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Pathways to Urban Sustainability: Challenges and Opportunities

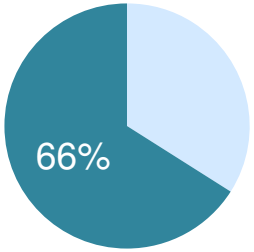
Third Committee Meeting
National Research Council's Committee on Pathways to Urban Sustainability
Chattanooga, Tennessee
July 28, 2015

Stephen A. Hammer, PhD
Manager, Climate Policy
World Bank Group

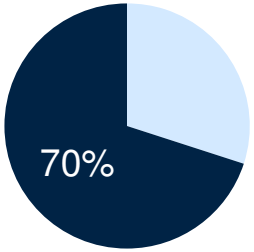
The Drive for Low Carbon, Climate Resilient Cities

Climate change and rapid urbanization are the dual challenges of the 21st century.

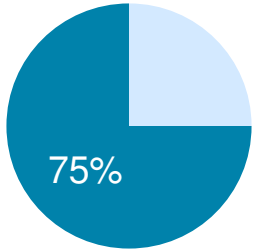
Urban share of global:



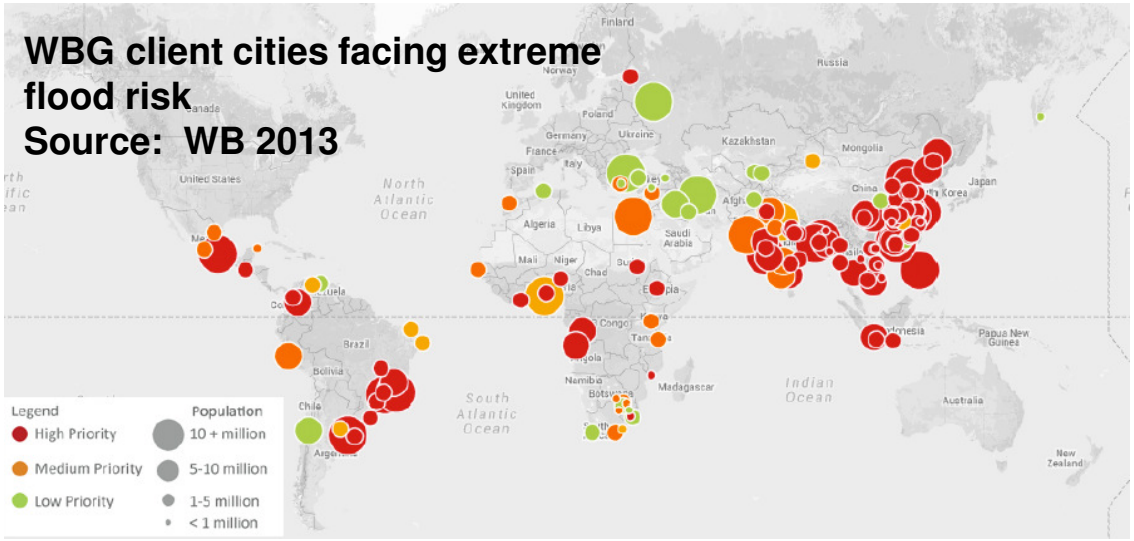
energy consumption



carbon emissions



population in 2050



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A Changing Policy Landscape Increasingly Focused on Cities

New Climate Economy report

Emerging Cities will play a significant role in growth of the global economy and carbon emissions to 2030

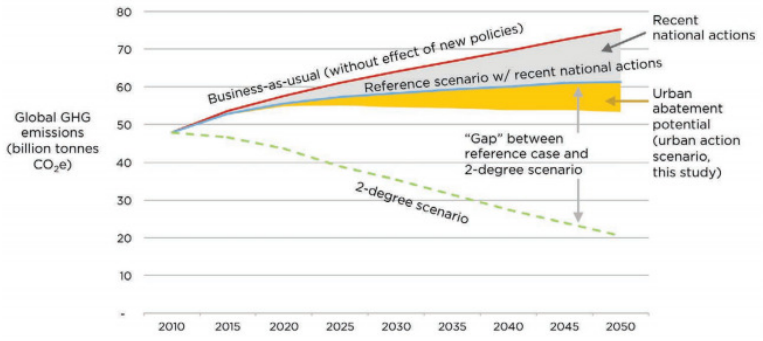
URBAN GROUP	PROJECTED BASE GDP GROWTH FROM 2012-2030, USD TRILLIONS	PROJECTED BASE CASE EMISSIONS GROWTH[1] FROM 2012-2030, MEGATONNES OF CO_2	PROJECTED POPULATION IN 2030, BNS	PER CAPITA IN 2030, TONNES OF CO_2 PER PERSON
Emerging Cities e.g. Bangalore, Kunming, Pune, Puebla	16	3230	~1.3	~7
Small Urban Areas Inc. villages, small towns, peripheral industrial areas pop. < 0.5 million	16	1220	~2.2	~4.6
Established Cities e.g. Stuttgart, Minneapolis, Stockholm, Hiroshima	11	390	~0.4	~12.1
Global Megacities e.g. Beijing, New York, London, Rio de Janeiro	10	1050	~0.6	~7.1
Total growth	~ 52	~ 5,890	**Total population in 2030** ~ 4.5	
Share of world growth	~ 87%	~ 65%	**Share of world pop. in 2030** ~ 55%	

Note: Energy assumptions are consistent with the IEA's Current Policies scenario. GDP figures are based on 2012 prices and exchange rates. Small urban areas are a highly diverse segment covering cities in both developed and developing countries. Estimates for this segment, especially for per capita emissions, are subject to significant levels of uncertainty and should be treated as indicative.

Source: Analysis by LSE Cities and Oxford Economics; data from the Oxford Economics Global 750 Cities database. Small Urban Areas

Bloomberg Philanthropy study

Figure 1. Urban action could help deepen the aggregate, global ambition of current national pledges[1]



[1] Chart sources (other than this study): BAU and "reference scenario" differ only in their assessment of energy-related CO_2 emissions: BAU uses IEA's 6DS scenario, reference uses 4DS*; for other gases, both scenarios use the average of BAU scenarios in the IPCC AR5 scenario database, 2-degree pathway from Rogelj et al.

NYC Climate Summit (2014)

- Compact of Mayors
- City Climate Finance Leadership Alliance
- Urban Resilience Accelerator
- Energy Efficiency Accelerator
- Transportation Accelerator

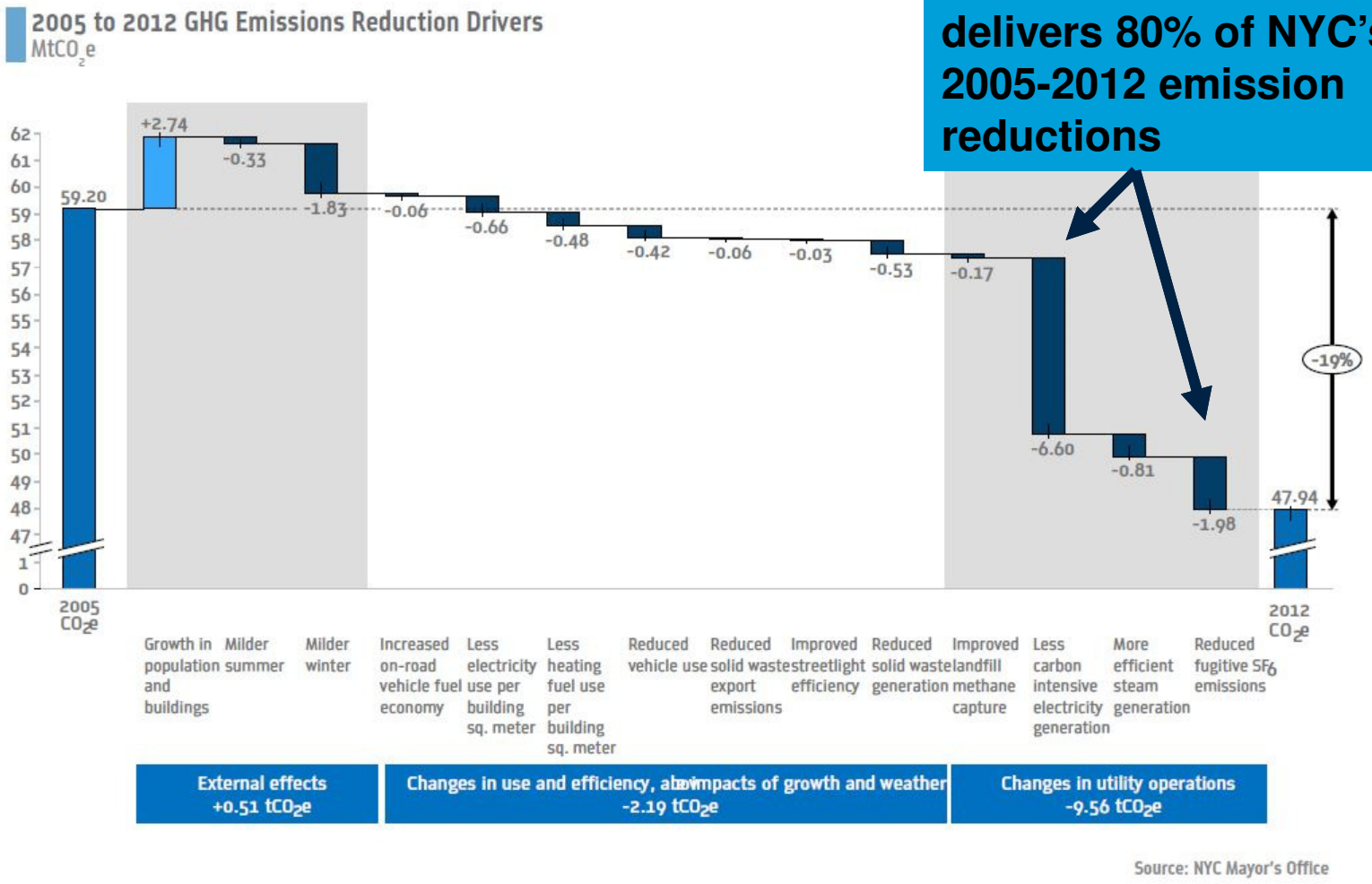
Lima-Paris Action Agenda COP21 (2015)

Impediments to Local Action

- Hard to sell “climate” action…easier to sell quality of life, cost savings, improved business climate
- Limited local capacity to act
  - Policy control powers
  - Key infrastructure system ownership outside of city control
- Sovereign policies limiting city financial wherewithal
  - Limited ability to directly apply for climate funds or issue municipal bonds
  - Cash transfer practices/policies
- Limited local knowledge/capacity
- High development and transaction costs given scale of projects in many cities

Who has greatest capacity to influence circumstances on the ground?

Fed/State/Market action delivers 80% of NYC's 2005-2012 emission reductions



Source: NYC Mayor's Office

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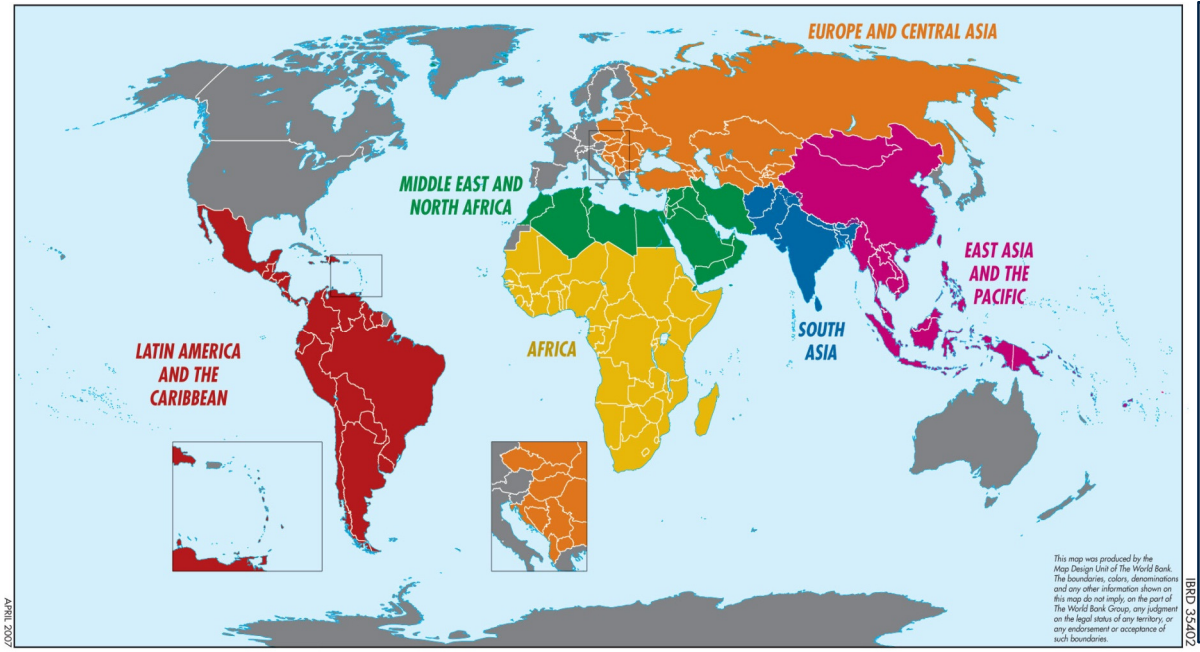
World Bank Group engagement on urban sustainability and climate

World Bank operations



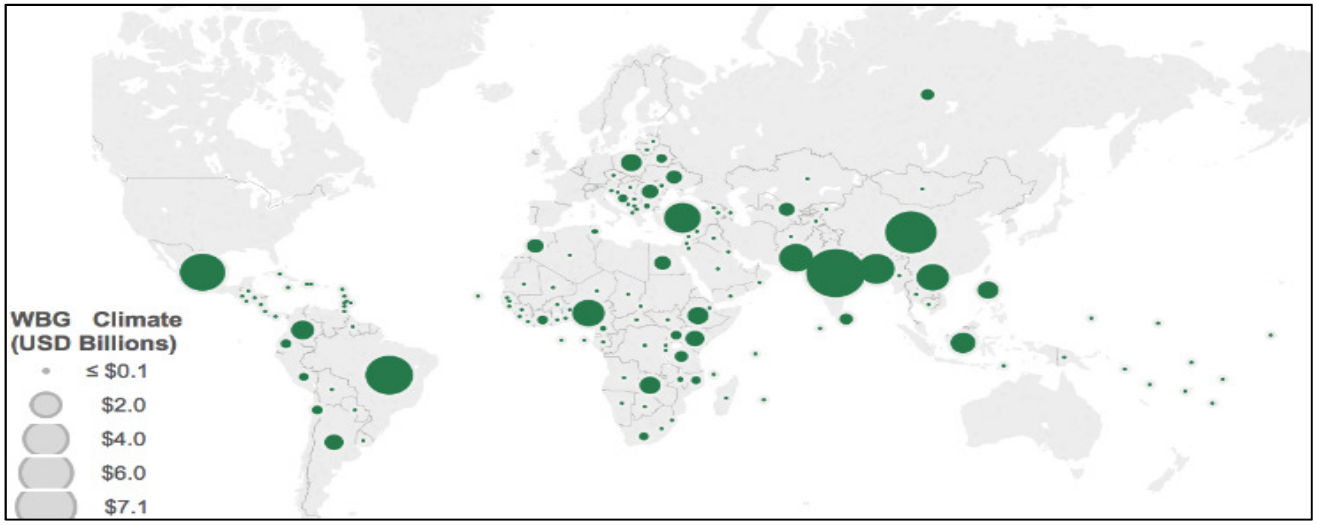
Twin goals:

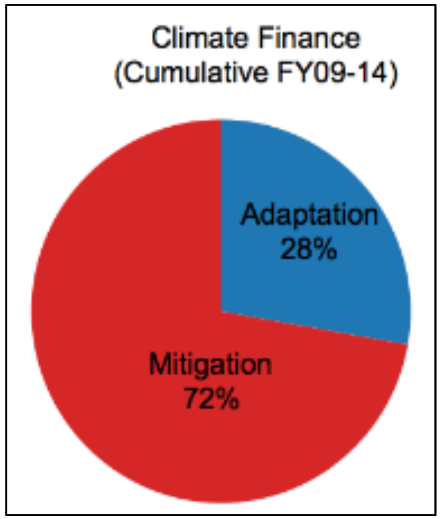
- eliminate extreme poverty by 2030
- boost shared prosperity

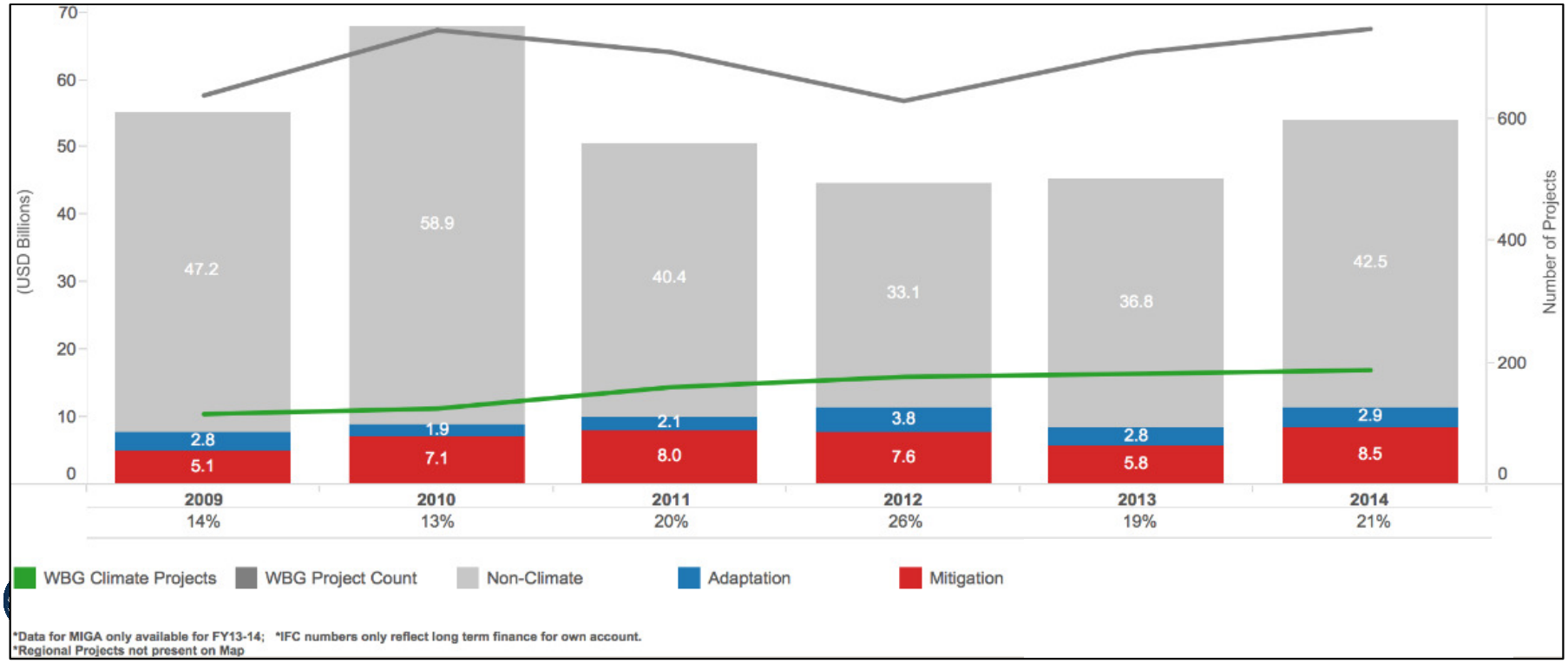
"A solutions Bank":

- Project financing of infrastructure and services
- Technical assistance/advisory services
- Knowledge creation and dissemination

Climate Finance at WBG (USD Billions, FY09-14)*







*Data for MIGA only available for FY13-14; *IFC numbers only reflect long term finance for own account.
*Regional Projects not present on Map

WBG corporate initiatives to boost climate investment levels

- Mandatory GHG emission screening for all projects (urban sector delayed, due in FY16)
- Resilience screening on IFC and IDA projects
- Mandatory climate change conversation during preparation of new multi-year country partnership framework agreements

World Bank Group Urban Climate & Sustainability Initiatives

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WBG urban initiatives we *could* talk about

IFC "cities" program

- EDGE tool (energy efficient buildings)

IFC + Treasury expanding focus on green bonds

- Potential for a city-focused green bonds school?

ESMAP City Energy Efficiency Transformation Initiative

- $9 million for EE investments and capacity building in cities (Brazil, Pakistan, Macedonia, Ukraine, China, South Africa)

Region/Country-specific programs

- Rio Low Carbon City Program
- Turkey Sustainable Cities Programs

GEF IAP Sustainable Cities program

- $145 million for 28 cities in 11 countries
- Global technical assistance platform

Supporting local action through improved analytics and human resource capacity

Improved Scenario Planning

CURB Tool
Climate Action for Urban Sustainability

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C40 CITIES

City Basic Data

City Characteristics	Value	Units
City Name	Pilot City	N/A
Country	Mexico	N/A
City Region	Central America	N/A
Proxy City (Select your city if available)	Culiacan	N/A
Climate Type	Wet	N/A
Baseline Year	2015	N/A
Horizon Year 1	2020	N/A
Horizon Year 2	2030	N/A
Horizon Year 3	2040	N/A
Population of Pilot City in 2015	1,009,035	Number of people
Number Jobs in Pilot City in 2015	635,692	Number of jobs

The user inputs or imports data to build a baseline picture of city energy demand and GHG emissions

Growth Rate

Select One:

- (•) Option 1: Use National Population Growth Rate for Urban Areas of Mexico (Source: UN 2010)
- ( ) Option 2: Enter City-Specific Growth Rate Data

See Proxy Values

Community Greenhouse Gas Emissions Inventory Data

Select One:

- ( ) Option 1: Use Tool-Generated Greenhouse Emissions Estimates
- (•) Option 2: Enter GPC-Compliant Emissions Inventory Data

Enter Community Emissions Inventory Data

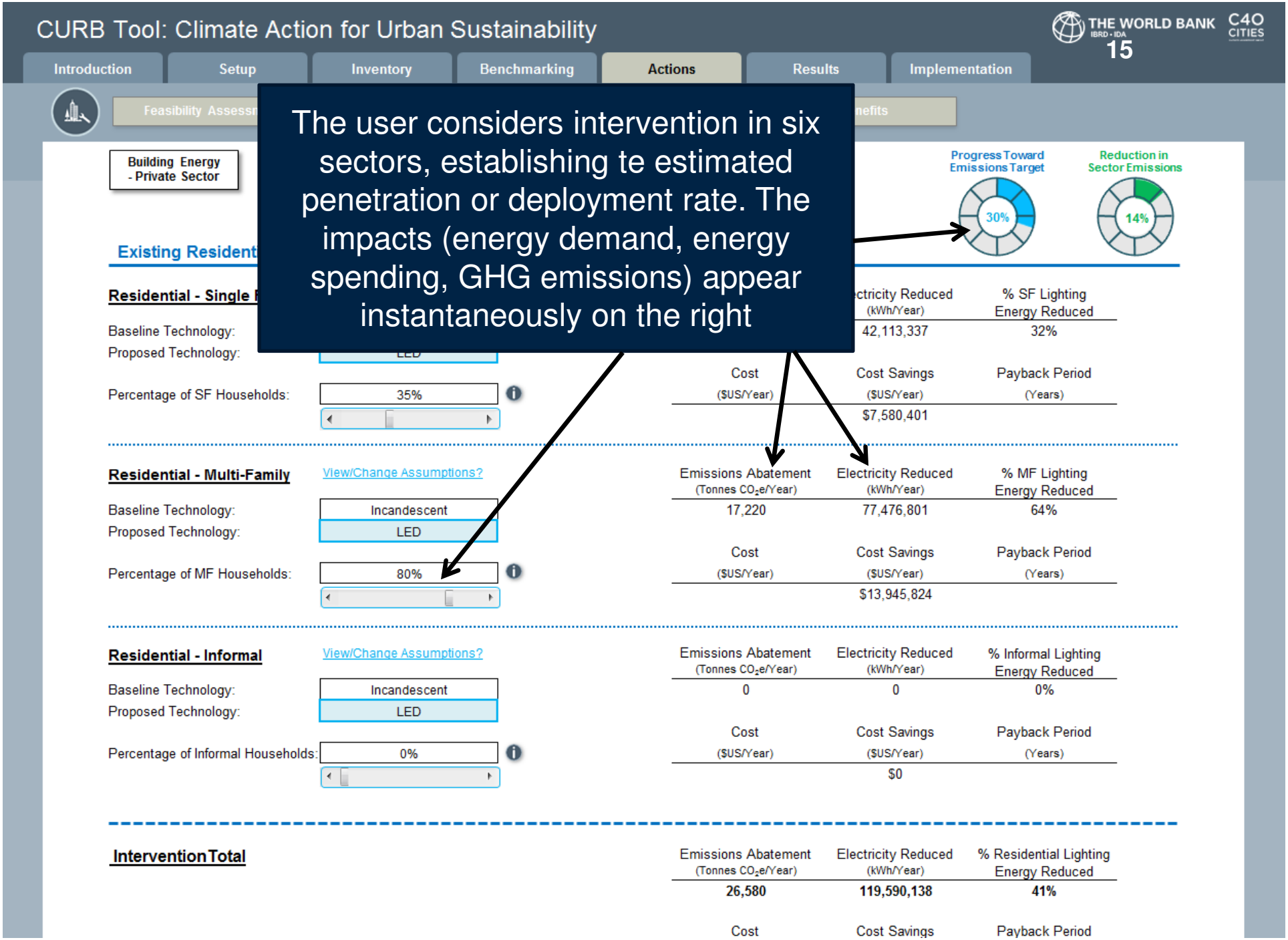
Link to Inventory Input Page

Private Sector Building Inventory Data

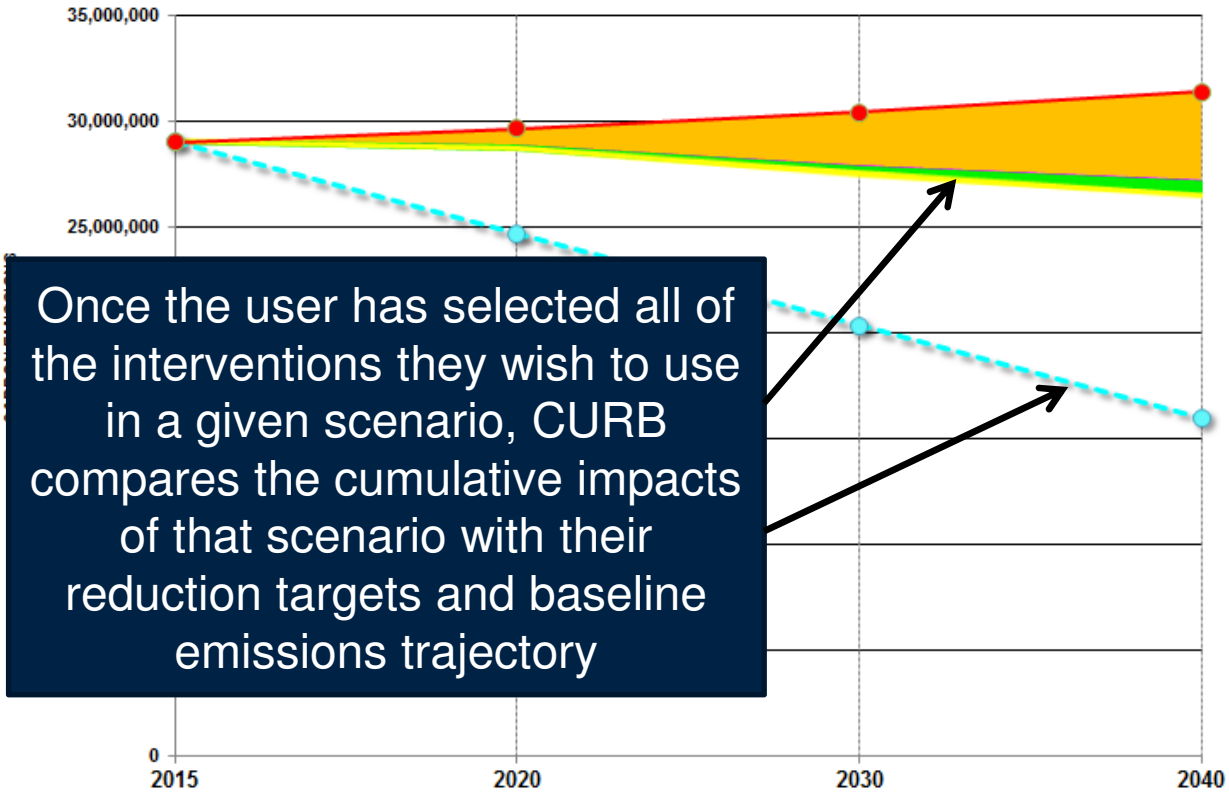
Select One:

- ( ) Option 1: Use Tool-Generated Building Inventory Estimates
- (•) Option 2: Enter City-Specific Building Inventory Data

If data is not available, the user can rely on build-in proxy data for their city/country.


CURB Tool: Climate Action for Urban Sustainability
THE WORLD BANK IBRD • IDA
C40 CITIES
15
Introduction
Setup
Inventory
Benchmarking
Actions
Results
Implementation
Feasibility Assessm
nefits
Building Energy - Private Sector
Progress Toward Emissions Target
30%
Reduction in Sector Emissions
14%
The user considers intervention in six sectors, establishing te estimated penetration or deployment rate. The impacts (energy demand, energy spending, GHG emissions) appear instantaneously on the right
Existing Resident
Residential - Single
Baseline Technology:
Proposed Technology:
LED
Percentage of SF Households:
35%
ctricity Reduced (kWh/Year)
% SF Lighting Energy Reduced
42,113,337
32%
Cost ($US/Year)
Cost Savings ($US/Year)
Payback Period (Years)
$7,580,401
Residential - Multi-Family
View/Change Assumptions?
Baseline Technology:
Incandescent
Proposed Technology:
LED
Percentage of MF Households:
80%
Emissions Abatement (Tonnes CO2e/Year)
Electricity Reduced (kWh/Year)
% MF Lighting Energy Reduced
17,220
77,476,801
64%
Cost ($US/Year)
Cost Savings ($US/Year)
Payback Period (Years)
$13,945,824
Residential - Informal
View/Change Assumptions?
Baseline Technology:
Incandescent
Proposed Technology:
LED
Percentage of Informal Households:
0%
Emissions Abatement (Tonnes CO2e/Year)
Electricity Reduced (kWh/Year)
% Informal Lighting Energy Reduced
0
0
0%
Cost ($US/Year)
Cost Savings ($US/Year)
Payback Period (Years)
$0
Intervention Total
Emissions Abatement (Tonnes CO2e/Year)
Electricity Reduced (kWh/Year)
% Residential Lighting Energy Reduced
26,580
119,590,138
41%
Cost
Cost Savings
Payback Period

Overall Carbon Abatement



Once the user has selected all of the interventions they wish to use in a given scenario, CURB compares the cumulative impacts of that scenario with their reduction targets and baseline emissions trajectory

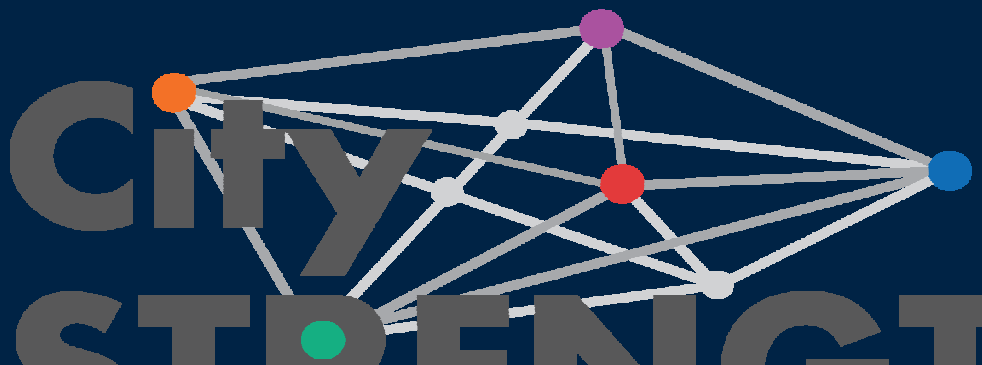
Tonnes CO_2e/Year	Emissions Metric
2015 Baseline Emissions Level	
29,011,337	Baseline
2020 Emissions Levels	
29,681,351	Reference Case Forecast
15%	Abatement Target (%)
24,659,637	Target Level
28,720,124	Achieved w/ Interventions
4,060,488	Achievement Gap
2030 Emissions Levels	
30,411,970	Reference Case Forecast
30%	Abatement Target (%)
20,307,936	Target Level
27,528,291	Achieved w/ Interventions
7,220,355	Achievement Gap
2040 Emissions Levels	
30,411,970	Reference Case Forecast
30%	Abatement Target (%)
20,307,936	Target Level
27,528,291	Achieved w/ Interventions
7,220,355	Achievement Gap

Legend:

- National Actions
- Building Energy - Private
- Building & Facility Energy -
- Solid Waste
- Wastewater
- Transportation

Set 2020 Target 15%

Set 2030 Target 30%



City STRENGTH

RESILIENT CITIES PROGRAM

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Stages of the CityStrength Diagnostic

CONTEXT

Client City Relationship

Diagnostic could be used with existing Bank clients or as a means of engaging with a new client – this will impact its focus.

CityStrength Diagnostic

Stage 1

Pre-diagnostic Data Collection

Review and synthesize what has already been studied in the city. Compile data and prepare base maps.

Stage 2

Launch Workshop

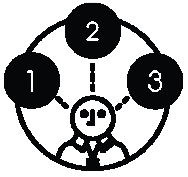
Get stakeholders together, explain the process, share and confirm findings of the data collection stage, and define/ confirm shocks and stresses.

Stage 3

Interviews & Field Visits

Talk to local experts, officials, community members, and conduct site visits.

Stage 4



Prioritization

Working session to share sectoral findings and agree on priorities and follow-on actions to recommend.

Stage 5

Debriefing & Discussion

Meeting with local leaders to summarize findings of the Diagnostic and agree on priorities and next steps.

NEXT

Engagement plan

Studies and surveys to fill data gaps

Feasibility studies for critical infrastructure or programs

Scope for technical assistance

Project concept preparation

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Sectoral Modules

DRM & Climate Change

Energy

Environment

Public Health

ICT

Logistics and Supply Chains

Solid Waste

Municipal Finance

Local Economy

Water & Sanitation

Urban Development

Community & Social Protection

Transportation

Education

Sample Guiding Questions -- Energy

Topic	Guiding Question	Relevance to Resilience
Institutional Capacity	Who manages the city's energy planning? What is the city's degree of influence/ control over power utilities?	Coordination: Close coordination among utilities and between utilities and the city can improve planning and accelerate response in case of disruption.
Finance	Is contingency financing available for energy supply infrastructure and service delivery?	Redundancy: A contingency fund covers unexpected disruptions in the energy sector, accommodates sudden demand increase and/or changes in energy prices.
Generation	Is the city's energy supply diversified in terms of type (e.g., coal, solar, hydro) and source (private, public, imported)? How are different system types distributed across the city?	An energy sector with diverse technology and source can better face disruptions in energy supply. Reliable and distributed energy supply has a better chance of providing sustained, uninterrupted electricity.

Energy

A resilient energy system offers a secure supply of power that ensures the continuity of services in the event of disruptions. It has spare capacity to provide power to the city under any circumstances, especially to ensure continuity to the functioning of critical infrastructure like hospitals and government buildings. The planning for and design of energy infrastructure is informed by an integrated risk assessment taking major shocks and stresses into consideration. A resilient energy system provides access to electricity to all societal groups. Management of the energy system, including decisions regarding distribution and pricing, is inclusive of local departments and stakeholders.

“City Climate Planner” professional certification program

- Focused on building the human resource base in cities through professional development
- Multiple certifications
  - First priority = GHG emission inventory specialist
- Development and delivery with multiple international partners

CITY CLIMATE PLANNING CAPACITY DEVELOPMENT INITIATIVE

Certification Exam	Certification Exam	Certification Exam
City GHG Emissions Inventory Specialist	City Climate Action Plan Specialist	Climate Risk & Vulnerability Assessment Specialist

Miscellaneous Observations

- Massive progress in past 25 years in terms of city action and engagement
- Still room for improvement to better link the development solutions being pursued in cities with sustainability and climate realities
- Data to support evidence-based planning is a huge problem in cities
- Lingering questions about who is best positioned to deliver the fundamental system changes needed to address climate change
- Vast difference in action and capacity between developed and developing country cities
- Limited engagement to date with private sector
- Finance remains key barrier to action, requiring:
  - tough decisions about local investment priorities
  - Improved coordination with sovereign/regional authorities
  - cities to get their own house in order, improving prospects of private investment
  - improved local creditworthiness

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Thank you

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