promoting Low-Carbon Development in Central Asia Regional Economic Cooperatio (CAREC) Program Cities
- Preparation of Xiangtan low-carbon city loan project concep book


3
Next work plan
Focus on low-carbon technologies and investments


Take the opportunity of low-carbon transformation, introduce more advanced low-carbon technology to landing in Chang-Zhu-Tan cities.
Publicize the experience of Xiangtan low-carbon city loan, combine various climate development funds, and introduce more capital into the construction of other low-carbon cities in Hunan.
Service for city GHG peaking



General introduction	Innovative low carbon center, Hunan (think tank) was established in 2013 with the approval of Hunan development and reform commission, and registered in the civil affairs department, and is aimed at promoting the cause of low-carbon development. It is the first local non-profit think tank in China, with 27 full-time staff.	
Business scope	Basic research work	GHG inventory preparation and audit, planning scheme preparation, low-carbon index system construction and assessment, research topics, and policy recommendations.
	Low-carbon city development	Low-carbon city and park pilot demonstration, capacity building, and professional BBS.
	Favorable financing for projects	Use various climate development funds and introduce advanced international technologies to serve low-carbon cities and enterprises
	Low carbon technology promotes	Adopt technology investment, incubation, trading and other modes to promote early investment and financing of low-carbon technologies.
	Low carbon data management	Establish a low-carbon development data management platform, and operate the platform to promote low-carbon data management at levels of province, cities and parks.


湖南省联创低碳经济发展中心
Innovative Low Carbon Center, Hunan
Thanks for your attention! Looking forward to cooperation.
Lawrence Xu
Tel： 15873177743
Email： Lawrence.Xu@mailici.com

Pilot City Activities

Astana, Kazakhstan

International Forum on Low Carbon Development
for Central Asia Regional Economic Cooperation Program Cities

Beijing, December 4-6, 2018

ADB

WORLD RESOURCES INSTITUTE

Wuppertal Institut

About Kazakhstan

Land area	• 2.725 million km²
Population	• 18.3 million
Climate	• Sharply continental with large temperature amplitudes and relatively dry
GHG emissions	• 300.9 $mtCO_2e$ (2015)
Key emitting sectors	• Energy intensive industries • Transport • Housing-utility services

About Astana

Photo credit: Skyscrapercity

Land area	797.33 km^2
Population	1,030,577
Climate	Sharply continental Hot and dry summer (20ºC) Cold and long winter (-15ºC)
GHG	9.8 $mtCO_2e$ (2013) • Thermal power plants • Housing utilities • Transport

Kazakhstan's NDC

15%

Unconditional

- Reduce GHG emissions by 15% by December 31, 2030 from 1990 levels

25%

Conditional

- Reduce GHG emissions by 25% by December 31, 2030 from 1990 levels, provided there are additional international investments

“Kazakhstan 2050” & “Modernization 3.0”

One of world’s 30 most developed countries

GREEN ECONOMY

Enhance the efficiency of resources use	Construct and modernize the infrastructure	Improve the well-being of people and quality of the environment	Improve national security, including water security

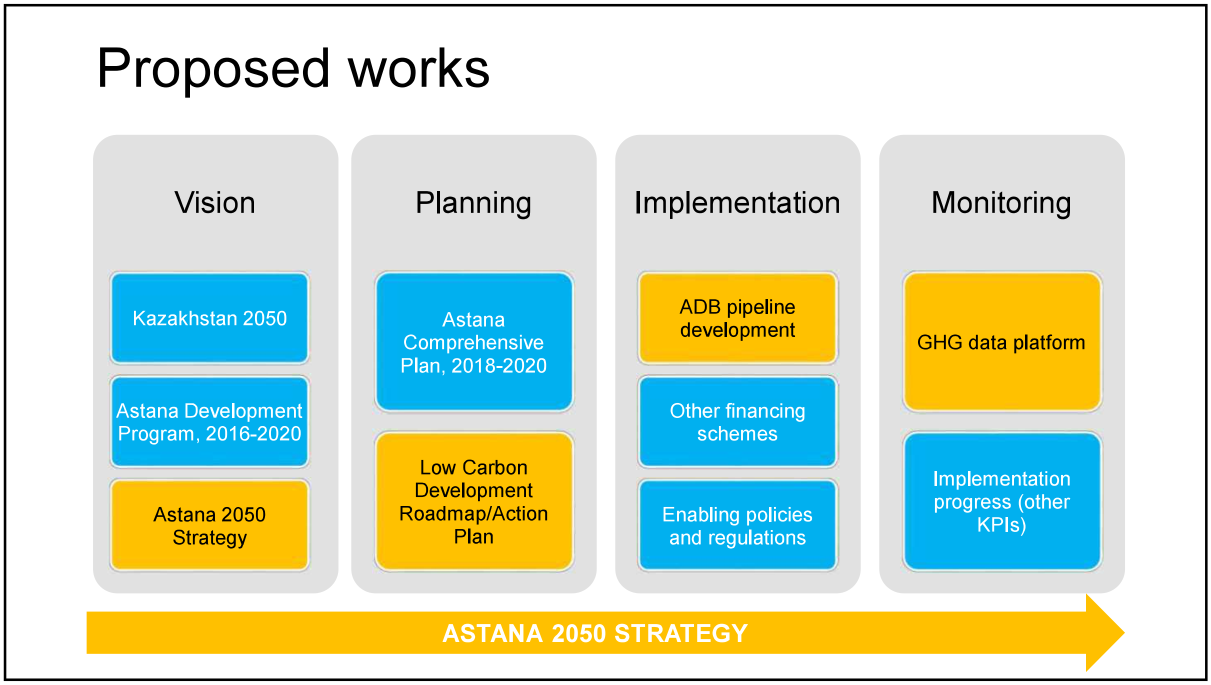
Astana’s existing policy instruments

Astana Development Program 2016-2020

Goal 5. City of a favorable ecological environment

Comprehensive Action Plan for Improving the Environment of Astana, 2018-2020

1. Reduce emissions from stationary sources
2. Reduce emissions from mobile sources
3. Develop green belt and landscaping
4. Manage waste and recycling
5. Manage water resources
6. Enhance public awareness
7. Monitor the environment quality
8. **Implement the Astana 2030 low carbon development strategy**


Proposed works
Vision
Kazakhstan 2050
Astana Development Program, 2016-2020
Astana 2050 Strategy
Planning
Astana Comprehensive Plan, 2018-2020
Low Carbon Development Roadmap/Action Plan
Implementation
ADB pipeline development
Other financing schemes
Enabling policies and regulations
Monitoring
GHG data platform
Implementation progress (other KPIs)
ASTANA 2050 STRATEGY

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LOW CARBON CITY DEVELOPMENT IN ULAANBAATAR: REDUCING GHG EMISSIONS AND IMPROVING AIR QUALITY

Speakers:
Zolzaya Enkthtur
Climate change and project management specialist
Otgonbaatar Dorjgotov
Transport consultant

Beijing , China
"International Forum on Low carbon development for CAREC program cities"
2018.12.05

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Pilot city profile (Ulaanbaatar, Mongolia)

Population	1.440.447 (46.2% of Mongolian population)
GDP	65.8% of Mongolian total
Key emitter sectors of Ulaanbaatar city	For 2015: Energy sector, Industry, Waste and agriculture
Key climate risks	Urban microclimate, loss of vegetation cover, increased public disease, less precipitation, frequent flash floods and city infrastructure damages caused by natural disastrous events
Climate change impact	Heat stress and hot weather impact, heat waves, cold waves, increased frequency of soil freeze, poor water quality, excess rainfall or storm, outbreak of pest insects and diseases, increased allergic or infectious disease, collisions in energy supply system
Key focal authorities in Ulaanbaatar city municipality	Ulaanbaatar city Governor's office Policy planning division, Projects and cooperation unity Ulaanbaatar city Environmental Agency

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The main Mongolian state and government policy documents in relation to Low Carbon Development

National

- Mongolia Sustainable Development Vision 2030
- Mongolia's Green Development Policy
- National Action Program on Climate Change
- Law on renewable energy
- Law on Energy Conservation
- Action Program of the Government of Mongolia for 2016-2020
- GHG Mitigation related documents submitted to UNFCCC (NAMA, National Communications)
- Intended Nationally Determined Contribution (INDC)

Subnational

- Capital City Mayor's Action plan 2016-2020
- Strategic plan for development of Ulaanbaatar up to 2020
- Ulaanbaatar city's Contribution to the Mongolia's NDCs
- UB city's sub-programs and sectorial master plans
- UB city sub program on climate change (pending)
- UB city sub program on waste
- UB city's Energy master plan
- UB city sub program on thermos technical renovation etc.

POLICY TIMEFRAME FOR ULAANBAATAR

МОНГОЛ УЛСЫН ЗАСГИЙН ГАЗАР БАЙГАЛЬ ОРЧИН, АЯЛАЛ ЖУУЛЧЛАЛЫН ЯАМ

6/13/2014 | 11/29/2015 | 3/23/2016

NATIONAL GREEN DEVELOPMENT POLICY

The Parliament of Mongolia approved the Green Development Policy (GDP) for Mongolia. The GDP aims to ensure that green development becomes one of Mongolia's fundamental goals.

DEVELOPMENT POLICY PLANNING LAW

The Parliament of Mongolia approved the Law on Development Policy Planning. The purpose of this Law is to determine stages of planning, implementation, monitoring and evaluation of the development Policy of Mongolia.

UB GREEN DEVELOPMENT STRATEGIC ACTION PLAN

City Council approved Ulaanbaatar Green Development Strategy 2020.

POLICY TIMEFRAME FOR ULAANBAATAR

2/5/2016

SUSTAINABLE DEVELOPMENT GOALS MONGOLIA 2030

By 2030, Mongolia aspires to be amongst leading middle-income countries based on per capita income. It hopes to be a multi-sector stable economy, and a society dominated by middle and upper-middle income classes, which would preserve ecological balance, and have stable and democratic governance.

09/2017

FINAL UB GREEN DEVELOPMENT POLICY 2025

Capital city Environmental Agency is working with international organizations such as The Asia Foundation to amend previous UB GDSAP to meet the requirements of national sustainable development goals and actions.

10/2017

UB CLIMATE CHANGE STUDY

GGGI is working with Capital city Environmental Agency to develop its municipal level contribution to the national INDCs and prioritized the investment pipeline of the capital.

POLICY TIMEFRAME FOR ULAANBAATAR

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2017-2019

ADB RETA ON LOW CARBON DEVELOPMENT

Based on the previous studies and results of policy planning activities Asian Development Bank's Technical assistance on Low carbon development in CAREC cities will further enable climate smart solutions for UB city

2020-2025

IMPLEMENTATIONS

Successful implementations of low carbon projects and successful transition towards climate resilient and sustainability.

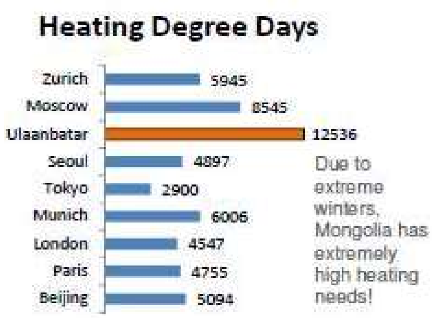
FUTURE

SUSTAINABLE AND CLMATE RESILIENT CITY

Overall objectives will be fulfilled, evaluated and monitored.

80 percent of the air and soil pollution comes from Ger-areas

- Mongolia is one of the **most urbanised** countries in Asia
- Ulaanbaatar is the **coldest capital** in the world



Source: ASHRAE.org

Lack of **essential urban services** is a major bottleneck for prosperity and development of Ulaanbaatar, and a main source of **air, soil, and water pollutions**

46% has access to district heating & water and sanitation
54% live in *gers*, using inefficient stoves for cooking and heating, and collect water from water distribution points

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Sources of the air pollution

GER DISTRICT

80%

216,021 households, **3000** heating stoves , annual coal consumption exceeds over **1 million tonnes**

TRANSPORTATION

10%

458, 212 vehicles and **72%** of the total vehicles on the road aged more than **10 years**

CHP

6%

3 CHPs operating in Ulaanbaatar with more than **5.1** million tonnes of coal consumption annually

OTHERS

4%

Dust, waste burning, ashes, construction and other polluting spurces from different activities

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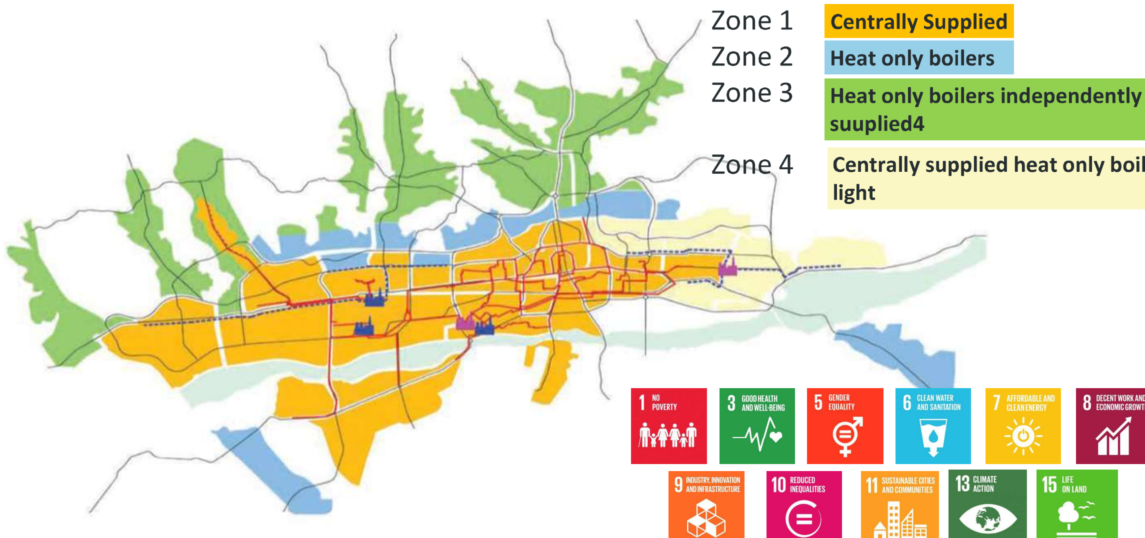
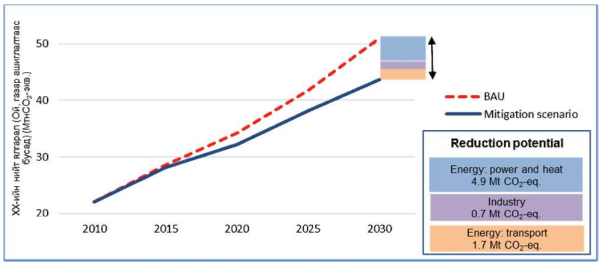
Gers could achieve both Systematic Emission Reductions, Poverty Reduction & Low Carbon Development

Zone 1	**Centrally Supplied**
Zone 2	**Heat only boilers**
Zone 3	**Heat only boilers independently suuplied4**
Zone 4	**Centrally supplied heat only boilers light**



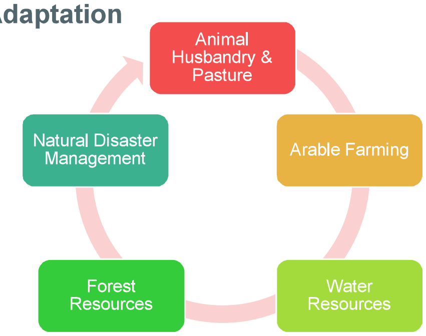
Mongolia's NDCs

Mitigation



Source; Mongolia's Intended nationally determined contribution, 2015
Note: Excludes LULUCF

Adaptation



7.3 Mt CO2-eq. reduction per annum in 2030, i.e. **14%** reduction compared to a BAU scenario

Investment needs USD 3.4 billion for mitigation and USD 2.7 for adaptation measures

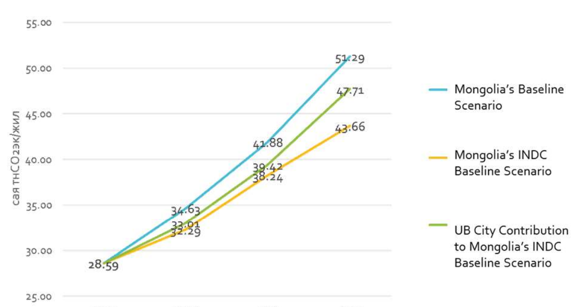
NDCs implementation is contingent upon **technology transfer** and access to **finance**

UB City contribution to Mongolia's NDCs

Mitigation - GHGs emissions in UB City Territory &

UB mitigation scenarios, 1000t CO_2-eq/year

Items	2015	2020	2025	2030
Baseline Scenario				
INDC Baseline Scenario	**28,591**	**34,632**	**41,877**	**51,294**
UB Mitigation Scenario				
1. Efficiency improvement of electricity, heat production and distribution	**0.00**	**786.16**	**990.00**	**1280.69**
1.1 Reduction of internal use of electricity in CHPs	0.00	93.51	160.00	226.95
1.2 Reduction of electricity transition and distribution losses	0.00	276.95	370.00	417.94
1.3 Reduction of heat distribution losses	0.00	385.70	420.00	583.80
1.4 Efficiency improvement of water heating boilers	0.00	30.00	40.00	52.00
2. Efficiency improvement of electricity, heat consumption	**0.00**	**480.00**	**638.00**	**825.60**
2.1 Electricity and heat saving in big industries and entities	0.00	80.00	88.00	94.40
2.2 Reduce heat losses in buildings	0.00	400.00	550.00	731.20
3. GHG emission reduction in transport sector	**0.00**	**150.00**	**435.00**	**880.00**
4. Increase the share of renewable energy in the total electricity generation capacity	**0.00**	**200.00**	**400.00**	**594.00**
GHG emission reduction total	**0.00**	**1616.16**	**2463.00**	**3580.29**



Baseline scenario and UB mitigation scenarios, 1000CO_2-eq/year

	2010	2015	2020	2025	2030
Baseline scenario	21,950	28,591	34,632	41,877	51,294
UB mitigation scenario	0	0	**1,616**	**2,463**	**3,580**
%			4.67	5.88	6.98

ADB ASIAN DEVELOPMENT BANK

Ulaanbaatar city's 7 climate investment sectors		
1	Energy (Production and consumption)	Mitigation
2	Transport (Increasing efficiency)	Mitigation
3	Water (Combating growing water stress)	Adaptation
4	Forest resources (Promoting carbon capture)	Mitigation
5	Urban planning (Low carbon cities/industries)	Mitigation/Adaptation
6	Waste management (Solid waste to energy)	Mitigation/Adaptation
7	Disaster management (Resilience)	Adaptation

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CAREC RETA Outputs for Ulaanbaatar city

After series of consultative meeting with stakeholders, following four major outputs will be delivered with this RETA:

1. Sustainable data management systems for greenhouse gas (GHG) data assessed and enhanced at city level;
2. Recommended investment road maps for low-carbon economic growth at selected cities developed;
3. A source book on successful practices and measures driving low-carbon economic development at city level developed and disseminated;
4. Strengthened capacity for low-carbon city development among CAREC countries expanded.

ADB ASIAN DEVELOPMENT BANK

What we heard as LCC priorities for Ulaanbaatar

- GHG Inventory analysis
- Options for attracting private sector investments
- Capacity building for the Climate Change and Green Development Unit
- Bus route rationalization and Low Carbon strategy for Urban Mobility
- Public awareness campaign for Pollution Reduction, and GER pollution remediation
- Support to PMOs for Affordable Housing and BRT Projects

WORLD RESOURCES INSTITUTE

Current Transport situation in Ulaanbaatar

Total number of registered Transportation units in UB 458,212 out of which 200,000 involved in daily traffic.

In case if we don’t take any measures to slow down the growth the total Number of transportation means will reach 970,000 by 2030

UB 458,212 out of which

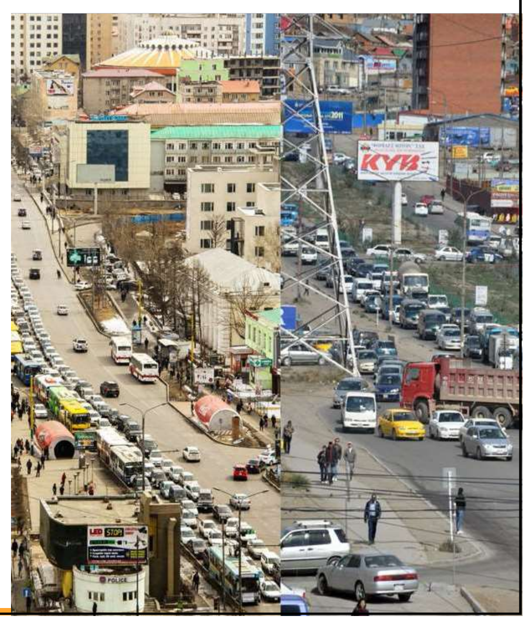
Number of transportation means will reach

200,000

involved in daily traffic.

970,000

by 2030



Current Transport situation in Ulaanbaatar

Traffic Congestion :
- below 5kph during peak-hours in CBD
- Cost <u>3.5% of GDP , $250 million per year</u>

Low Quality Public Transport :
- Slow and congested low quality buses
- Vehicle ownership has doubled

Traffic accident :
- 824 death in 2011 nation wide (26th in the world)
- 70% accidents in UB, 80% passenger cars

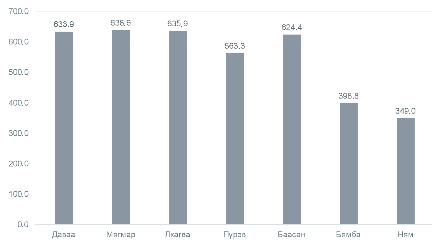
Air Pollution and Co2 by vehicles:
- 33% of NOx and 14% od CO2
- 80% od vehicles not meet emission standards

Urban transport

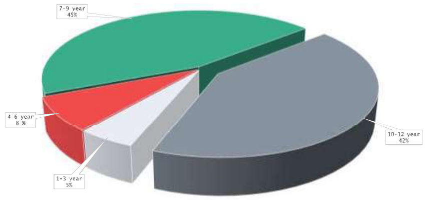
Bus

937 bus

Daily trip /thousand/
September-November, 2018

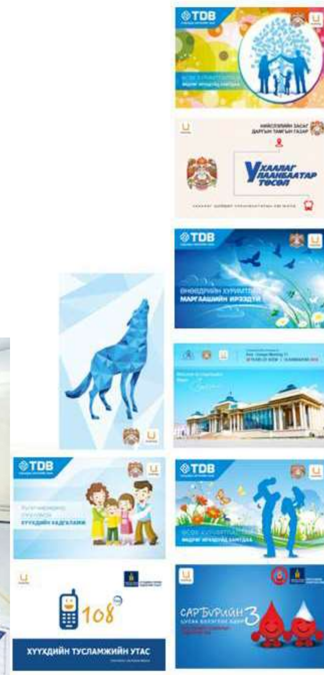


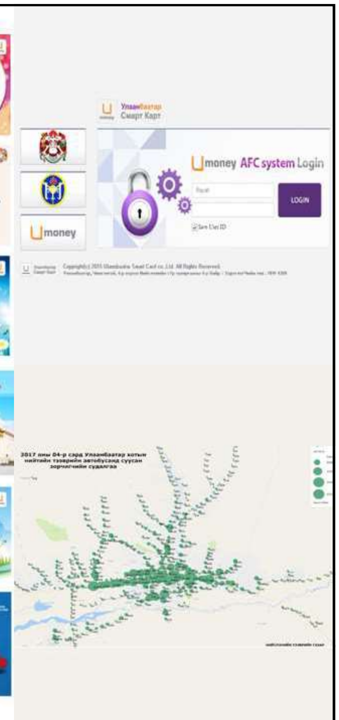
Resource: Ulaanbaatar city transport agency, 2018



Resource: Ulaanbaatar city transport agency, 2018

Bus management system, bus information system, e-ticketing system





Governor office of Ulaanbaatar’ s Initiatives…

- UB BIKE project, which introduces Ulaanbaatar's bicycle service, has been implemented since July 9, 2018.
- Starting from 01 April 2017, the public transportation of Ulaanbaatar City fully adopted the electronic card system.
- MUB has plan 21 EV plug-in Station by 2018 000 less vehicles on the road (19% reduction)

UB BIKE sharing

UB smart card system

EV/ charging Station and Incentive

Locally manufactured

Current Transport situation in Ulaanbaatar

ULAANBAATAR CITY MASTER PLAN 2020-2030

1. Reduce traffic congestion
2. Improve public transport
3. Improve traffic safety (Pedestrian and Vehicle)
4. Reduce vehicle emissions

MAIN GOALS

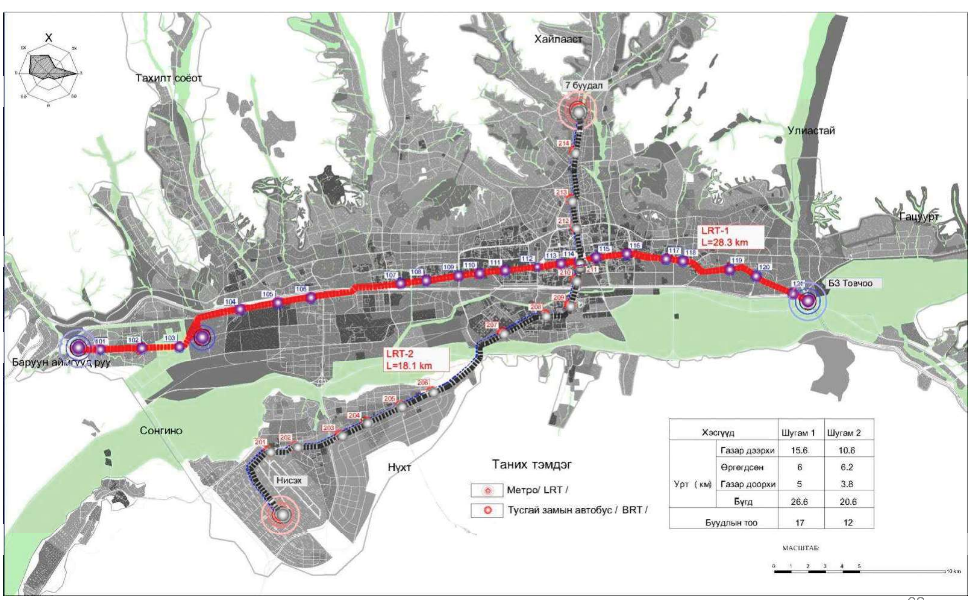
1. BRT (Bus Rapid Transit)
- UB BRT Corridor Design
- Station Location & Design

2. Road Improvement
- Road and Bridge Improvement
- Trolley Bus Improvement.

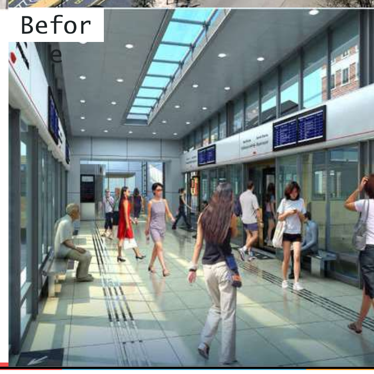
3. Traffic Management
- Intersection Improvement
- Traffic Safety Improvement

4. Parking Management & NMT
- CBD Parking Control
- Parking policy

METRO(JICA) , BRT(ADB)



BRT Future



Why BRT for Ulaanbaatar city?

1. **Flexible implementation :**
   BRT corridor : 29m minimum with road
   BRT vehicles : Diesel buses, trolley buses, hybri
2. **Short time Implementation (1.5 ~ 3 years)**
3. **Low cost ($1-$5 million per km) and high capacit**
4. **Easy access by the passengers :**
   At grade, pedestrian bridges, underground pedest
5. **Low dependence on foreign technology**

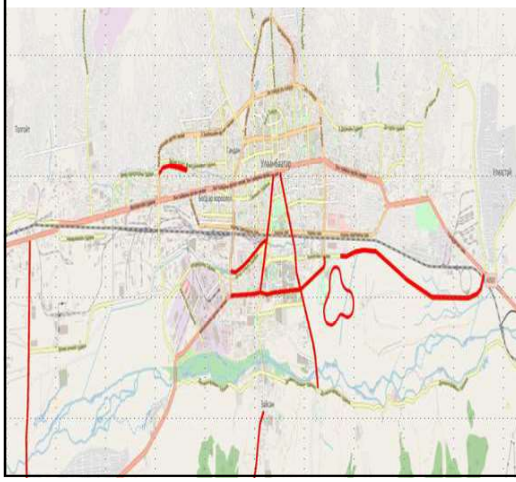
Better Branding Improved transit service quality

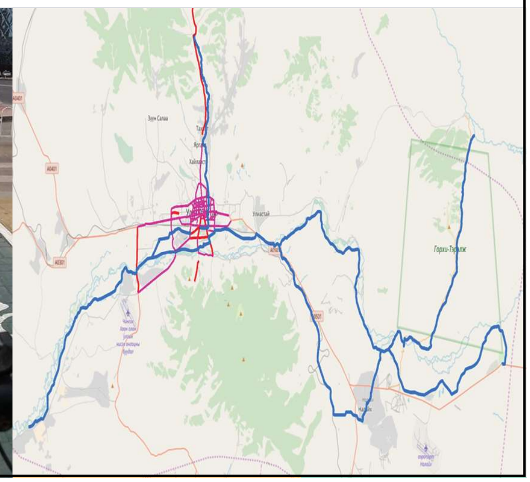
xisting bike lanes

60.5 km

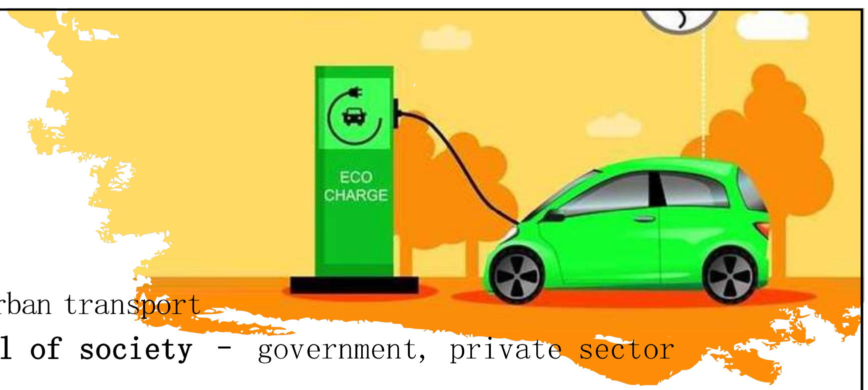
Planned bike lanes

350.2 km





So what are the next steps needed?



More upstream dialogue on urban transport

Efforts must come from all of society – government, private sector and consumers

Long term engagements

- Policy reform and sector development
- Master plans and sector level programs
- Financing and implementation of larger and longer term policy

Short term engagements

- New Project Readiness Facility (PRF)
- EV awareness among public
- Funding for Public EV Charging Infrastructure-Pilot project

Thanks for your attention

Email us for more detail:

zolzaya.env@gmail.com
oogii123@gmail.com