Expert Meeting: Measuring the Impact of Urban Planning Strategies on GHG Emissions

Summary Report

April 23 – 24, 2018
The World Bank, Washington D.C., USA

Contents

Background

The Global Platform for Sustainable Cities, or GPSC *www.thegpsc.org*, promotes an integrated approach to sustainable urban planning and strategic growth. This meeting, titled "Measuring the Impact of Urban Planning Strategies on GHG Emissions," was convened to bring together technical experts with urban and greenhouse gas (GHG) focuses to:

- Identify relevant existing tools that have been used to measure GHGs at the city level, with the focus being on urban planning (such as comparing cities' urban growth forecasts and assessing the expected GHG impact of each scenario along with applicable policy packages); and
- Discuss the pros and cons of the tools, and the suitability of their use by GPSC cities.

The conclusions of the Expert Meeting are valuable to help GPSC determine the most relevant tools so they can be made available by GPSC for its member cities.

Overview of the Sessions

Day 1 | 23 April

I. Opening of the Expert Meeting

Welcome

About 40 domain experts from international organizations, academia, and the private sector joined the GPSC Expert Meeting. Participants were first welcomed by Ms. Xueman Wang, GPSC Program Coordinator, who highlighted the key purpose of the workshop was to understand the tools used by urban planners and policymakers to quantify cities' effect on GHG emissions. GPSC seeks this understanding to facilitate a better integrated planning process for cities.

Opening Remarks

Mr. Sameh Wahba, Director for the World Bank's Social, Urban, Rural and Resilience Global Practice, offered opening remarks for the meeting. He stressed the importance of bringing together the knowledge of different strategies – such as the Transit-oriented Development (TOD) guidebook which GPSC is currently creating – to ensure a multi-sectoral and integrated approach that can lead to positive outcomes for cities.

Further to promoting the multi-sectoral and integrated approach, Mr. Wahba made reference to his previous experience working in Brazil. Sao Paolo was mentioned as a good example of a city gathering their data, effectively analyzing, and creating useful output information. "This importantly took the information out of the realm of politics, and into the realm of evidence-based decisions."

Fig 1. Mr. Sameh Wahba, Director, Social, Urban, Rural and Resilience Global Practice, World Bank, addressed the Expert Meeting participants

Mr. Wahba highlighted that the Expert Meeting was convened because attendees of GPSC's 2nd Annual Meeting in New Delhi, India had mentioned the importance to cities of understanding the impact of their integrated urban planning approaches on GHG emissions. Due of this feedback, GPSC commissioned the Technical Note titled "A Review of Tools to Assess Integrated Urban GHG Mitigation Strategies Incorporating Land Use, Technology, and Behavioral Change," which has been developed in collaboration with a research team at the University of Minnesota. Based upon the different programs and approaches presented during the Expert Meeting, the note's purpose is to guide cities to find the tools and integrated development solutions which are most relevant to their contexts.

In closing, Mr. Wahba thanked the Global Environmental Facility (GEF) for supporting this initiative, and also thanked each participant for their contribution to the meeting's efforts.

II. Overview: Assessing the Impact of Urban Policies, Growth, and Integrated Planning Strategies for GHG Emission Reductions

Overview of the Existing Tools

The first session began with an overview of the existing tools for GHG measurement given by Professor Anu Ramaswami from the University of Minnesota. She and her research team aimed to address two key questions in their presentation and the Technical Note which they authored:

1. How can the relationship between compact urban development policies (density and strategic intensification actions) and GHG emissions be quantified?
2. How do current tools treat the complexity of compact urban development (CUD) and integrated urban planning policies in future urban development scenarios?

She explained that regardless of focusing on sectors, land-use, or other models, the modeling tools for integrated urban GHG mitigation normally adopt four levers:

- **Lever 1 – CUD Land Use Change** that uses the "5D" CUD framework as an essential performance evaluation tool:
    - **Density:** Maximizing compact urban form while mitigating negative aspects such as air pollution and congestion;
    - **Diversity of use and income:** Neighborhoods with mixed income groups and diverse opportunities for jobs, commerce, and leisure;
    - **Design:** Shaping cities so that urban residents benefit from the advantages of dense areas. Good design includes walkability, traffic safety controls, and tree cover;
    - **Distance to transit:** transit options should ideally be accessible within 400-800m; and
    - **Destination access:** sustainable transport modes that take people where they want to go.
- **Lever 2 – Single Sector Technology Strategies** that focus on seven key sectors that contribute to almost 87% of GHG emissions (e.g. energy, water, building/shelter, transportation/communication, food, wastewater/waste management, and public spaces). This level takes transboundary life cycle GHG accounts into consideration to avoid leakages between local instruction provisions, community, infrastructures and global interactions;

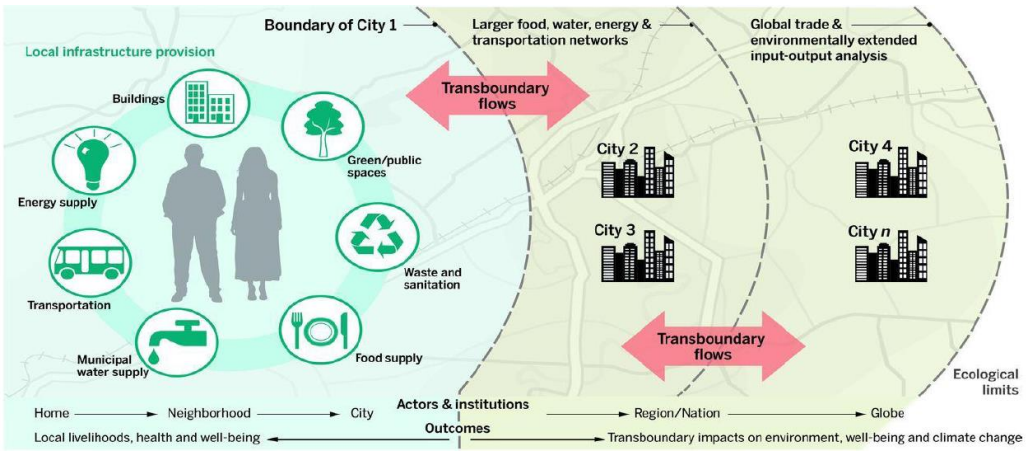

Fig 2. Transboundary issue in GHG accounting (Source: Ramaswami et al. 2016. Science.)

- **Lever 3 – Cross-sector Efficiency Strategies** that could yield a 40% additional mitigation potential compared to national single sector efficiency targets. Recent studies have shown that there is high potential for cities to decarbonize through urban planning that facilitates cross-sectoral exchange of "waste" heat and materials where technologies make great contributions. It is also a model that takes transboundary factors into consideration, such as pairing emission models with similar air pollution models to capture all GHG mitigation co-benefits; and
- **Lever 4 – Behavior Change and Policy Strategies** that refer to tracking behavioral change both in voluntary programs and the number of people that are encouraged to participate in mitigation strategies through regulatory action.

Prof. Ramaswami then presented the team's major findings and recommendations:

1. Combining a focus on multiple levers in the same model;
2. Encouraging authors to make algorithm assumptions, participation assumptions and base case studies publicly available;
3. Making a concerted effort to track CUD metrics connected to the 5Ds and key performance indicators;
4. Incorporating the life-cycle of key fuels and materials into GHG baseline accounting;
5. Making the process flexible and transparent enough so that it is possible to adjust reach and elasticity assumptions; and
6. Creating a database of participation in various voluntary and mandatory programs throughout various regions of the world.

III. Tools for Assessing Integrated Urban Planning's Effect on GHG

Morning Session: Measuring the Effect of Integrated Urban Strategies on GHG Emissions

CityDNA: Measuring Urban Form/ Street Space and the Effect on Emissions in China

During the rest of the day, tools and case studies were presented. Mr. Jiang Yang, Program Director of the China Sustainable Transport Center (CSTC) introduced their TOD Index, a weighted performance measurement calculated based upon a TOD measuring framework. The pilot TOD Index ranking of Chinese cities allows corridor by corridor comparisons of quantifiable and perceptive values, which results attract institutional attention to improve current TOD services.

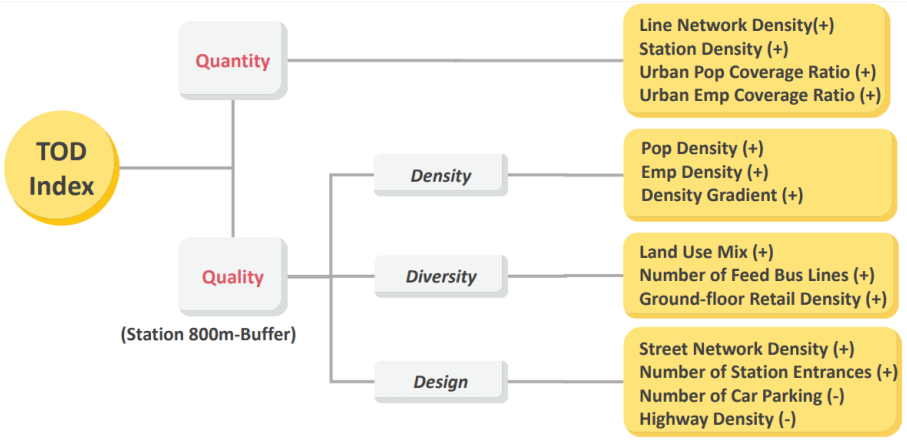

Fig 3. TOD Measuring Framework (Source: CSTC)

Mr. Jiang also presented a spatial error model that measures the relationship between the urban rail TOD Index and air quality. Although no research has yet explicitly linked air quality and TOD patterns with empirical evidence in rapidly urbanizing China, the spatial error model results indicate a significant and negative correlation between the urban rail TOD Index and the season, such as the spring and fall air quality index. By utilizing open source data, Mr. Jiang's research team overcame the data availability challenge, put forward a methodology for street walkability and bikability measurements in China, and created a modeling approach for the assessment of CO_2 in Jinan City.

Measuring TOD's Impact on Emissions: An Approach Adopted by Seven Chinese GPSC Cities for GEF Reporting

Ms. Yan Li, Infrastructure Economist Consultant from the World Bank, presented a GHG reporting approach adopted for seven Chinese cities where TOD projects funded by GEF are being implemented. The model assumes a carbon intensive city with either a TOD or Business as Usual (BAU) situation. Each city has a peak carbon assumption ranging from years 2021 to 2030, with a 0.3% reduction assumption per year. An estimated 62 million tons of CO_2 emissions will be avoided in the period of 2021-30 from implementing TOD in the seven Chinese cities.

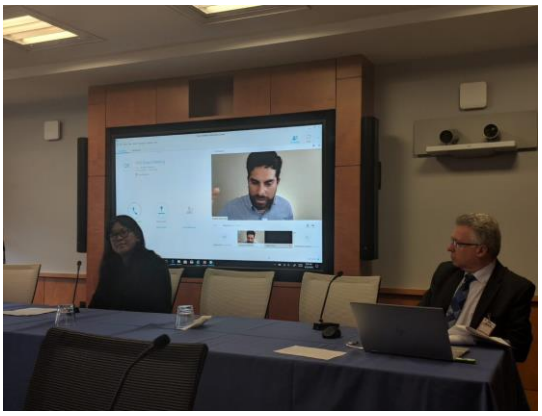

Fig 4 & 5. Prof. Ramaswami, Ms. Erika Lew, and Mr. Ricardo Ochoa Sosa presenting different modeling tools and research findings.

Early Afternoon Session: Urban Growth Scenario Modeling for GHGs

RapidFire/ UrbanFootprint: Scenario Modeling for Chongqing, China, Mexico City, and California

Ms. Erika Lew, Project Manager at Calthorpe Analytics, presented the following tools:

- **RapidFire**
  The development of this Excel-based tool was driven by the idea of making everything transparent and adaptable. Starting with three place types, Urban, Standard, and Compact, RapidFire is both top-down and flexible to different assumptions. A key strength has been the ability to articulate to the wider public induced patterns for human decision making based upon land use.

- **UrbanFootprint**
  As Calthorpe Analytics's flagship product, UrbanFootprint performs a geospatial analysis of a range of metrics, with more capabilities being added. The bottom-up tool has a geospatial model that can analyze spatial options. Similar to RapidFire, the model is built to examine urban growth and GHG emission scenarios based on the role of land use.

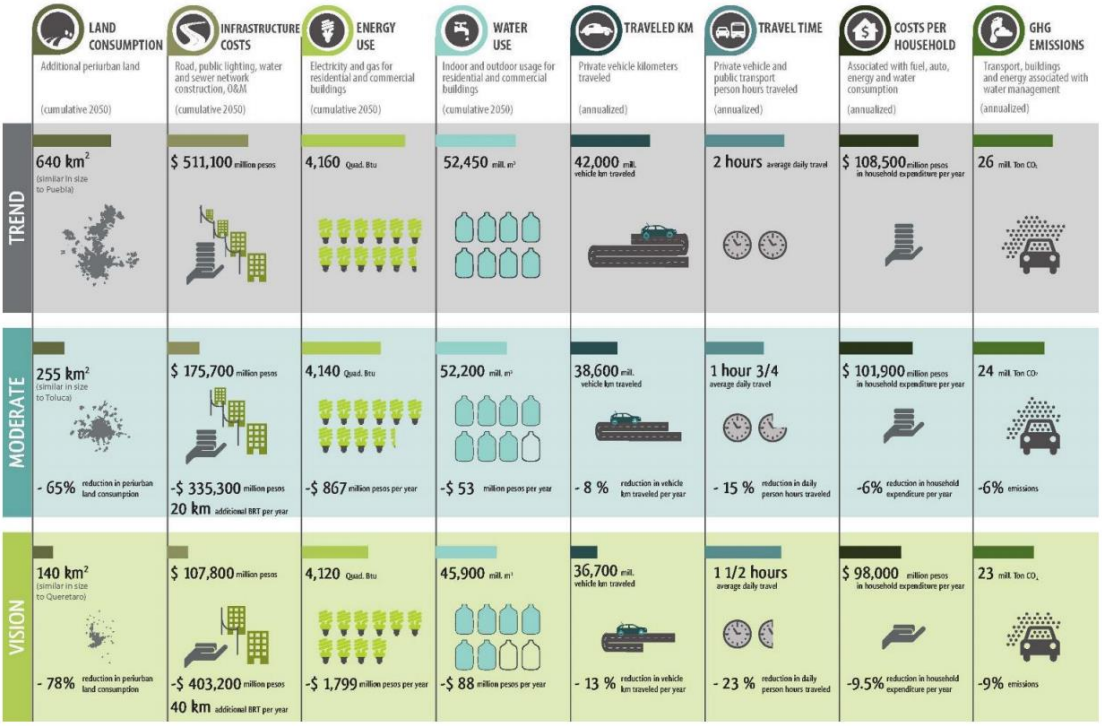

Fig 6. Mexico City RapidFire scenarios matrix (Source: Calthorpe Analytics)

Urban Growth Scenario Modeling for Cities in Jordan

Mr. Ricardo Ochoa Sosa, Director of Urban Studies at CAPSUS, explained that by using RapidFire/ UrbanFootprint as reference models, CAPSUS has created urban growth scenarios for the 5 municipalities in the Hashemite Kingdom of Jordon. The main objective is to compare the environmental, social and economic impacts of different urban growth paths for the cities to guide the identification, preparation and implementation of sustainable urban investment projects. By analyzing four scenario types (vision, compact growth, moderate, and BAU), the team is able to assist the Jordanian government in leveraging the most impactful policy and sectorial levers to achieve low-carbon development goals.

<u>Late Afternoon Session: Other Analytical and Modeling Tools for GHGs</u>

City Performance Tool: Case Studies

Ms. Noorie Rajvanshi, of Siemens Healthineers, explained that by using exclusive data to analyze the effects of more than 70 diverse technologies, the City Performance Tool (CyPT) calculates the impact on CO_2 equivalent emissions and air quality improvements. After data is input, the tool processes it via more than 350 data points and creates emission baselines. It also identifies new local jobs each technology can create in a city. So far, Siemens has worked with more than 35 cities to provide CyPT free of charge.

Climate Action for Urban Sustainability

The World Bank created the program Climate Action for Urban Sustainability (CURB) in coordination with C40, Global Covenant of Mayors, and AECOM. Ms. Silpa Kaza, Urban Development Specialist at the World Bank, explained that the tool is an Excel-based scenario planning tool that helps cities prioritize more than 50 different low carbon actions and investments. By comparing the cumulative impacts of selected interventions in each scenario with their reduction targets, CURB can show the cost and emissions of each type of investment. It differentiates the impacts that result from sovereign (national) interventions with those being driven by local policy or program changes and was designed to be able to be used for a wide range of cities.

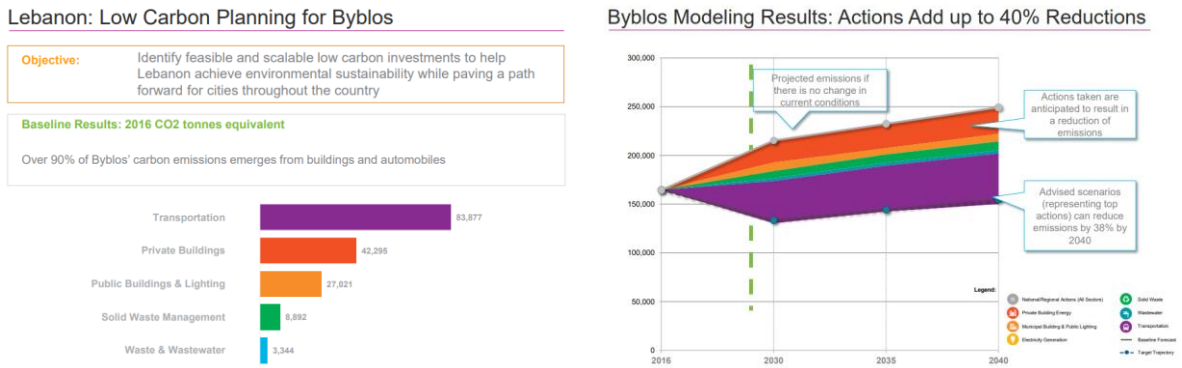

Fig 7. Low Carbon Planning for Lebanon's city of Byblos and its CURB modeling results (Source: World Bank)

Mapping Analytical and Modeling Tools for Nationally Determined Contributions Implementation

For the last presentation of the day, Mr. Suphachol Suphachalasai who is an Environmental Economist at the World Bank, presented the process and dimension criteria for mapping different modeling tools of Nationally Determined Contribution (NDC) cycles. In addition to geographical scale, granularity of policies and measures, sectors and GHG coverage, and so forth, he also emphasized the importance of understanding the theoretical foundations of each model. He explained that NDCs from the Paris agreement generated a lot of dialogue regarding how city-level discussions can contribute to the national level conversations. Further to this, GHG reductions which are a big co-benefit of integrated urban planning and sectorial inputs, such as transport and buildings, could be strengthened through a city's planning.

Wrap Up of Day 1

Ms. Xueman Wang summarized the key conclusions that were heard throughout Day 1's discussions. Firstly, further guidance should be provided to cities to help them improve understanding of their own context and policies. And secondly, that more attention should be paid to understanding the gaps which exist in the current set of tools in linking between the key development drivers of land use and urban form.

Day 2 | 24 April

III. Accounting and Reporting City GHG Inventories

Morning Session: Assessing the Impact of Technology, Data, and Policy Packages on GHGs

The second day started with three presentations moderated by Prof. Ramaswami on approaches to assess the impact of technology, data, and policy packages on GHGs.

carbon*n* Climate Registry and ClearPath Integration for GHG Inventories Reporting and Development/ City Climate Planner Accreditation Program

Mr. Cesar Carreño Chasin, Senior Project Officer from ICLEI, introduced the Carbon*n* Climate Registry (cCR) and ClearPath. Both are GHG reporting platforms for cities, towns and regions to track their GHG reduction targets, actions and performance. As a global response to create a framework for GHG reporting, cCR has reached more than 1,000 cities, provinces and regions. Its GHG reporting tab is an Excel-based tool that can be generated once a city creates its profile. The cCR includes two GHG inventories reporting tabs, one based on the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) basic requirements for community scale inventories, and the other based on a simplified corporate inventory for local government activities. Importantly, the tool includes an aligned inventory tab not for developing a carbon strategy, but for reporting.

ClearPath is an ICLEI USA web-based tool created for energy and emissions management. The purpose is to develop protocol-compliant emissions inventories, modeling, and so forth. 383 jurisdictions within the United States have created 953 community scale inventories, along with 28 cities outside of the US having created 48 inventories. ClearPath is directly linked to cCR with a one-click submission to the cCR database.

Mr. Chasin concluded by giving an overview of the City Climate Planner accreditation program.

Guiding Principles for City Climate Action Planning

"The question of the guiding principles is how to integrate climate planning into overall master planning", stated Mr. Robert Kehew, the Leader of UN-Habitat's Climate Change Planning Unit. UN-Habitat started to develop the guiding principles in December 2014 at Lima's COP-20 where program partners raised the need of integrating climate change concepts into planning processes. Since 2015, UN-Habitat has conducted a series of consultations, established a drafting committee, done an iterative set of reviews, received organization and city partner indorsements, and collected forewords. Their guiding principles were launched at COP-21. From 2016 the team developed a set of 18 indicators based upon the 8 principles (ambitious, inclusive, fair, comprehensive and integrated, relevant, actionable, evidence-based, and transparent and verifiable), and a toolkit was created to equip partners to apply the guiding principles in cities.

Fig 8. Ms. Xiaomei Tan, Senior Climate Change Specialist from GEF giving a presentation

Climate Technology Center and Network (CTCN): Building Capacity for Cities to Lower GHG Emissions

The Climate Technology Center and Network (CTCN) is a network of 400-member experts and clients in 75 countries, sitting within the COP climate convention. It aims for building capacity for cities to lower GHG emissions, specifically through providing technical assistance (TA) up to USD250,000 per location for both climate change adaptation and mitigation.

Mr. Federico Villatico Campbells, Senior Manager of CTCN Secretariat, explained a further three recent TAs: determining for Panama the most energy-efficient transport system; for Jakarta informing building disaster resilience; and for Senegal assisting the planning of eco-industrial zones. The 200 TAs that CTCN has provided in the past have a wide range of focuses, from disaster management, to solid waste management and urban planning.

During the morning's presentations, discussions focused on how to integrate climate change into the scenario models presented in Day 1. Determining the technologies at the beginning of the action planning process could be a critical starting point, with assistance from agencies like CTCN. Supervision and integration, along with citizen engagement, are equally important. There was interest from participants in exploring the impact of black carbon and the relationship between air quality and climate change models, which was mentioned to currently lack evidence.

Panel Discussion: GHG Accounting and Reporting for Cities and Development Projects

Three experts participated in the concluding panel discussion moderated by Nigel Jollands regarding GHG accounting and reporting for cities and development projects.

GEF GHG Accounting Standard and Approach to Urban Development

Ms. Xiaomei Tan highlighted that GEF provides all of its GHG accounting methodologies online and has set an ambitious goal of having 1,723 million tons of GHGs mitigated through GEF-7's projects. These target contributions will create direct global environmental benefits which are double the 750 million tons mitigated during GEF-6. Importantly for the GPSC, one-third of these emissions were contributed by the Sustainable Cities Integrated Approach Pilot.

World Bank GHG Accounting Guidance

For the World Bank, "Climate Change Action Plan 2016-2020" serves as an overarching guidance document for climate change action and enforces GHG accounting for investment projects in sectors such as energy, environment, agriculture, transport, and water and waste management. Ms. Anne Schopp highlighted that the goal is to increase bank funding that is tied to climate benefits from 21% to 28% by 2020. Emission reductions and increases are calculated relative to a baseline, along with a low and a high shadow price of carbon, which is recommended for projects' economic analysis.

Global Protocol for Community-Scale Greenhouse Gas Emission Inventories

Mr. Wee Kean Fong, Senior Associate from World Resources Institute (WRI), presented about GPC. GPC offers two reporting frameworks based on inventory boundaries. The Scope Framework comprehensively reports all GHG emissions from in-boundary sources (scope 1), uses grid-supplied energy (scope 2), and gathers out-of-boundary sources as a result of activities in the city (scope 3). City-induced Framework reports only GHG emissions that attributable to activities in the city. The two frameworks have complementary coverage. This was reinforced by Prof. Ramaswami's demonstration during the meeting of the analogy of two overlapping plates.

Tools for Measuring the Impact of Integrated Urban Sustainable Planning on GHG Emissions

Feedback on the Draft Technical Note, Next Steps and Wrap Up

Day 2 ended with a consultation discussion moderated by Ms. Xueman Wang on the GPSC Technical Note "A Review of Tools to Assess Integrated Urban GHG Mitigation Strategies Incorporating Land Use, Technology, and Behavioral Change." Ms. Qiyang Xu, GPSC Coordinator, highlighted that feedback from the audience will be incorporated and an updated version of the paper is planned to be made available by the end of June 2018.

Fig 9. Meeting in progress

Meeting Agenda

Day 1 – April 23

8:30 – 9:00	***Registration and Continental Breakfast outside Meeting Room***
I.	**Opening of the Expert Meeting**
9:00 – 9:15	**Welcome** - *Ms. Xueman Wang, GPSC Program Coordinator and Senior Urban Specialist, World Bank* **Opening Remarks** - *Mr. Sameh Wahba, Director, Social, Urban, Rural and Resilience Global Practice, World Bank* **Introduction of Meeting Participants (tour de table)**
II.	**Overview: Assessing the Impact of Urban Policies, Growth, and Integrated Planning Strategies for GHG Emission Reductions**
9:15 – 10:45	**Overview of the Existing Tools** - *Ms. Anu Ramaswami, Professor and Charles M. Denny, Jr., Chair of Science, Technology, and Environmental Policy at the Humphrey School of Public Affairs, University of Minnesota; Director, Sustainable Healthy Cities Network* **Discussion**
10:45 – 11:15	***Coffee Break***

III. Tools for Assessing Integrated Urban Planning's Effect on GHGs *Relevant tools and case studies presented. Participants invited to comment on the pros and cons, and the suitability of the sustainability tools for GPSC purposes.*	
11:15 – 12:30	**Measuring the Effect of Integrated Urban Strategies on GHG Emissions** *Moderator: Mr. Shagun Mehrotra, Senior Urban Specialist, World Bank* 1. **CityDNA: Measuring Urban Form/ Street Space and the Effect on Emissions in China** - *Mr. Jiang Yang, Program Director, China Sustainable Transport Center* 2. **Measuring TOD's Impact on Emissions: An Approach Adopted by Seven Chinese GPSC Cities for Global Environment Facility (GEF) Reporting** - *Ms. Yan Li, Infrastructure Economist Consultant, World Bank* 3. **Discussion**
12:30 – 13:30	***Lunch***
13:30 – 15:15	**Urban Growth Scenario Modeling for GHGs** *Moderator: Mr. Marlon Boarnet, Department of Urban Planning and Spatial Analysis, Sol Price School of Public Policy, University of Southern California* *Discussant: Ms. Yuan Xiao, Urban Development Specialist, World Bank* 1. **RapidFire/ UrbanFootprint: Scenario Modeling for Chongqing, China, Mexico City, and California (Calthorpe Analytics)** - *Ms. Erika Lew, Project Manager, Calthorpe Analytics* 2. **Urban Growth Scenario Modeling for Cities in Jordan** - *Mr. Ricardo Ochoa Sosa, Director of Urban Studies, CAPSUS (via WebEx)* 3. **Discussion**
15:15 – 15:30	***Coffee Break***
15:30 – 17:30	**Other Analytical and Modeling Tools for GHGs** *Moderator: Mr. Marlon Boarnet, Department of Urban Planning and Spatial Analysis, Sol Price School of Public Policy, University of Southern California* 1. **City Performance Tool (CyPT): Case Studies** - *Ms. Noorie Rajvanshi, Cities Center of Competence, Urban Development, Siemens Healthineers* 2. **Climate Action for Urban Sustainability (CURB)** - *Ms. Silpa Kaza, Urban Development Specialist, World Bank (via WebEx)* 3. **Mapping Analytical and Modeling Tools for Nationally Determined Contributions (NDC) Implementation** - *Mr. Suphachol Suphachalasai, Environmental Economist, World Bank* 4. **Discussion**
17:30	**Wrap Up of Day 1**

Day 2 – April 24

8:30 – 9:00	***Continental Breakfast outside Meeting Room***
IV. Accounting and Reporting City GHG Inventories *Experts sharde the information on approaches and standards used for accounting, reporting, and tracking GHG inventories at the city level and for development projects, with a focus on elaborating how they work and the benefits that cities can derive through this process to achieve their GHG emissions reduction targets.*	
9:00 – 11:00	**Assessing the Impact of Technology, Data, and Policy Packages on GHGs** *Moderator: Ms. Anu Ramaswami, Professor and Charles M. Denny, Jr., Chair of Science, Technology, and Environmental Policy at the Humphrey School of Public Affairs, University of Minnesota; Director, Sustainable Healthy Cities Network* **1. carbon*n* Climate Registry and ClearPath Integration for GHG Inventories Reporting and Development/ City Climate Planner Accreditation Program** - *Mr. Cesar Carreño Chasin, Senior Project Officer, Low Carbon Cities, ICLEI* **2. Guiding Principles for City Climate Action Planning** - *Mr. Robert Kehew, Leader, Climate Change Planning Unit, Urban Planning and Design Branch, UN-HABITAT* **3. Climate Technology Center and Network (CTCN): Building Capacity for Cities to Lower GHG Emissions** - *Mr. Federico Villatico Campbells, Senior Manager, CTCN Secretariat* **4. Discussion**
11:00 – 11:15	***Coffee Break***
11:15 – 12:30	**Panel Discussion: GHG Accounting and Reporting for Cities and Development Projects** *Moderator: Mr. Nigel Jollands, Associate Director, Policy and Climate Finance, European Bank for Reconstruction and Development (EBRD)* *Discussant: Ms. Anu Ramaswami, Professor and Charles M. Denny, Jr., Chair of Science, Technology, and Environmental Policy at the Humphrey School of Public Affairs, University of Minnesota; Director, Sustainable Healthy Cities Network* **1. GEF GHG Accounting Standard and Approach to Urban Development** - *Ms. Xiaomei Tan, Senior Climate Change Specialist, GEF* **2. World Bank GHG Accounting Guidance** - *Ms. Anne Schopp, Environmental Economist, World Bank* **3. Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC)** - *Mr. Wee Kean Fong, Senior Associate, World Resources Institute*
12:30 – 13:30	***Lunch***

V. GPSC Technical Note Review and Consultation *A draft GPSC technical note "A Review of Tools to Assess Integrated Urban GHG Mitigation Strategies Incorporating Land Use, Technology, and Behavioral Change", was shared with participants prior to the session for review and discussion. Feedback and comments provided in this session are meant to further enhance the contents and improve the uptake of the research.*	
13:30 – 15:30	**Discussion: Tools for Measuring the Impact of Integrated Urban Sustainable Planning on GHG Emissions** *Moderator: Ms. Xueman Wang, GPSC Program Coordinator and Senior Urban Specialist, World Bank* **Feedback on the Draft Technical Note**
15:30 – 15:45	***Coffee Break***
15:45 – 16:15	**Next Steps and Wrap Up** - *Ms. Qiyang Xu, GPSC Coordinator*
16:15	**End of the Expert Meeting**

Attendees

World Bank and GEF

Name	Title	Unit
Sameh Wahba	Director	Social, Urban, Rural & Resilience Global Practice (GSURR)
Xueman Wang	Senior Urban Specialist and Program Coordinator	GPSC
Mohamed Bakarr	Lead Environmental Specialist	GEF
Xiaomei Tan	Senior Climate Change Specialist	GEF
Shagun Mehrotra	Senior Urban Specialist	GSURR
Johannes Heister	Senior Environmental Specialist	Fund Management Unit
Harikumar Gadde	Senior Carbon Finance Specialist	Carbon Markets & Innovation
Alexandrina Platonova-Oquab	Senior Carbon Finance Specialist	Research and Advisory Unit
Monali Ranade	Senior Energy Specialist	Energy & Extractives Global Practice
Silpa Kaza	Urban Development Specialist	GSURR
Anne Schopp	Environmental Economist	Climate Change
Suphachol Suphachalasai	Environmental Economist	Research and Advisory Unit
Yuan Xiao	Urban Development Specialist	GSURR
Alexandra Le Courtois	Urban Development Specialist	GSURR
Yan Li	Infrastructure Economist Consultant	GSURR
Sara Mills-Knapp	Consultant	Energy & Extractives Global Practice
Stefania D'Annabali	Consultant	GSURR
Lincoln Lewis	GPSC Coordinator	GPSC
Qiyang Xu	GPSC Coordinator	GPSC

Agencies and Institutions

Name	Title	Unit
Jessica Seddon	Director of Integrated Urban Strategy	WRI Ross Center for Sustainable Cities
Mariana Orloff	Associate and GPSC Resource Team Coordinator	WRI Ross Center for Sustainable Cities
Terra Virsilas	Urban Development Associate	WRI Ross Center for Sustainable Cities
Wee Kean Fong	Senior Associate	WRI China
Nomsa Zondi	Policy Advisor for Green Fund and SC-IAP Coordinator	Development Bank of South Africa
Lin O'Grady	Deputy Director, Municipal and Environmental Infrastructure	EBRD
Nigel Jollands	Associate Director, Policy and Climate Finance	EBRD
Peter Hirsch	Analyst, Policy Products, Energy Efficiency and Climate	EBRD

Cesar Carreño Chasin	Senior Project Officer, Low Carbon Cities	ICLEI
Ludmilla Diniz	Regional Technical Advisor for Climate Change Mitigation and Energy	UNDP
Robert Kehew	Leader, Climate Change Planning Unit Urban Planning and Design Branch	UN-Habitat
Mark Draeck	Industrial Development Officer, Department of Energy	United Nations Industrial Development Organization (UNIDO)
Katarina Barunica	Program Manager, Department of Energy	UNIDO
Sunday Leonard	Program Officer	United Nations Environment Program, and GEF Scientific and Technical Advisory Panel

City/ Sub-National Users

Name	**Title**	**City and Country**
João Domingos Azevedo	President, Instituto da Cidade Pelópidas Silveira (ICPS)	Recife, Brazil
Adou Amani Charles Olive Elvis	Deputy Director, Environmental Actions	Abidjan, Cote d'Ivoire
Manish Chaube	Project Manager, Smart City Limited	Bhopal Municipal Corporation, India
Janardhanan Nivas	Commissioner	Vijayawada Municipal Corporation, India

Domain Experts

Name	**Title**	**Affiliation**
Marlon Boarnet	Professor and Chair, Department of Urban Planning and Spatial Analysis	School of Public Policy, University of Southern California
Erika Lew	Project Manager	Calthorpe Analytics
Noorie Rajvanshi	Cities Center of Competence, Urban Development	Siemens Healthineers
Jiang Yang	Program Director	China Sustainable Transport Center
Anu Ramaswami	Professor	Sustainable Healthy Cities Network; Humphrey School of Public Affairs, University of Minnesota
Sam Tabory	Research Manager	Sustainable Healthy Cities Network; Humphrey School of Public Affairs, University of Minnesota
Andrew Fang	Researcher	Sustainable Healthy Cities Network; Humphrey School of Public Affairs, University of Minnesota
Federico Villatico Campbells	Senior Manager	CTCN Secretariat
Ricardo Ochoa Sosa	Partner and Director	CAPSUS (Sustainable Capital, Mexico)