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# **AFDI Lecture Series:**

# **Green Cities and Green Finance**

Shanghai, 18 May 2017

Hubert Jenny Principal Infrastructure Specialist East Asia Department, Asian Development Bank hjenny@adb.org

# Understanding Asian URBAN Challenge



# Need for Green Cities & Green Finance





# unicef AN URBAN WORLD

This graphic depicts countries and territories with 2050 urban populations exceeding 100,000. Circles are scaled in proportion to urban population size. Hover over a country to see how urban it is (percentage of people living in cities and towns) and the size of its urban population (in millions).

Urban Population Greater than 75% 50% - 75% 25% - 50% Less than 25%



#### unicef

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# Asia is doing in 50 years What Europe did in 500 years !!!



# **Urbanization East Asia: Key Findings**

### Jan. 2015:

- + 200 M urban population between 2000-2010
- Urbanization: From 25% (2000) to 36% (2010)
- Population (2010):
  - 8 Megacities: > 10 M
  - 123 large cities: 1 to 10 M
  - 738 secondary cities: 100,000 to 1 M
- Pearl River Delta = Most urbanized area in Asia
- Direct link: Urbanization <-> Income Growth
- Expanding urban areas across boundaries fragments local governments and revenue sources

# Economy



Cities produce 80 % of GDP Drivers of economic growth

Vulnerable to impacts CC: Flood, drought, erosion, sea level rise, ...

Water Food Energy Nexus Cities use about 85% of energy Asia - 35% CO2 emissions Air pollution estimate 2%-4% dent on GDP: PRC -7.5% GDP (BTH)

# Climate Change

# Environment

# **ADB - Strategy 2020 Urban**

To transform the archetypical chaotic, polluted, inequitable city of Asia into a competitive, equitable and environmentally sustainable urban region — in short, a livable city - will require a new approach to city development and to ADB's support for that development.

Core to the transformation is a new emphasis on the need for an integrated planning approach to the provision of environmental infrastructure and services and other public goods."

### **History Urban Development**

From Sector Urban Development Project (1990's) to Multi Sector Urban Development Program (2000's) or City Comprehensive Socioeconomic Development

Baseline Situation - Master Plan: Liability or Asset? Sectors Master Plans delinked Spatial Plan / 5Y Plan

- Force of Law; Difficult process to change
- Cost estimates, but no financing / funding plan and no prioritization of projects (most often destroys assets)
   Public sector and demand driven
- Public sector and demand driven

# **Urban Development**

Where do we start to fix a city?

Infrastructure ?
Municipal Finance ?
Social Issues ?
Land Use ?

# **Urban Development vs. Urban Planning**

**Critical: Linking Planning with Development** 

Actors = Government, Private, Civil Society

# **Methodology:**

- City Development Strategy
   Sustainable City Program:
- ⇒ Start to focus on Urban Environment, Not yet Climate Change !

# **Business / Corporate Plan for the City:**

 Define Long Term Vision (2050) by all the actors (public, private and civil society) together
 What do you want your City to be?

 Define Competitive Advantages of the City through a Strength & Opportunity Analysis
 What are the assets of your City?

 Localization MDGs/SDGs: Focus on access to basic urban services
 Where does your City stand for MDGs/SDGs?

# **Project Preparation: Process**

What is preventing the City to meet the Vision, MDGs/SDGs and building on competitive advantages

Infrastructure gaps: **Definition Project Components** 

•

Highlight Institutional bottlenecks: Definition of Technical Assistance Program

=> Priorization, Rationale, Preliminary cost / TA



# **Example:** Thanh Hoa City Comprehensive Socioeconomic Development Project

#### Thanh Hoa Province (150 km South Ha Noi)

- 4th largest Province (Population)
- 2nd largest Province (area)
- 2nd poorest Province

High level of migration out of both City and Province

#### Vision: Establish Thanh Hoa City as a Livable and Competitive City in the Region

#### MASTER PLAN 1999 - Revised 2006



- 1. An Ambitious Final Phase
- 2. A quite Significant Area of the City Core Compared to the Current Situation
- 3. Incoherent develoment of the City center
- 4. Planning a huge green belt removing the remaining urban villages and associated economic activities (craft, industries)
- 5. An urbanisation stretching over 16km from THC to Sam Son Resort City



# **Existing Master Plan - Main Rationale**

#### **Ambitious Development Plan**

500 000 inhabitants in 2020: Class I City in Charge of Infrastructure Management as well as Educational Facilities

Population growth rate changing from 1.6% 2000-2006 to more than 3% until 2020

Extensive and costly expansion of urban build up area

About 20% of GDP yearly growth until 2020, Double GDP per capita every five years

**Current growth indicator quite low** 

Major future regional investments: Super Investment from Central Government

#### **Regional Investments**



### Recommendations for a Pragmatic and Efficient Urban Development enabling local economic development

#### **Strengthen and Develop the Existing Driving Forces**

- Industrial Development and Craft Villages based on existing resources (limestones, kaolin, seafood, ...)
- Tourism Potential: Historic Province and 12 km beaches

### Organise a Rational, Efficient and Cost Effective Urban Development

- Within the City Financial Capacity « Live within your means »
- Master Plan shows the ultimate image of the City, but needs to:
- (1) Develop an intermediary phase combining the existing competitive advantages with the final objectives of the Master Plan
- (2) Address quickly the environmental problems and issues

Prepare the Future: Invest NOW in key sectors and infrastructure to prepare the development of Class I City urban functions and play its regional role

### **Thanh Hoa City Development Strategy**





Line (Chang Change of the all balls

**Tourism Corridor:** 

of Hoang Hoa beaches

#### THANH HOA - URBAN VILLAGES LABOUR RESERVOIR FOR OVER 80,000 People



### **Project Components - General Overview**



### **Investment Mapping (Before Appraisal)**

1. UKBAN KORD DEVELOPM	en i zolo mua
1A Eastern Ring Belt Total length: 6.18 km	5.6 MUSD
1B Western Ring Belt Total length: 16,70 km	9.6 MUSD
1C Bridges and others	2.1 MUSD
1D Telecom and Power Grid Lightning System	1.5 MUSD
<ul> <li>Resettlement - Land Acquisition PMU7 Consulting Services</li> </ul>	4.7 MUSD
• Taxes	2 MUSD
2. WATER SUPPLY	6.8 MUSI
2A Urban Core Total Length: 18.7 km	2.3 MUSD
28 Ring Belt & Villages Total length: 18.6 km	3.3 MUSO
<ul> <li>PMU / Consulting Services</li> </ul>	0.6 MUSD
• Taxes	0.6 MUSD
3. DRAINAGE AND WWT	33.5 MU80

	a state state a s
3A Urban Core Network Total Length: 27,7 km	11:5 MUSD
3B Ring Belt & Villages Network Total length: 20.2 km	5.9 MUSD
3C WWT Urban Core WWTP 13,500 m <sup>3</sup> ) Ringbelt WWTP 9,000 m Xday Hospitals	9.1 MUSD day
<ul> <li>Land Acquisition / PMU Consulting Services</li> </ul>	4.1 MUSD
• Taxes	2.9 MUSD

- laxes	2.9 ML	
4 HUMAN	RESOURCE DEV.	10.1 8

USD

4A Vocational College of Industry	4.2 MUSD
4B THC Continuous Training Centre	0.7 MUSD
4C School of Handicraft	0.5 MUSD
4D School of Tourism and Commerce	0.6 MUSD
4E Voc. Centre of Blind Association	0.2 MUSO
4F School of Construction	0.7 MUSD
4G Thien Duc Private Voc. Centre	0.3 MUSD
4H Phuc Khiem Private Voc.Centre	0.3 MUSD
Land Acquisition & Compensation	/ PMU
Training / Consulting Services	1.8 MUSD
• Taxes	0.8 MUSD
5. YOURISM DEVELOPMENT	9 MUSI
5A Welcome Centre 245 m <sup>2</sup>	0.2 MUSD
en a la seconda de la conce -2	0.0.10.000

58	Archeological Park 1200 m <sup>2</sup>	0.6 MUSD
50	Ham Rong Area Natural Area Botanical Park 60 ha	5 MUSD
5D	Mat Son Area Le River Beautification & Art Park	0.9 MUSD
٠	Land acq. / PMU / Ben En Nat. Par	k
	Capacity Building / Cons. Services	1.6 MUSD
	Taxos	0.7 MUSD



#### **Thanh Hoa City** Comprehensive Socio-Economic **Development** Project PPTA - 4976-VIE

**Project Owner Thanh Hoa Province** People's Commitee

#### **Total Investment** 115.5 MUSD

incl. Contingencies 27.3 MUSD Financing Charges for Impl. 3.3 MUSD

**Base cost w/o Taxes** 77.8 MUSD





# **ADB Financing Tools** Thanh Hoa City Comprehensive Socioeconomic Development Project

DB

- Project Preparation Technical Assistance \$1 M (ADB): Identification and Preparation of project compenents to develop the city as a service center for the Province
- City Development Initiative in Asia \$0.3 M (ADB): Pre-Feasibility Studies for urban infrastructure investment through public private partnerships
- Public Private Infrastructure Advisory Fund \$0.2 M (ADB): Implementation of Local Development Investment Fund - Initial seed fund from local government (\$6 M grant) and central government (\$15 M loan) to leverage private sector (1 to 1 evolving to 1 to 5 within 5 years)
- City Development Strategy in a Regional Context \$0.575 M (Cities Alliance, delegated to UN-Habitat)
- Japan Fund For Poverty Reduction \$2 M (ADB): Development of Community Led Infrastructure Plans in peri-urban areas
- e-Asia Information Communication Technology Fund \$0.5 M (ADB): e-Government, Management Information System, Geographic Information System
- Investment Loan: \$72 M (ADF, ADB); \$32.7 M (KEXIM, Korea)
- Technical Assistance / Capacity Building: \$2 M grant (WFPF, ADB) and \$6 M loan (ADF, ADB)

# **ADB Urban Operational Plan 2012**



# **GrEEEn Cities**

From City Comprehensive Socioeconomic Development to GrEEEn Cities Projects (2010's)

- Environment (Green)
- Economy (Competitive)
- Equity (Inclusive)

**Others:** Eco-City, Simbio-City, Smart City, Climate Change Action Plan, City Resilience, Urban Climate Change Resilience, Low Impact Development, Low Carbon City, Sponge City...

# **What is Green?**

**Reduce Carbon (CO2) Emission** 

⇒ Reduce Carbon & Water Footprint

⇒ Sector Indicators (Land, Urban, Transport, Energy, Water, Sanitation, Waste, …)

⇒ Consider waste as a resource !!!

Water – Food – Energy Nexus / Climate Change to support decision making

#### ARJEN Y. HOEKSTRA AND Ashok K. Chapagain

# Globalization of Water

Sharing the Planet's Freshwater Resources



ADB

1.

2.

3.

4,



# The big numbers: withdrawals, km<sup>3</sup>/yr

	2005		2030		Growth
	km3	%	km3	%	
Agriculture	3,100	69%	4,531	66%	46%
Industry	800	18%	1,531	22%	91%
Domestic	600	13%	843	12%	41%
Total	4,500	100%	6,905	100%	53%





# The big numbers

# The issue: global water overuse and shortage – sum of 154 basins; 2005 and outlook 2030



# **Achieving Sustainable Green Cities**



# **Urban Development: Strategic Investments**





### What are Intelligent Systems?





# **Resilient City**

"ACCESS TO BASIC URBAN SERVICES - A RIGHT FOR ALC

# ADB Viet Nam Green Cities (2017 - 2025)

**Green City Action Plans => Greening Master Plan:** 

Green infrastructures => Preserve Natural Habitat
 Urban design => Green City Planning
 Low impact development => Urban Resilience
 => Infrastructure :

**Embankments & Dredging** 

Wastewater & Drainage

Water Supply

Roads & Bridges

Parks and Lighting

# **Green Infrastructures**



ADB

# **Green Infrastructures**





Source Singapore National Water Agency



Source Pierre Beauchamp Shanghai Botanic Garden

# **Green Infrastructures**

#### Ha Giang Component 3: Roads

#### Introduce LID components

#### FROM





# **FROM: Urban Design**



# **TO: Green Urban Design**



# **Green Urban Design**



# **Urban Low Impact Development**

Major City Centre Development Site Commercial Area-Hotels and Restaurants. Streetscape Upgrading

Linear Park

Pedestrian Friendly Junction Improvements

Incorporate Existing Tree Planting into Linear Park. Picnic Areas, Pathways and Riverside Bathing Pools

1.mearsh

CPC Offices

Linear Park

City Centre Park. Landscape Improvements for Passive/ Active Recreation Commercial Area- Hotels and Restaurants. Streetscape Upgrading and Pedestrian Friendly Junction Improvements PPC Offices Formal Riverside Park, Gardens and Main Square, Improve Festival Space and Riverside Gardens

# **SMART CITY: Use of ICT**

e-Disaster Mgmt & safety e-Citizen (municipal Services)

e-Health Services

e-Education

Smart Utilities Smart Buildings & Transport

### **ICT aspects of Smart City**



#### ADB examples – Bhutan e-Health center (Smart Health)

- Medical doctor delivers virtual medical service in primary healthcare
- electronic health centre (eHC) using new internet technology Television White Spaces (TVWS)
- Experimented by HP in three Indian villages in three states in 2013

Standard shipping container; Connected doctors through internet; Container goes around the villages



#### ADB examples – Myanmar e-campus (Smart campus)

#### **Smart Campus** is

- Solution Yangon Technological University, comprises:
  - Speech-enabled, responsive systems
  - Natural language understanding in human-machine interaction
  - Voice biometrics for secure authentication of users
  - Anytime, anywhere access of systems
  - a **multi-channel** solution that works across Internet, smartphones, feature phones and web
- a solution that is powered by technologies such as
  - Automatic Speech Recognition
  - Voice Biometrics

#### **Multi-channel features of Smart campus**



- Enrolment and authentication using voice biometrics to verify students and parents
- Speech-enabled, rule-based tracking of student's marks for users authenticated using voice biometrics and PIN
- Speech-enabled complaint registration and tracking



# **What is Green Finance?**

- Developing Green Finance Mechanism:
  - Help fund green & bankable project pipeline
  - Leverage private and commercial funds
  - Create incentive-based flow of funds, linked to both Green and Bankability Indicators
- Proposed Concept intends to pilot in China a framework for green investment financing

# Objective

• Assist developing Green Finance Mechanism:

Help fund green & bankable project pipeline

- Leverage private and commercial funds
- Create incentive-based flow of funds, linked to both Green and Bankability Indicators
- Proposed Concept intends to pilot in China a framework for green investment financing.

# Rationale



GLCL



The GFCF Concept: Overview



#### **Umbrella Green Financing Catalyzing Facility**

- Links concessional sovereign to <u>measureable</u> ES / FB indicators
- Provides a <u>co-financing</u> vehicle for <u>Private / Commercial / Equity</u>







The GFCF Facility is structured to have a MULTIPLIER effect on funds going into green infrastructure

Every US\$ of sovereign guaranteed donor funds through the Facility will directly catalyse US\$ 1.5 of non-governmental / commercial funds



#### Likely Overall Impact of GFCF

		(US\$' million)
	-	2076
Commercial & Institutional Funds	40% Avg. per project	830
Sponsor Equity Funds	20% Avg. per project	415
GFCF Funds - Sovereign Gtee'd	40% Avg. per project	830



# END

Thank You for Your Attention Contribution ADB: Arun Ramamurthy (Smart Cities) Sonia Sandhu & Ramola Singru (GrEEEn Cities) Anouj Mehta (Green Finance)