Progress and Prospects :

in China's Transition toward Sustainable Cities

Introducing the China Low-Carbon and Green for Cities Index (LOGIC)

Innovative Green Development Program (iGDP)
China Energy Group of Lawrence Berkeley National Laboratory
Energy Foundation China

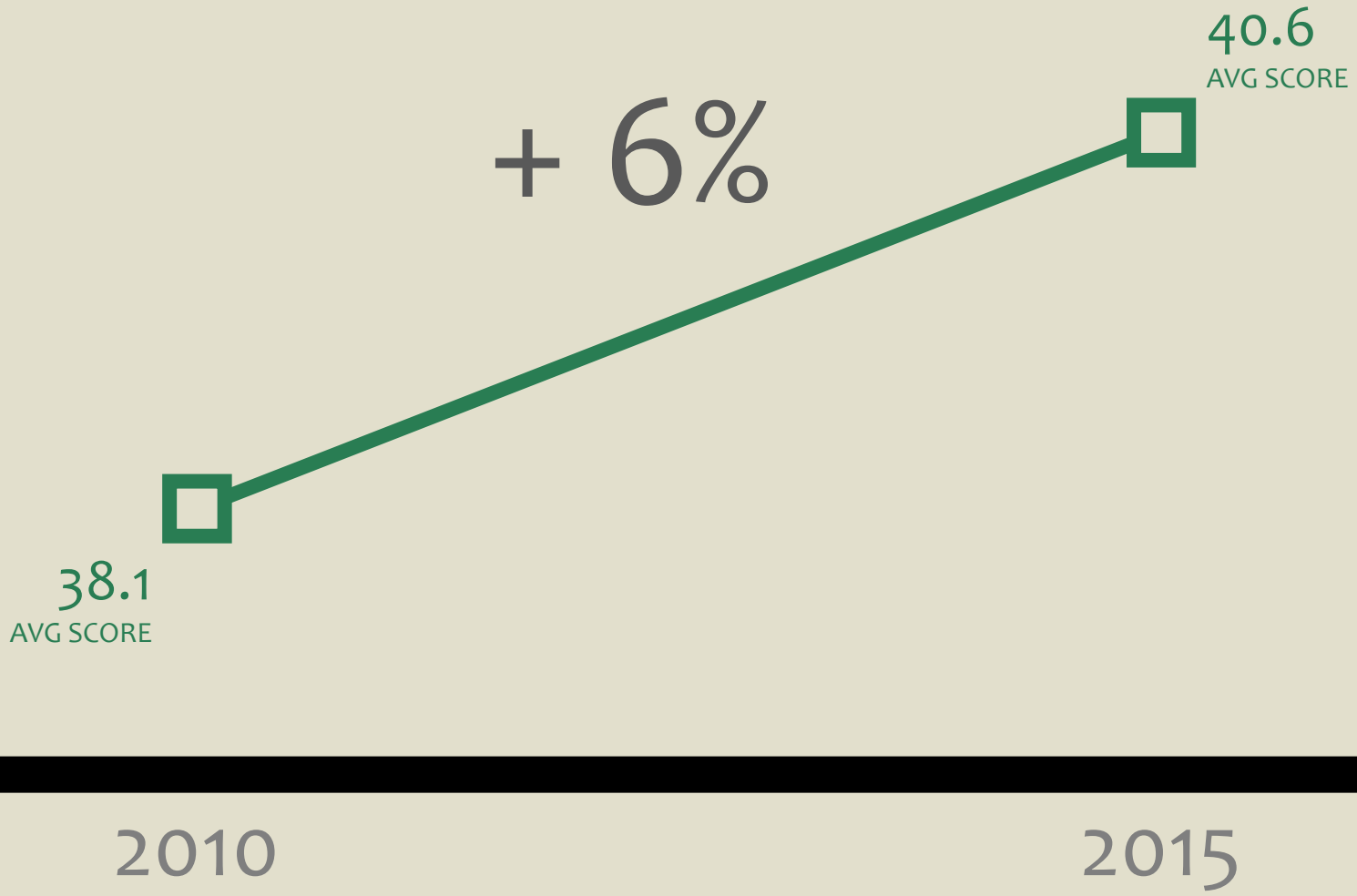
Northeast Asian Mayors' Forum: Low Carbon City Development: Improving Air Quality and Reducing Greenhouse Gas Emissions
Ulaanbaatar, 18-19 June 2018

A KEY QUESTION :

Are China’s cities making progress on their green and low-carbon goals?

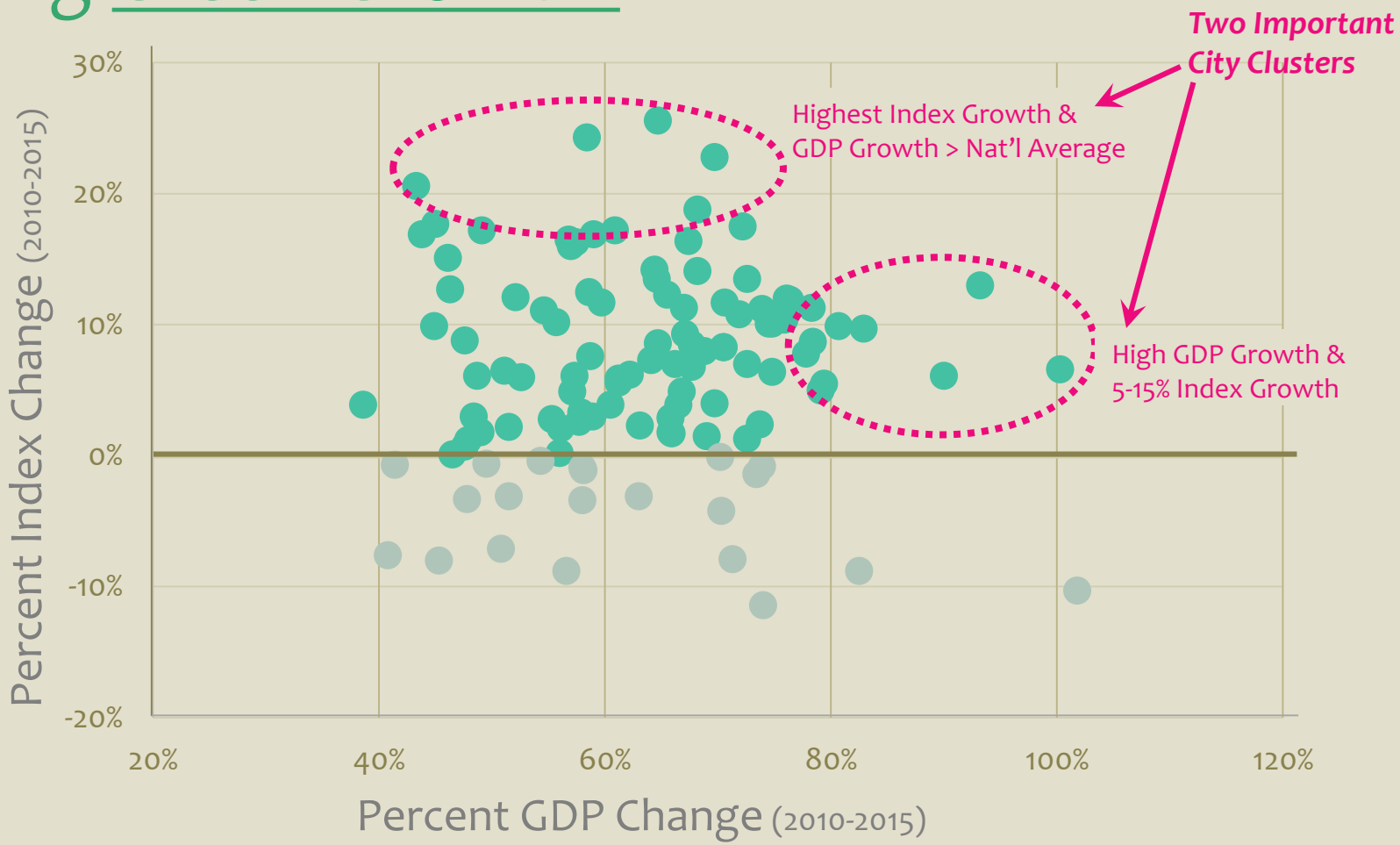
*China's cities **are** getting greener :*

Overall LOGIC Index scores improved 6% from 2010-2015



*Chinese Cities are seeing **Green Growth** :*

*Over 90 cities saw both GDP growth **and** LOGIC Index growth from 2010-2015*

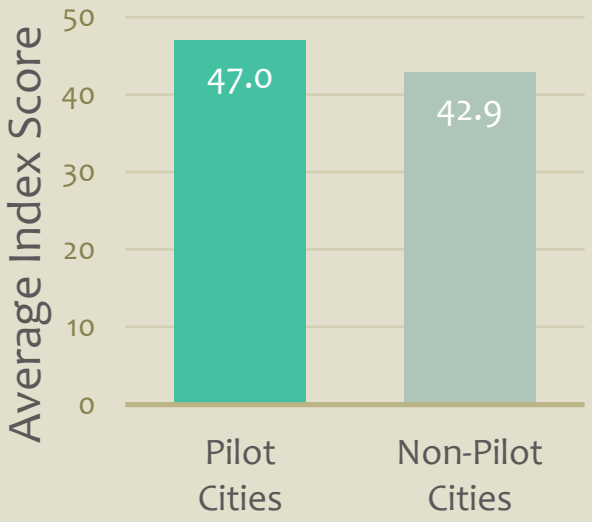


2015

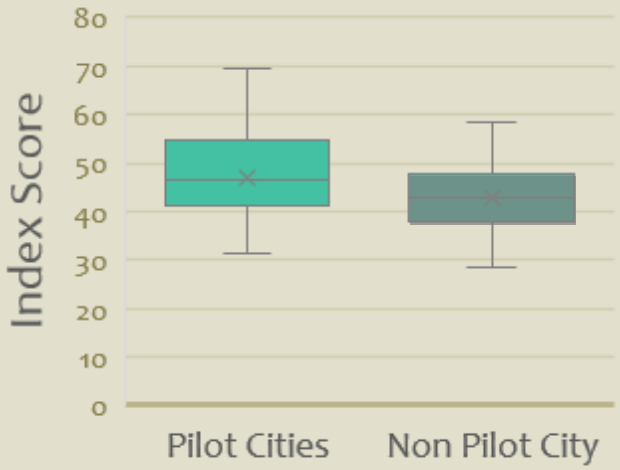
China's Low-Carbon Pilot Cities show the way :

Pilot cities have been quicker and more successful in achieving green & low-carbon results…

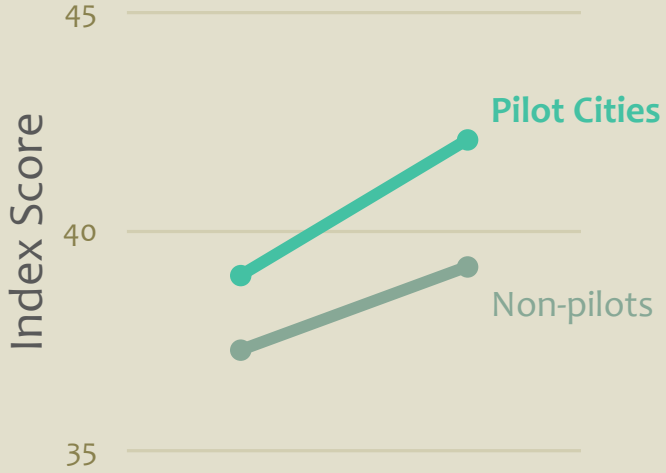
Pilot cities have higher average scores…



Pilot cities have scores in a higher range….



And, pilot cities' scores are improving faster.



2015

INTRODUCING THE NEW

China Low-Carbon and Green Index for Cities (LOGIC Index)

Building off a strong foundation…

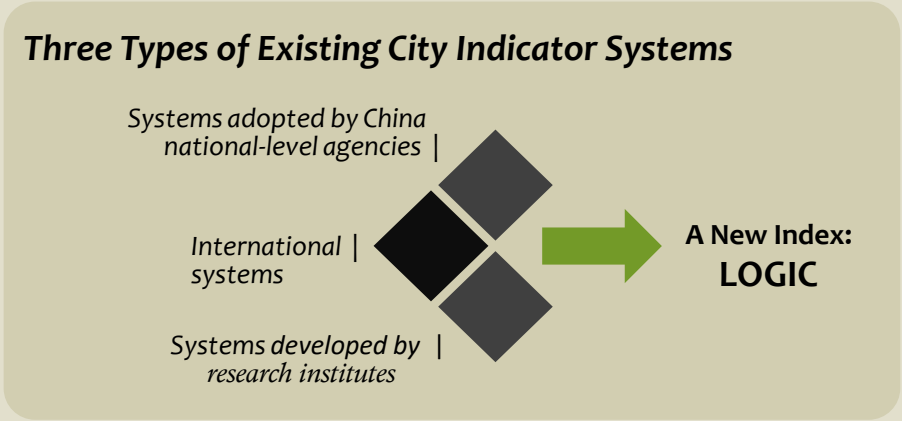
Adapting existing tools:

BEST Cities model (LBNL)

ELITE Cities model (LBNL)

Policy Mapping (iGDP)

Learning from international and domestic city indicators:



INTRODUCING THE NEW

China Low-Carbon and Green Index for Cities (LOGIC Index)

A NEW AND UNIQUE CITY INDEX DESIGNED FOR CHINA'S LOW-CARBON URBAN AND ECONOMIC TRANSITION

FOCUS ON KEY ECONOMIC & SOCIAL FACTORS

- Group and evaluate cities according to development
- Three economic groups
- Three city-size groups
- Four regional groups
- Status of low carbon pilots

REFLECTS RECENT POLICY EFFORTS

- Four policy indicators
- Assess efforts and new actions

TRACKS LOW-CARBON PERFORMANCE

- 19 quantitative indicators, across key urban sectors
- Tracking real low-carbon performance
- Reflect China's urban economies and industry

DEFINED USING GLOBAL BENCHMARKS

- Assess performance against China + Global best practice
- Guide the path forward

INTRODUCING THE NEW

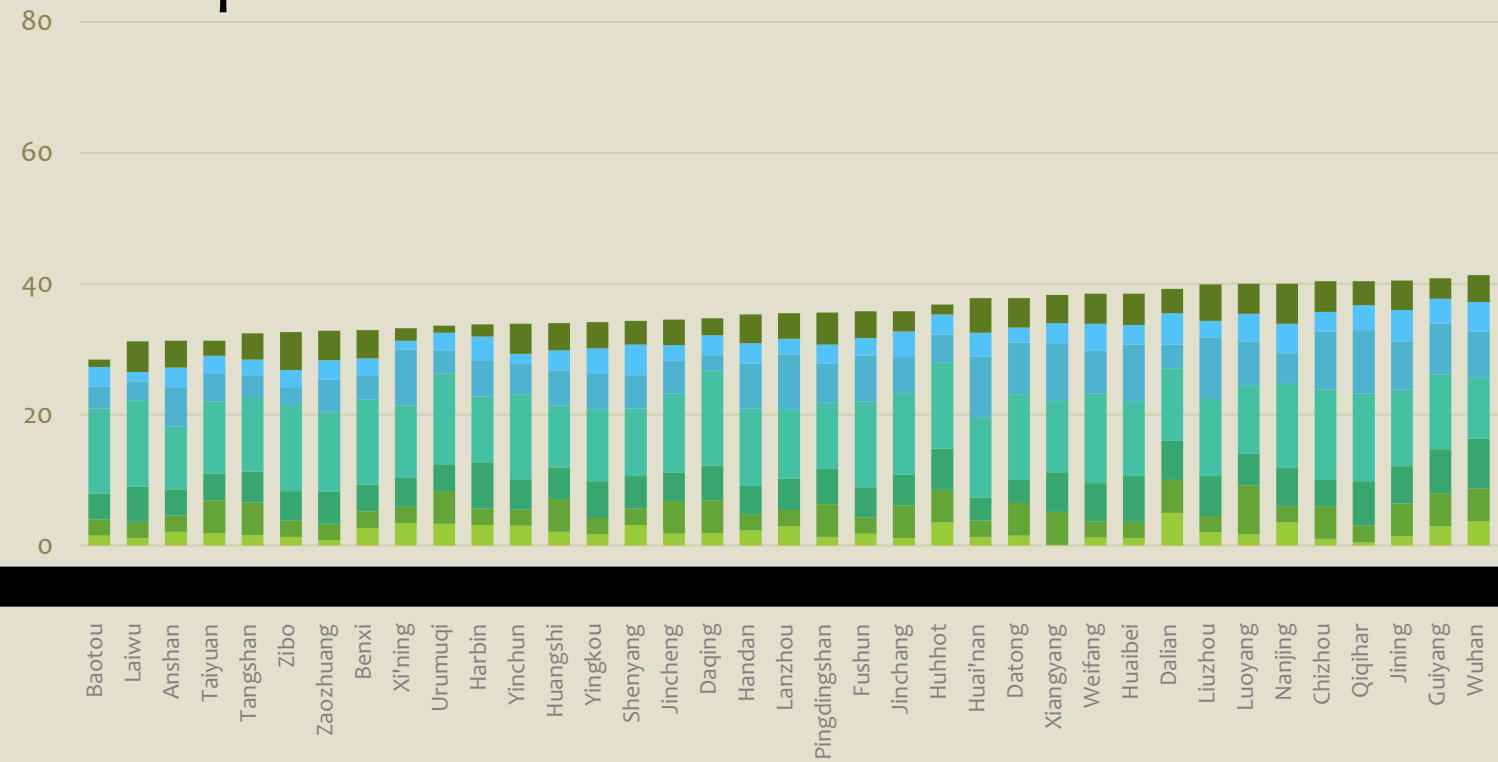
China Low-Carbon and Green Index for Cities (LOGIC Index)

115 Chinese Cities

7 Index Categories

- Energy & Power
- Economic Dimension
- Industry
- Environment & Land Use
- Transportation
- Policy Dimension
- Buildings

Composite Index Scores

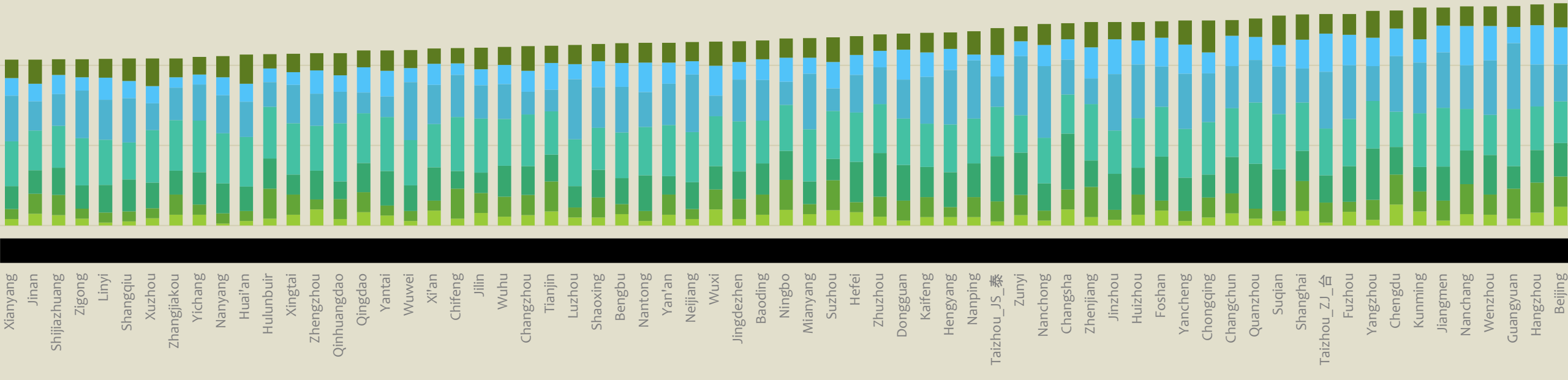


INTRODUCING THE NEW

China Low-Carbon and Green Index for Cities (LOGIC Index)

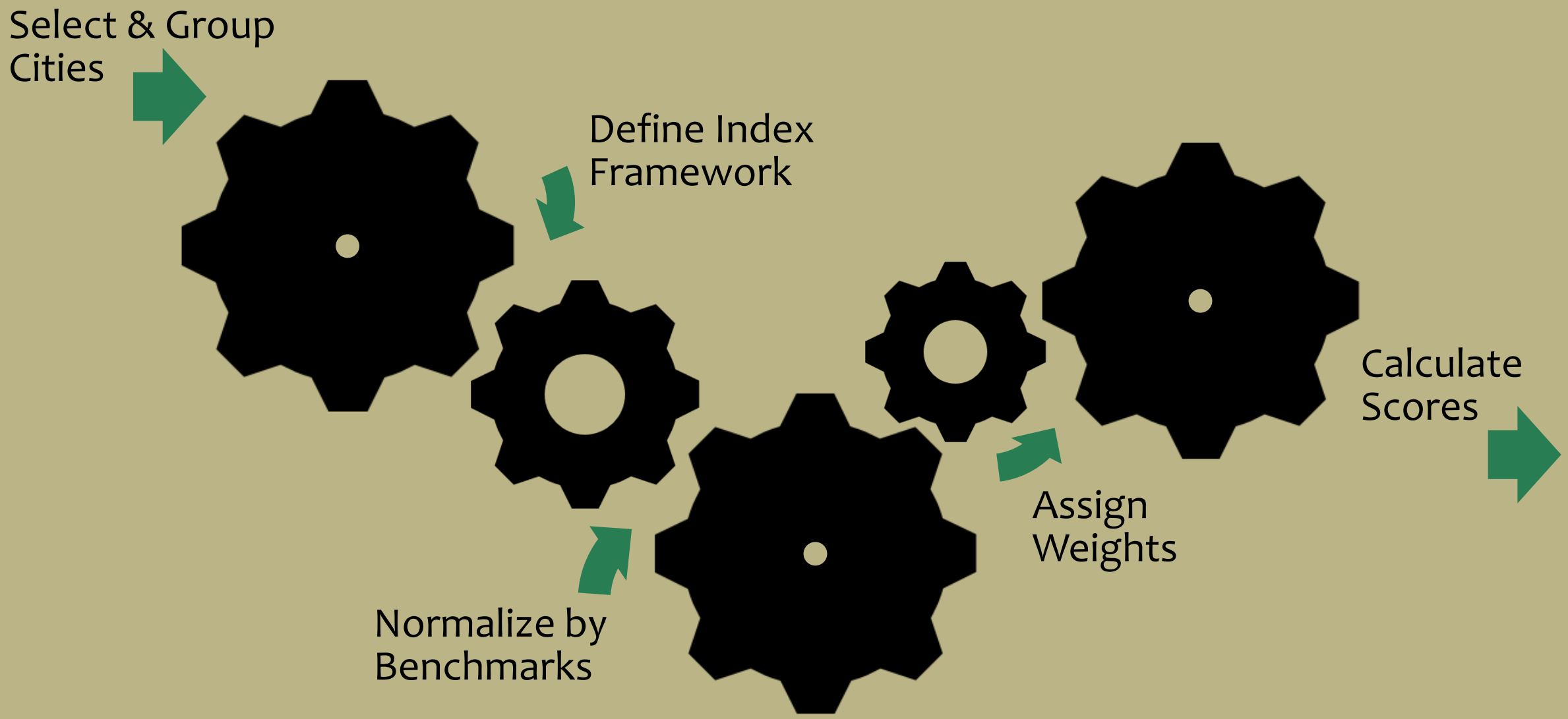
Why a new indicator system?

- Recent fast change in China's low carbon polices + actions
- China's economic and urban policies are unique
- Rely on publicly available city data in China
- Holistic Green + Low-Carbon assessment + Energy



How does the Index Work ?

Inside the Index: LOGIC Methodology



METHODOLOGY:

City Selection and City Grouping

115 Cities, accounting for:

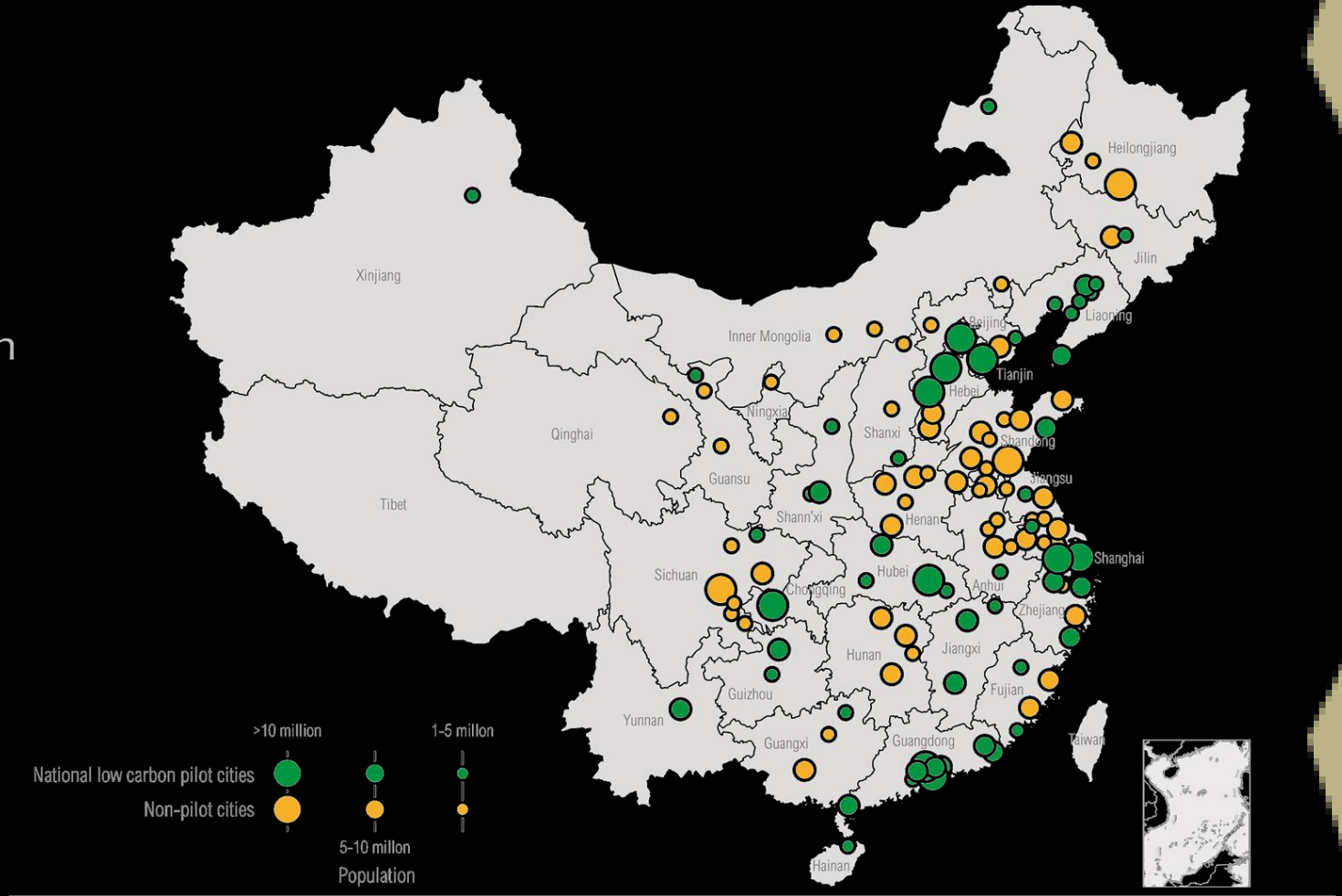
74% of National GDP

58% of National Energy Consumption

52% of National Population

4 Groupings of Cities for analysis:

- Economic Groups
- Size Groups
- Geographic Regions
- Low-Carbon Pilot Status



METHODOLOGY:

Index Framework and Weighting: Categories + Indicators

7 Categories / Sub-Categories

	Weight
Economy	20%
Energy & Carbon	50%
Environment & Land Use	20%
Policy & Outreach	10%

23 Indicators

Indicator	*Weight*	*Data*
———	—	#
———	—	#
———	—	#
———	—	#
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$\sum$ = 100%

METHODOLOGY:

Benchmarking Performance against Global Best Cities

Benchmarking Principles:

- Meaningful Measures – connect to green & low-carbon goals
- Ambitious – future looking, and goal stretching
- International – connect to best cities, and other indices

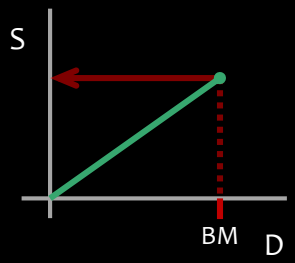
Three Types of Benchmarks:

- International Best Practice
- China Policy Targets
- +20% Better than Best City in Sample

Two Types of Benchmark Functions

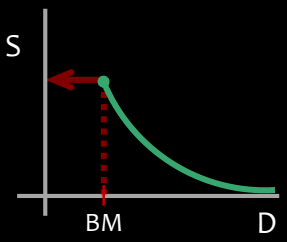
- Directly Proportional
  High Data Value = HIGH Score Value

$$S \sim \frac{D}{BM} \times 100$$

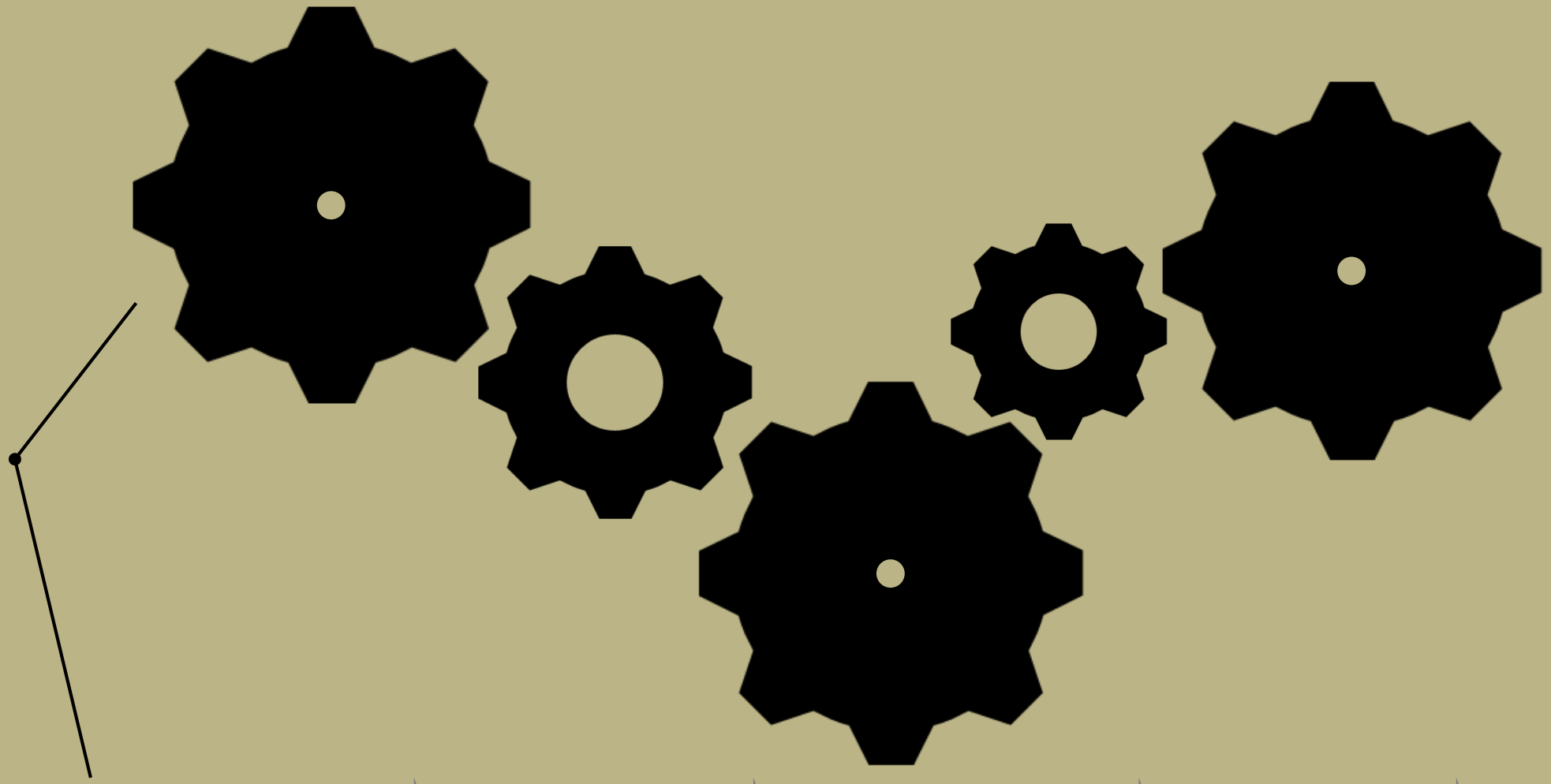


- Inversely Proportional
  High Data Value = LOW Score Value

$$S \sim \frac{BM}{D} \times 100$$



Inside the Index: LOGIC Methodology



Select & Group Cities → Define Index Framework → Normalize by Benchmarks → Assign Weights → Calculate Scores

EXPLORING LOGIC INDEX RESULTS :

Which index dimensions are most important?

Which types of cities and which policies perform the best?

Key Findings

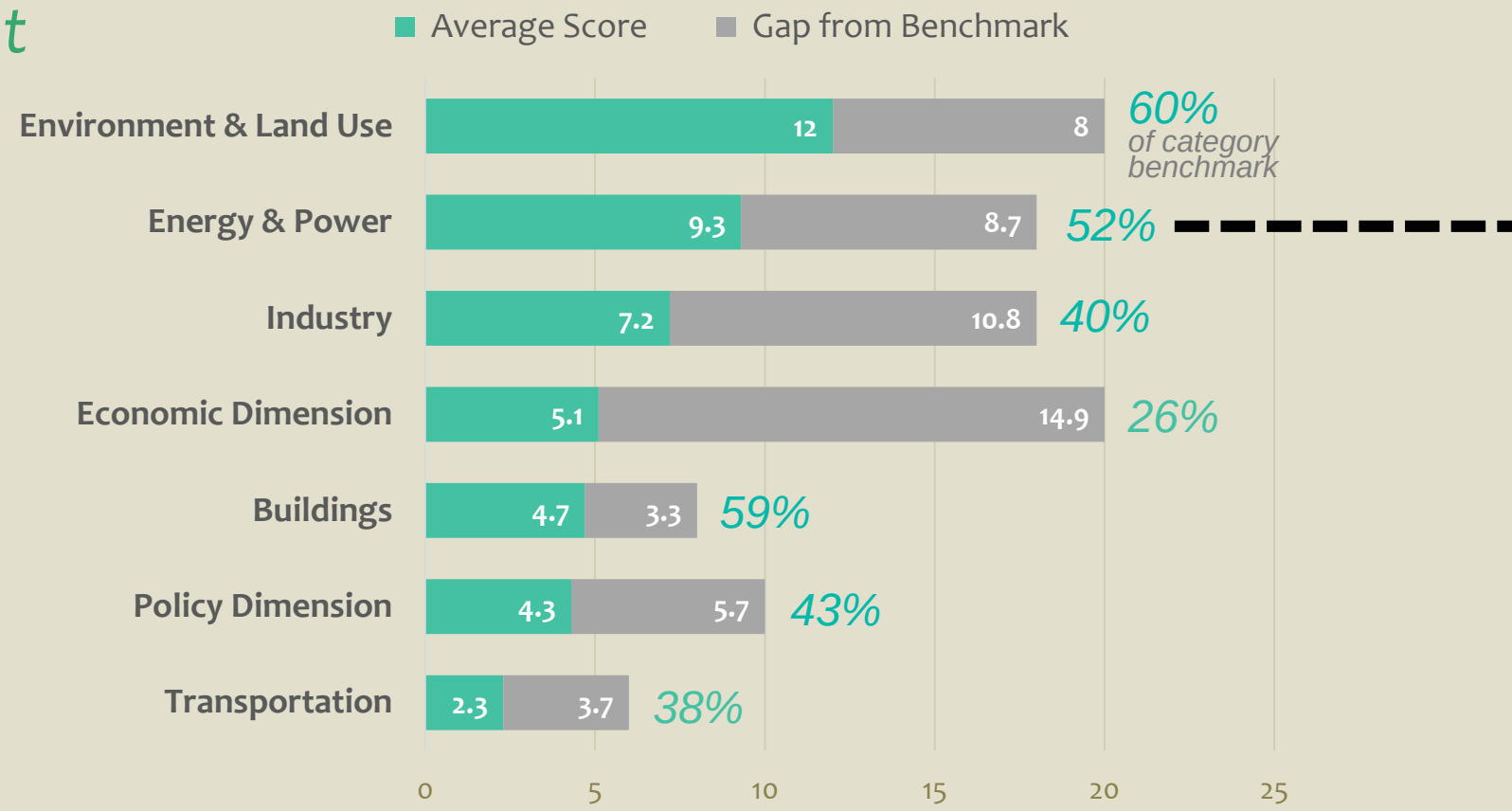
- Chinese Cities have considerable room to improve
  Especially in the economic, transportation, & industry dimensions

- Economic, Energy, + Industry categories drive index scores
  Urban energy and economic structure are key part of low-carbon transition

- Cities of all types can be Top-Performers in the LOGIC Index
  Cities with different levels of economic & urban development achieved high scores; all cities can learn from top-performers in any Group, any Region, & any Policy area

Exploring Results :
LOGIC Index Categories

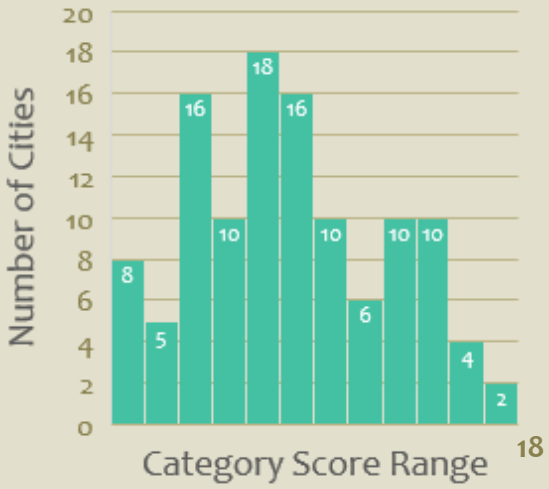
Chinese cities have significant potential to improve their Green and Low-Carbon performance.



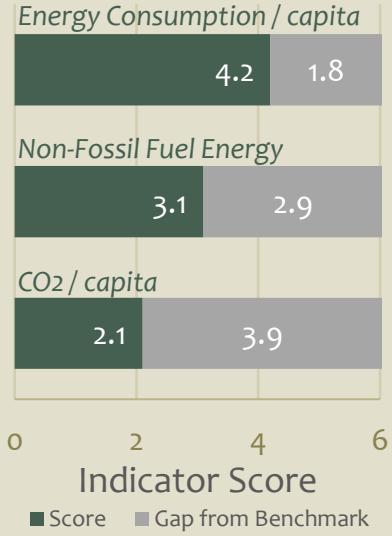
Exploring Results
LOGIC Index Indicators

Energy & Power

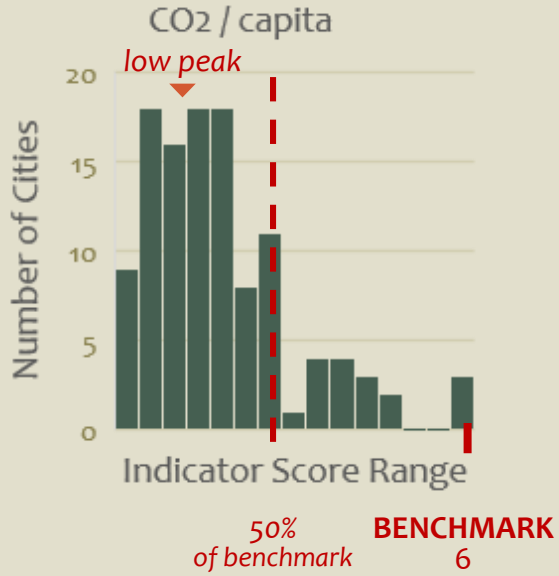
Category Scores Histogram
115 sample cities' distribution

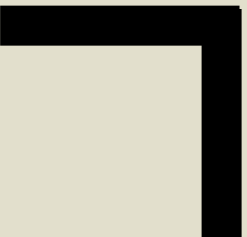


Indicator Scores vs Benchmark
3 indicators in E&P category
115 sample cities



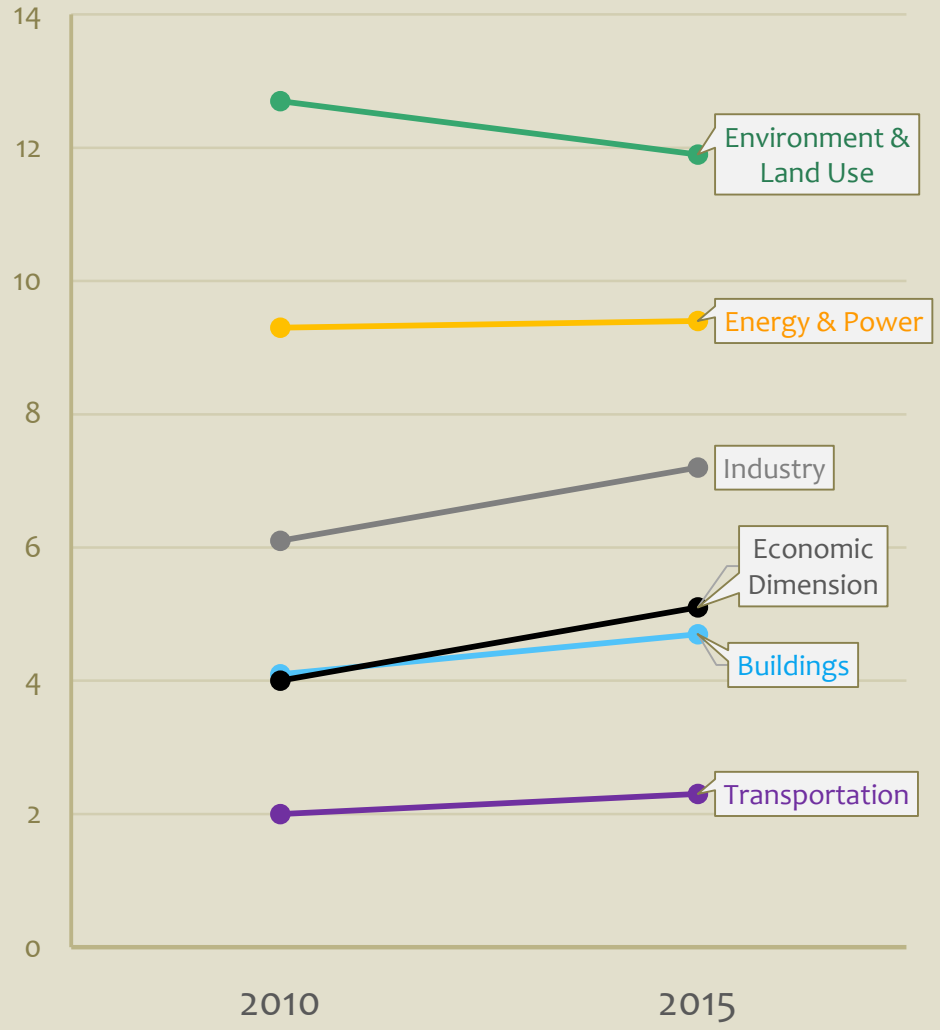
Indicator Scores Histogram
One indicator from E&P category
115 sample cities' distribution





Exploring Results
Index Category Change

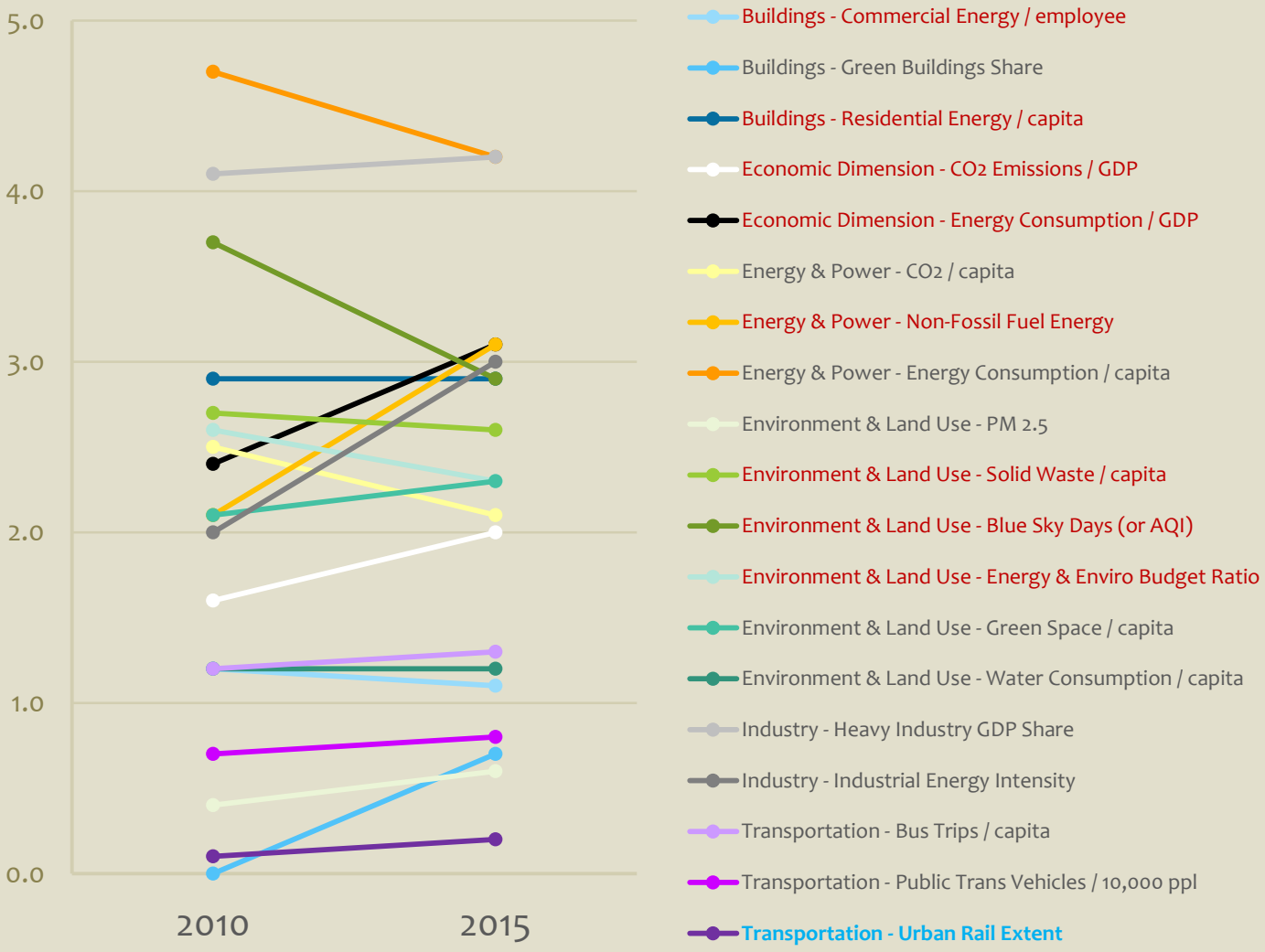
Most categories improved in Chinese cities, form 2010-2015



- 6 out of 7 index categories have rising scores, 2010-2015
- Only **Environment & Land Use** category has score decrease
  Driven by air quality and solid waste problems
- **Economic** category has fastest score growth

Exploring Results
Index Indicator Change

Chinese cities saw mixed indicator performance



- 11 out of 19 index indicators have rising scores, 2010-2015

  Highest increase of 121% in five years (Urban Rail Extent)

- 8 out of 19 index indicators have score decrease, 2010-2015

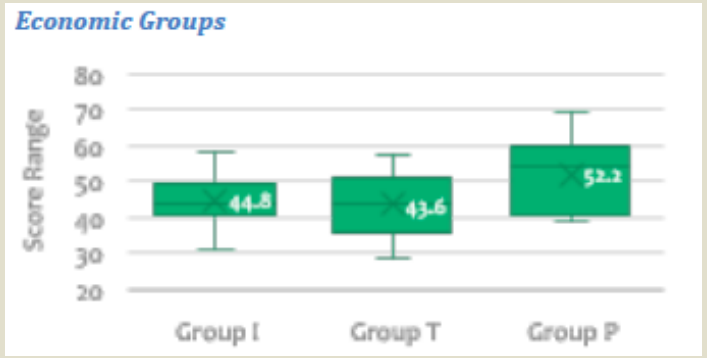
  Biggest drop in score is -21% (Blue Sky Days , AQI)

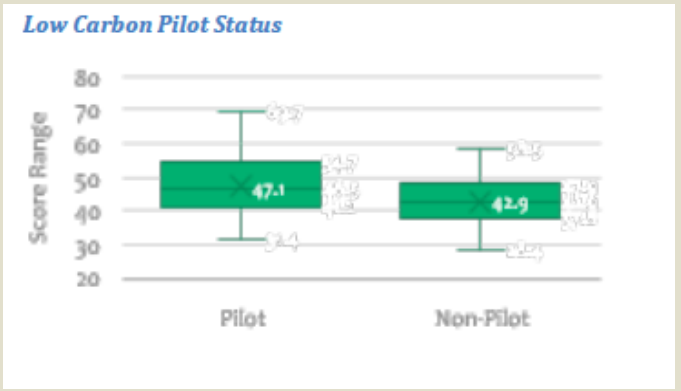
City Performance by Groups

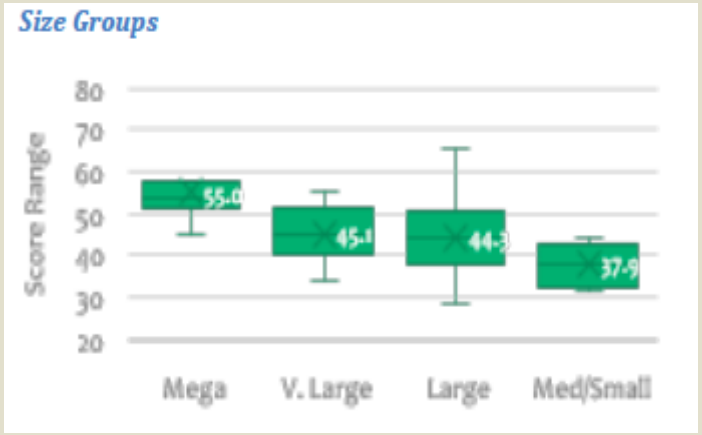
Exploring Results

City Group Scores

Larger, Wealthier, Developed cities *have better, higher scores in the LOGIC Index.*







Exploring Results
Top Scoring Cities

Cities of all types can be Top-Performers in the LOGIC Index

City Name	Rank, Overall Index	Overall Score	Economic Group	Size Group	Region	Low Carbon Pilot Status
Shenzhen	1	69.7	Group P	Mega	East	Pilot
Xia'men	2	66.0	Group P	Large	East	Pilot
Changde	3	58.5	Group I	Large	Central	Non-Pilot
Nanning	4	58.2	Group I	Large	West	Non-Pilot
Haikou	5	57.7	Group T	Large	East	Pilot
Ganzhou	6	57.5	Group I	Large	Central	Pilot
Guangzhou	7	57.5	Group P	Mega	East	Pilot
Shantou	8	57.4	Group T	Large	East	Pilot
Jieyang	9	56.7	Group I	Large	East	Pilot
Guilin	10	56.3	Group I	Large	West	Pilot
Zhanjiang	11	55.8	Group I	Large	East	Pilot
Beijing	12	55.5	Group P	Mega	East	Pilot
Hangzhou	13	55.3	Group P	Very Large	East	Pilot
Nanchang	14	54.8	Group T	Large	Central	Pilot
Wenzhou	15	54.8	Group T	Very Large	East	Pilot
Guangyuan	16	54.7	Group I	Large	West	Pilot
Jiangmen	17	54.5	Group I	Large	East	Pilot
Kunming	18	54.5	Group T	Large	West	Pilot
Chengdu	19	53.7	Group T	Mega	West	Non-Pilot
Yangzhou	20	53.6	Group T	Large	East	Non-Pilot

Conclusions

The LOGIC Index allows deep and detailed exploration of city performance :

- The LOGIC Index is useful to compare China's cities to global benchmarks, on multiple green + low-carbon dimensions.
- The index helps in identifying promising opportunities, and in understanding key challenge areas.
- National and Local governments can use LOGIC Index scores to prioritize policies and financial support; and to promote city exchanges and learning.

Limitations + Next Steps

Some Known Limitations

- Data availability limitations
- Missing urban form dimensions
- Missing some other urban goals (livability, resilience, …)
- Urban consumption not considered

LOGIC Index Next Steps

- Work with cities to improve data availability and collection
- Update index regularly; track cities' progress

Low-carbon City Planning: From Establishment to Evaluation

- Start a proposal
- Form a team
- Collect information
- Conduct consultation

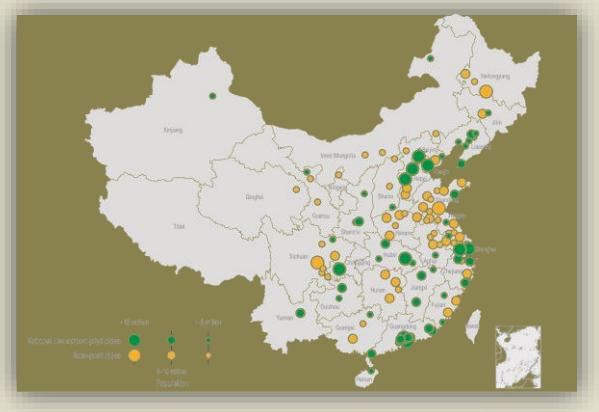
Preliminary Setting Up

Plan Drafting

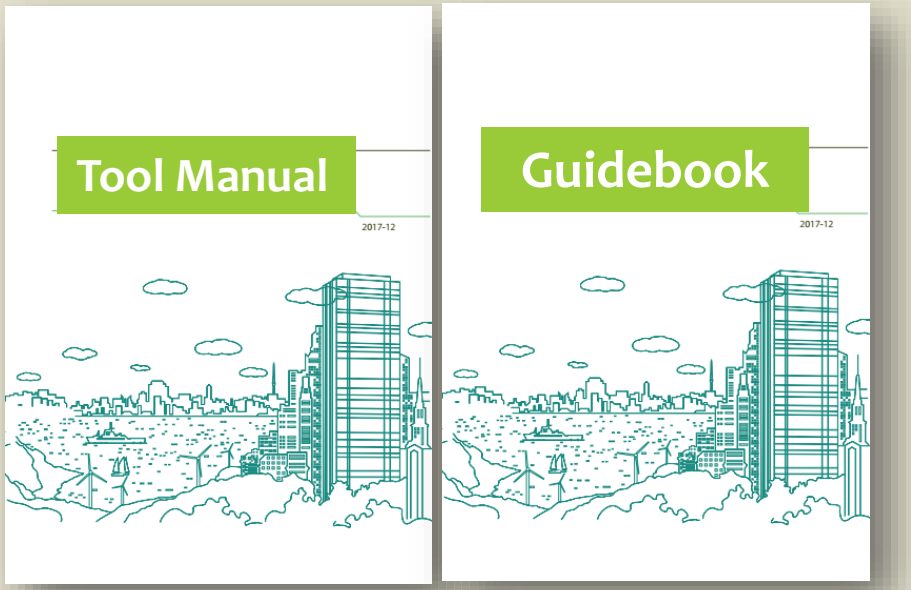
Evaluation and Upgrade

- Establish evaluation system and mechanism
- Update GHG inventories

LOGIC Index Tool

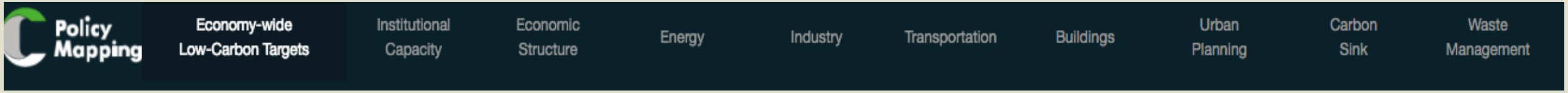


A Guidebook for Strategic Planning and Actions



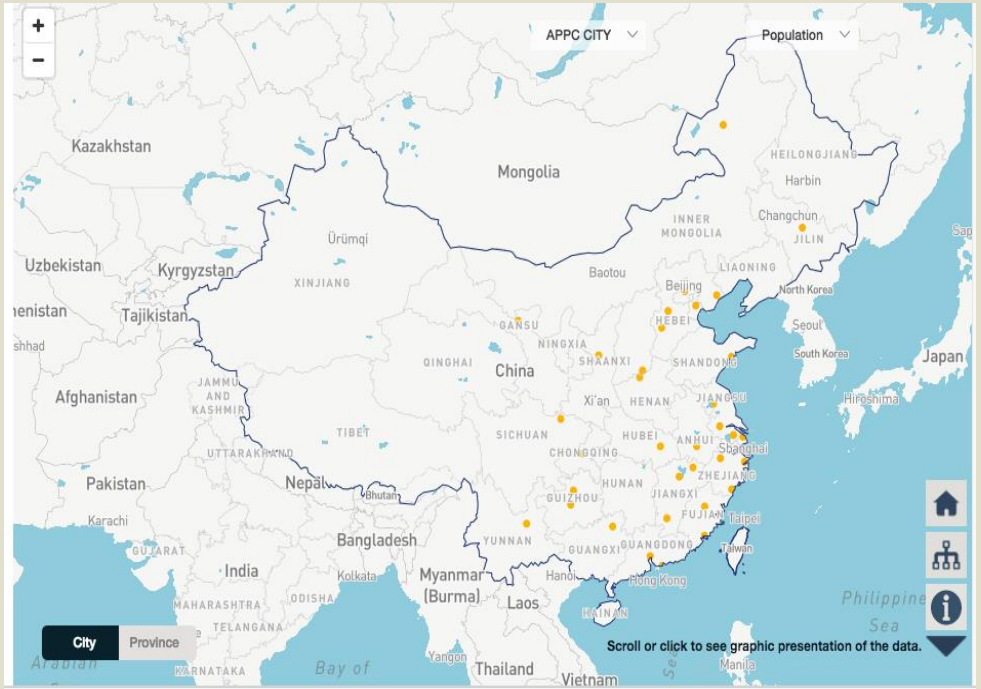
Policy Mapping Tool

- A database and interactive platform to track, synthesize and compare low-carbon development: http://www.cepm.igdp.cn/



--- Framework of Indicators: 10 Categories

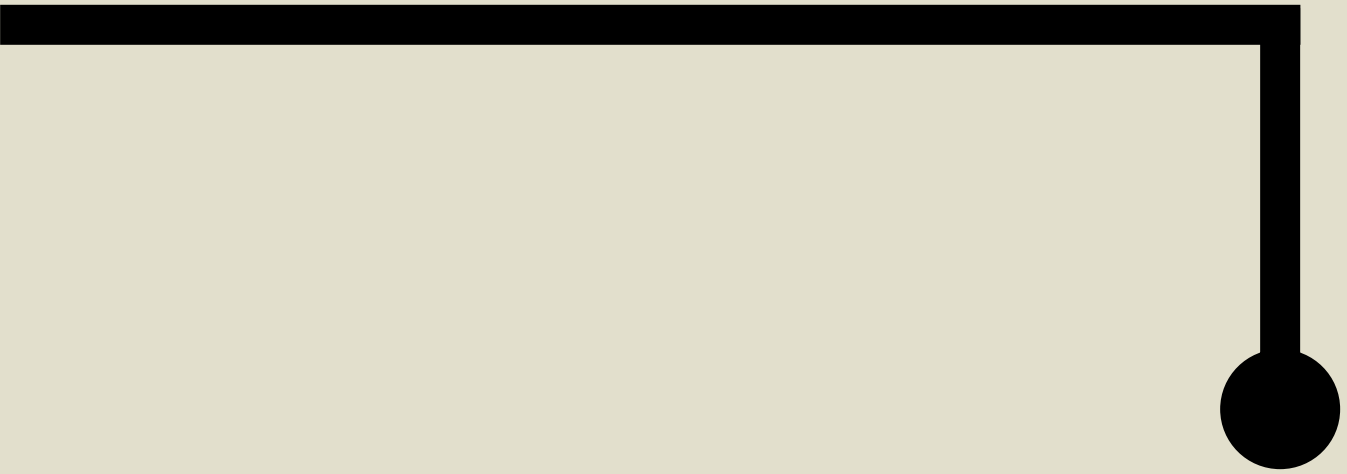
1. Economy-wide Development Goals
2. Institutional Capacity
3. Economic Structure
4. Energy
5. Industry
6. Transportation
7. Buildings
8. Urban Planning
9. Carbon Sink
10. Waste Management



About iGDP

- **An independent Chinese think tank working on:**
  - Green and Low-Carbon Development Planning
  - Green Economy
    - Green Finance
    - Carbon Market
  - International Cooperation on Climate Change
- **The implementation organization of the Green Low-Carbon Development Think Tank Partnership (GDTP):**
  - A network of 45 local research institutions that have been providing technical support for subnational green low-carbon development

- Please visit us at www.igdp.cn.



End

Thank You