Progress and Prospects :

in China's Transition towards Sustainable Cities

城市低碳绿色转型评估和展望

Introducing the China Green Low-Carbon City Index (CGLCCI)

A joint Project by iGDP, LBNL and EFC, June 2017

A KEY QUESTION :

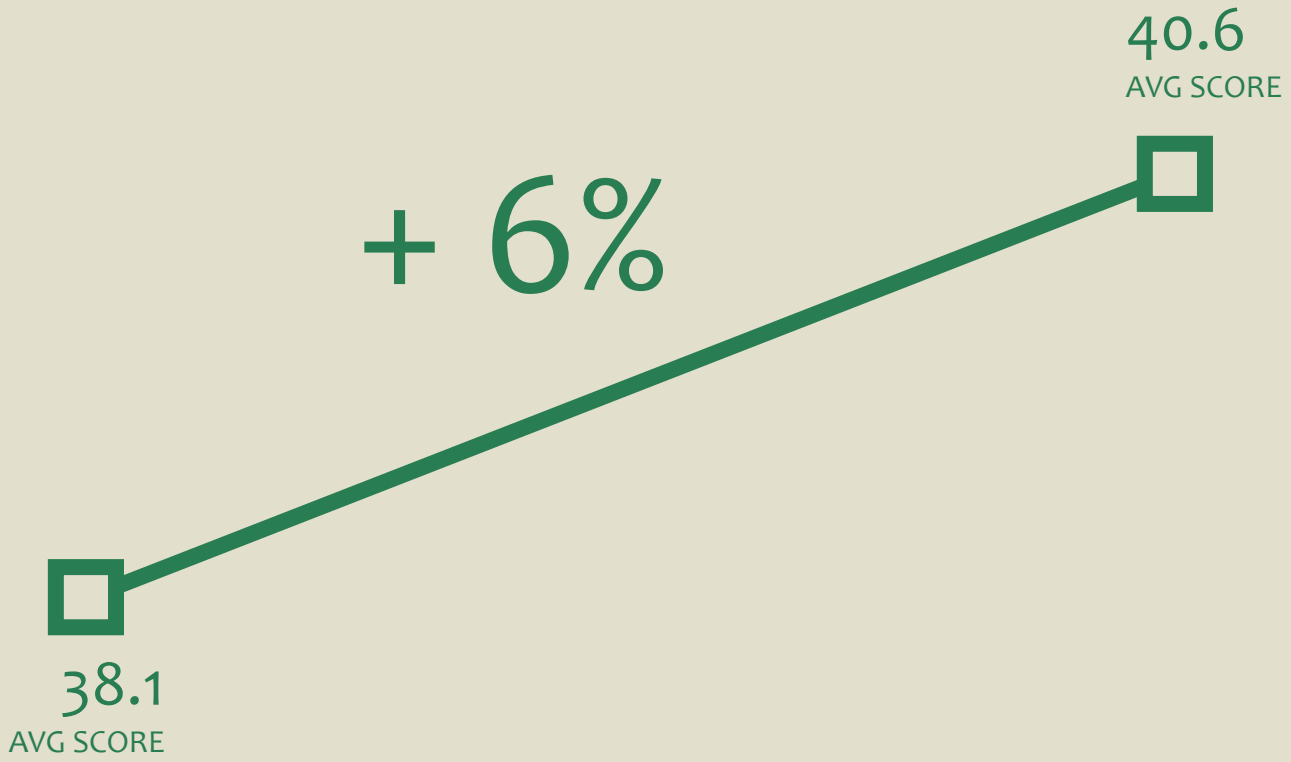
Are Chinese cities making progress on achieving green and low-carbon goals ?
中国城市低碳绿色转型的进展如何？

Chinese cities ***are*** getting greener :

Overall CGLCC Index scores improved 6% from 2010-2015

以指数表征的绿色低碳状况整体改善:十二五期间改善6%

Map of Top 50 Cities in the CGLCCI, 2015



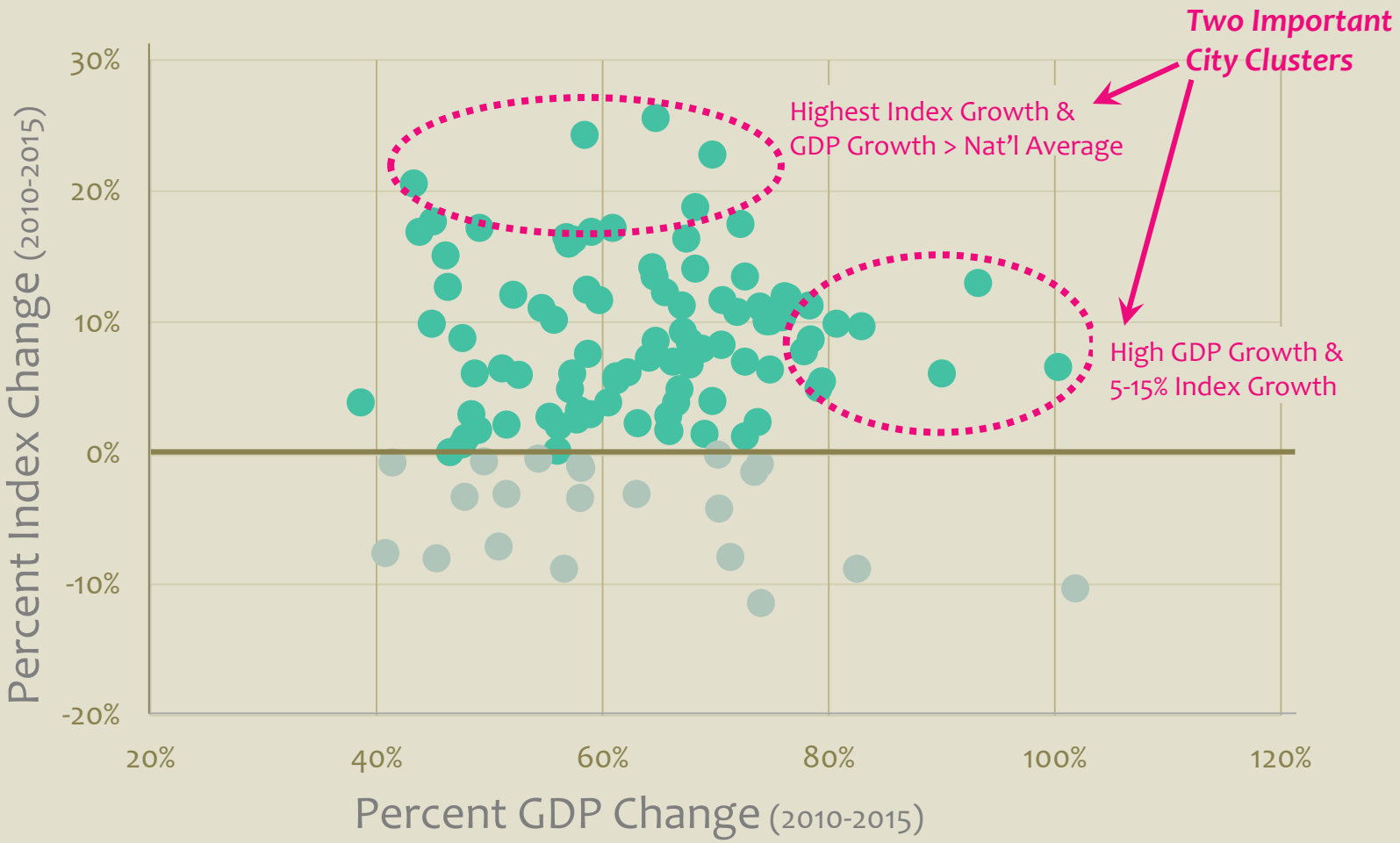
Chinese Cities are seeing **Green Growth :**

城市绿色低碳状况整体好转

两个典型城市组：
- GDP增长远超国家平均水平同时也实现指数提升
- 指数大幅度提升，同时实现高GDP增长

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

78%的城市实现经济增长和绿色低碳双赢



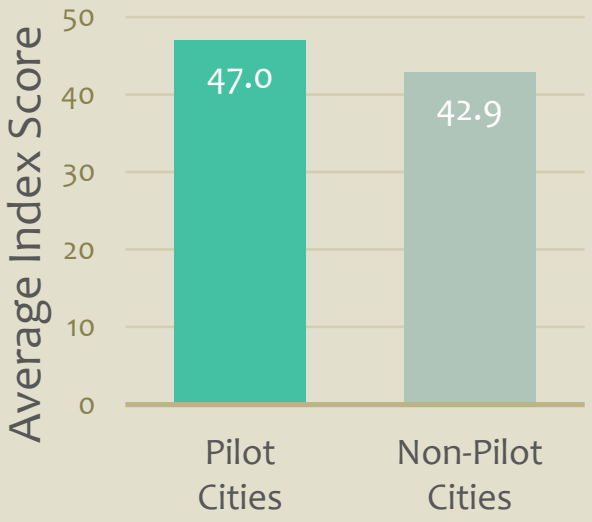
2015

低碳试点表现优于非试点地区

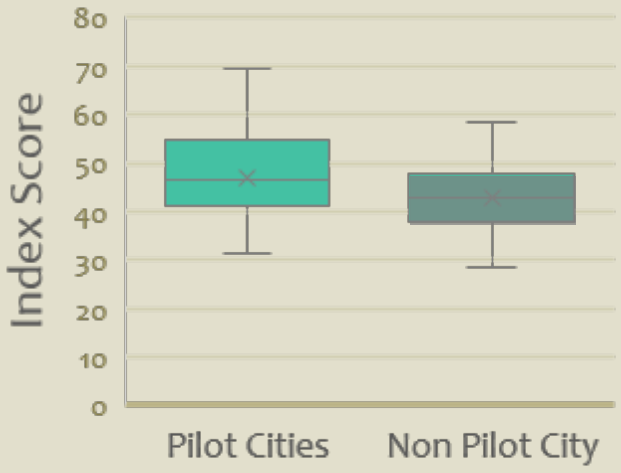
China's Low-Carbon Pilot Cities show the way :

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

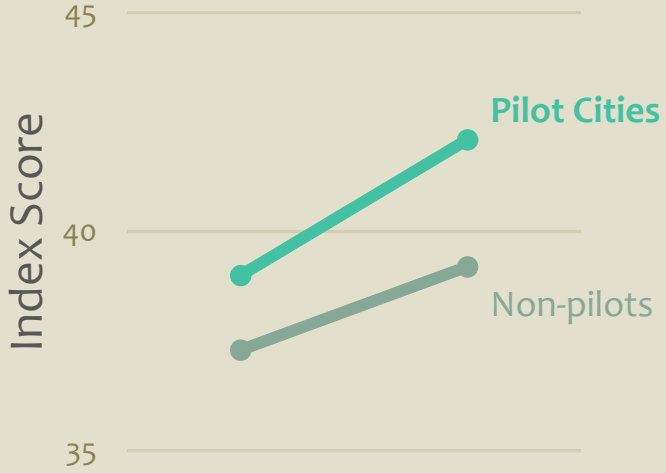
Pilot cities have higher average scores…



Pilot cities have scores in a higher range….



And, pilot cities' scores are improving faster.



2015

INTRODUCING THE NEW

China Green and Low-Carbon Cities Index (CGLCC Index)
中国绿色低碳发展指数介绍和特点

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

科学的城市分类

FOCUS ON KEY ECONOMIC & SOCIAL FACTORS

- Group and evaluate cities according to development
- Three economic groups
- Three city-size groups

反映近期政策变化

REFLECTS RECENT POLICY EFFORTS

- Five policy indicators
- Assess efforts and new actions

分行业量化指标

TRACKS LOW-CARBON PERFORMANCE

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

确认改善方向

DEFINED USING GLOBAL AND DOMESTIC BENCHMARKS

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

INTRODUCING THE NEW

China Green and Low-Carbon Cities Index (CGLCC Index)

115 Chinese Cities

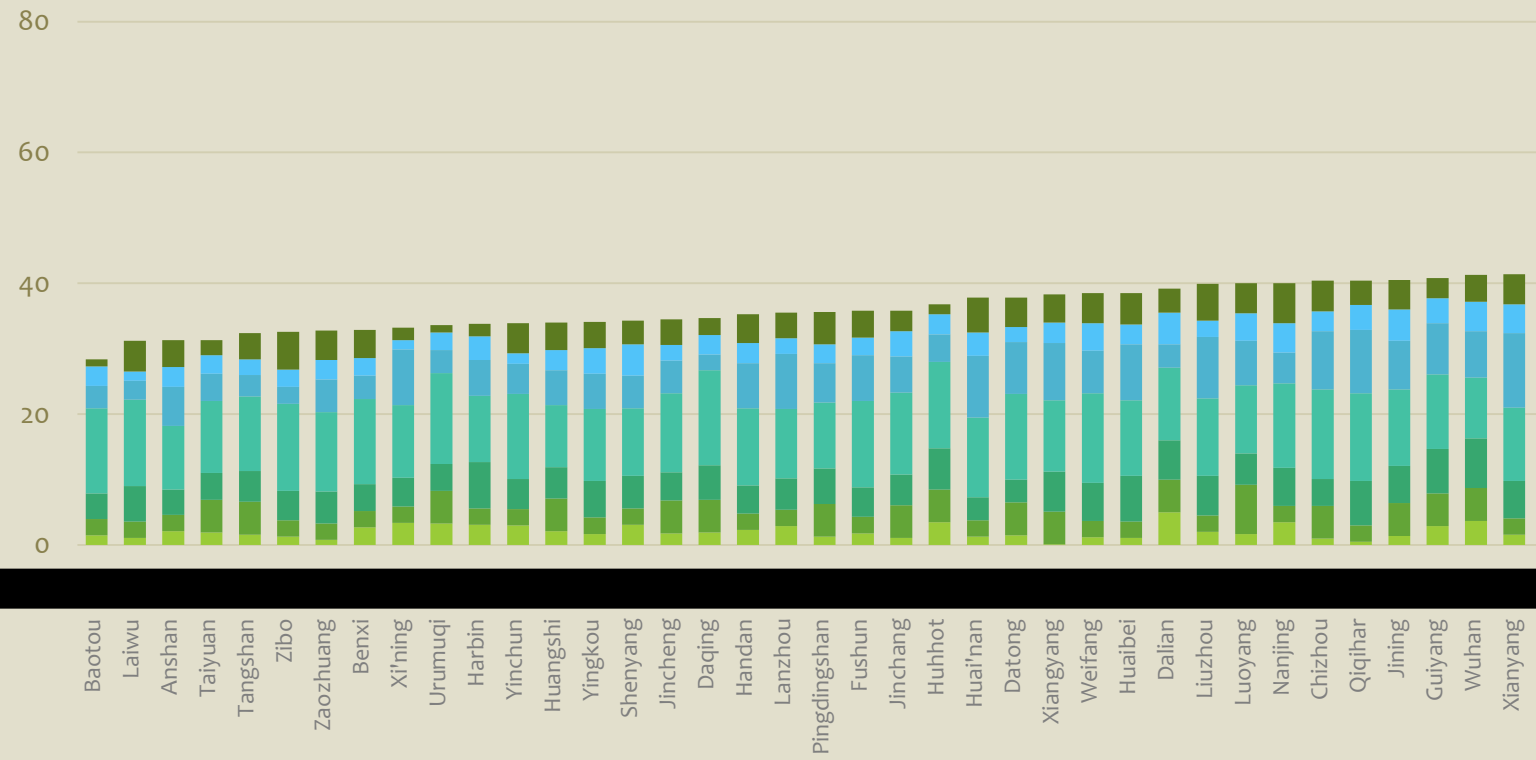
7 Index Categories

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

能源和电力 建筑
经济结构 环境和土地
工业 利用
交通 制度体系

Based on publicly avaialble data
依靠公开可得数据推算

Composite Index Scores

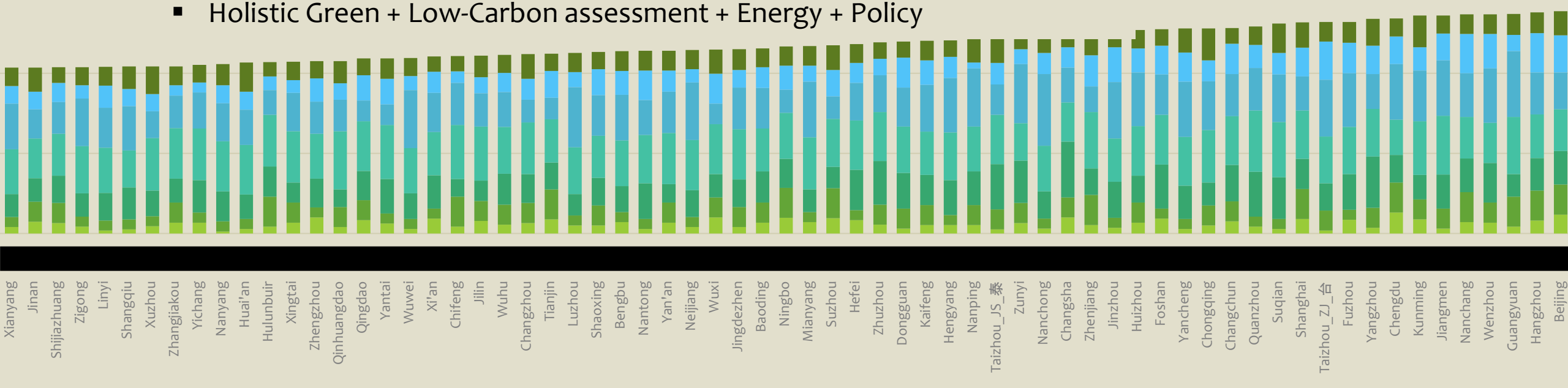


INTRODUCING THE NEW

China Green and Low-Carbon Cities Index (CGLCC Index)

Why a new indicator system?

- Current international index and benchmark not suitable for China; Domestic index lacks of holistic approach and appropriate benchmark
- 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 + Policy



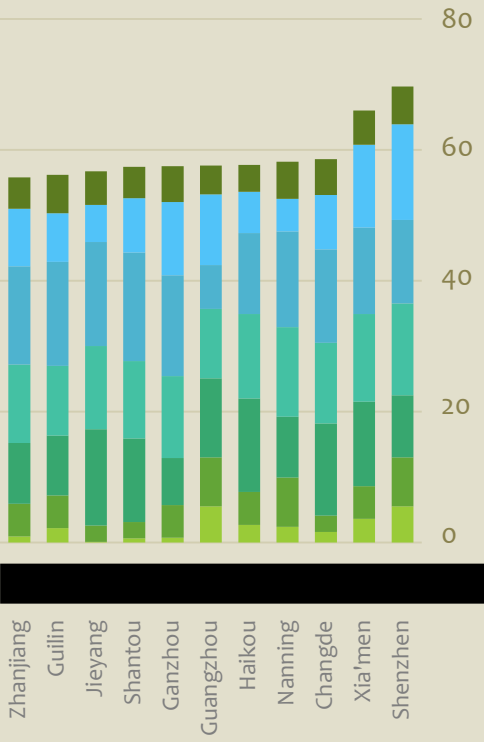
INTRODUCING THE NEW

China Green and Low-Carbon Cities Index (CGLCC Index)

中国绿色低碳发展指数介绍和特点

Building off a strong foundation...

基于以往经验

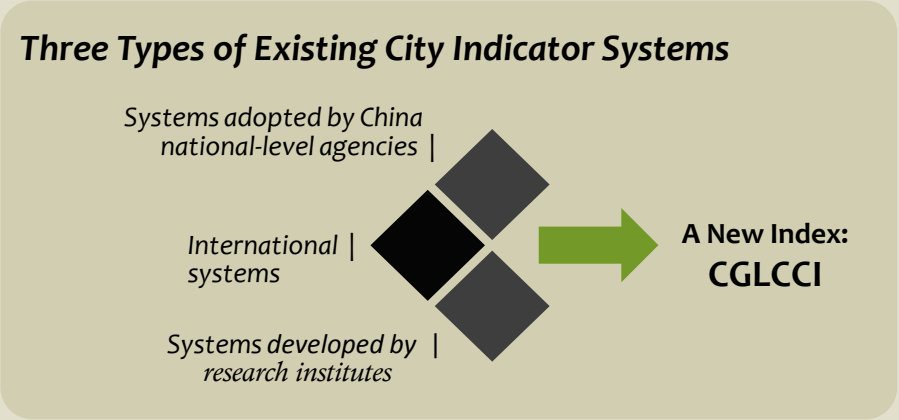


Adapting existing tools:

ELITE Cities (LBNL)

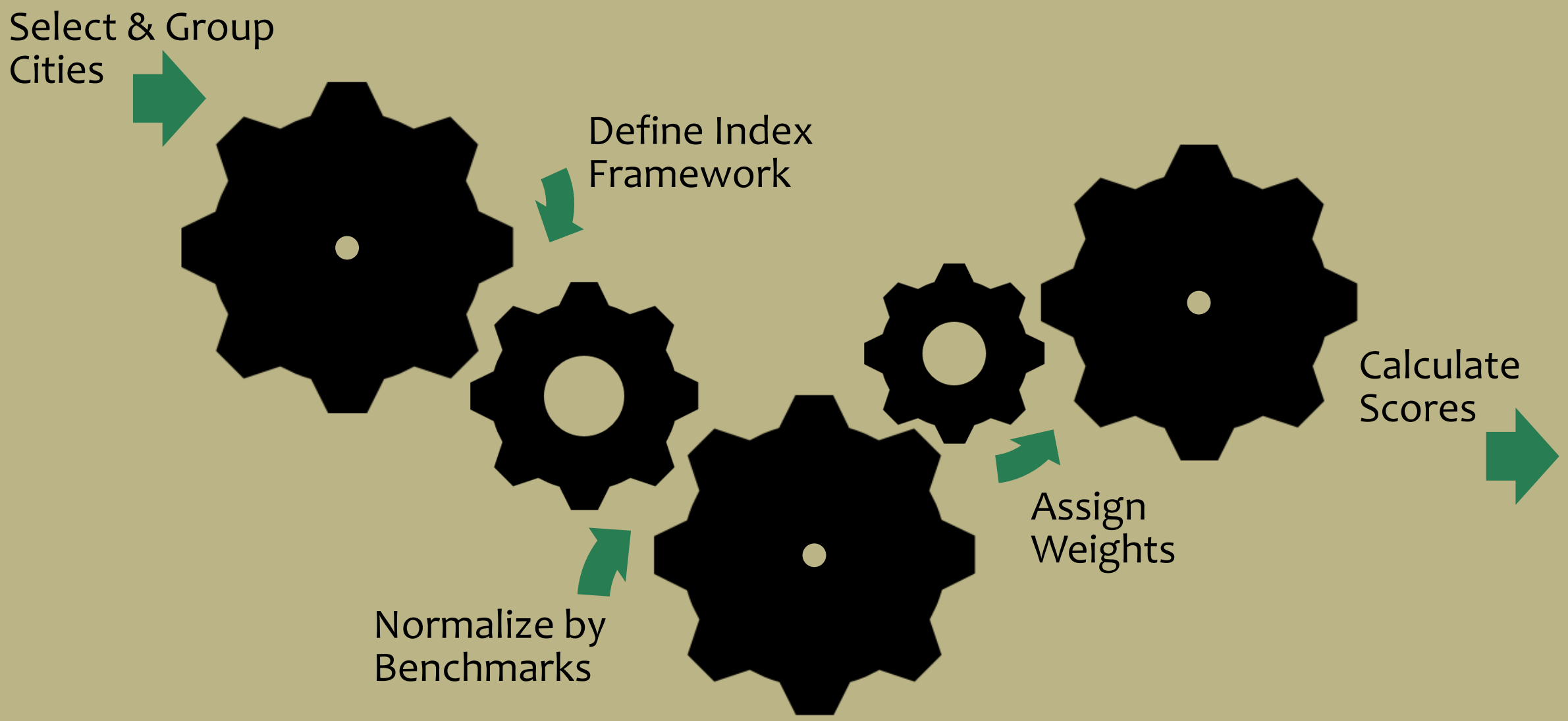
BEST Cities (LBNL)

Learning from international city indicators:



How does the CGLCC Index Work ?
CGLCC指数体系建立

Inside the Index: CGLCC Methodology 指数构建



METHODOLOGY:

City Selection and City Grouping
城市选择

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

METHODOLOGY:

Index Framework and Weighting: Categories + Indicator 指数结构

7 Categories / Sub-Categories

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

23 Indicators

Indicator	Weight	Data
		#
		#
		#
		#
		#
		#
		#
		#
		#
		#
		#
		#
		#
		#

$\sum = 100\%$

METHODOLOGY:

Benchmarking Performance against Global Best Cities 对标

Benchmarking Principles:

- Meaningful Measures – connect to green & low-carbon goals
- Ambitious – future looking, aspirational and goal stretching
- **International and Best practices within China**– connect to best cities, and other indices

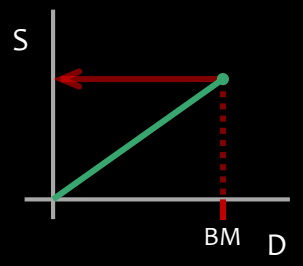
Three Types of Benchmarks:

- International Best Practice 国际最佳
- China Policy Targets 中国现有政策目标
- +20% Better than Best City in Sample 国内最佳（相当于该指数国际最佳）

Two Types of Benchmark Functions

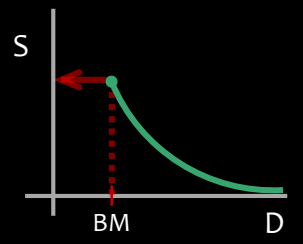
- Directly Proportional
  High Data Value = HIGH Score Value

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



- Inversely Proportional
  High Data Value = LOW Score Value

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



EXPLORING CGLCC INDEX RESULTS :

What does the index results imply for low carbon transition?

Which types of cities perform the best?

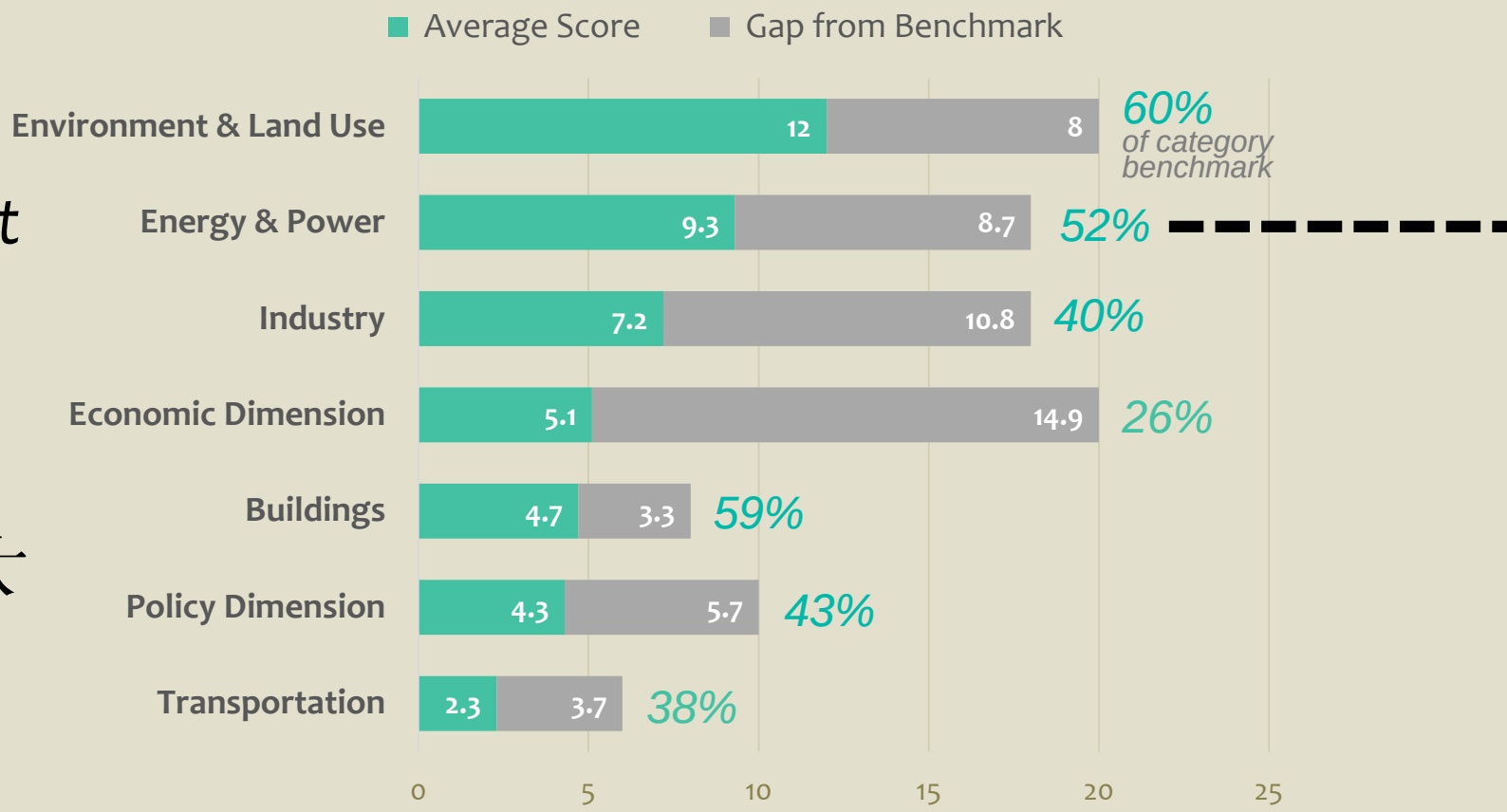
What area needs further improvements?

主要结论

Exploring Results :
CGLCC Index Categories

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

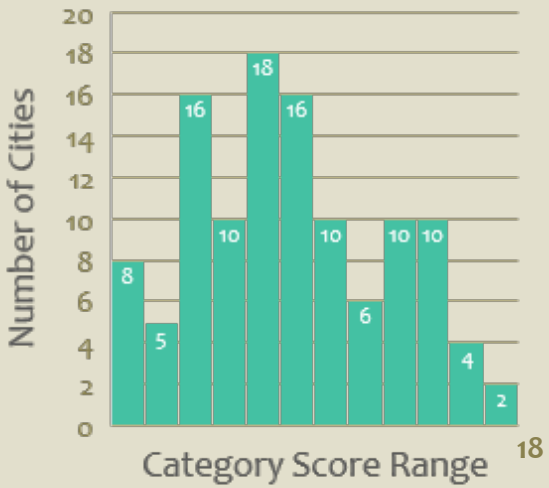
城市低碳绿色改善空间巨大



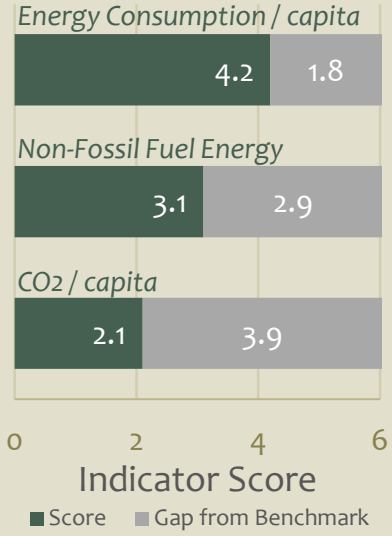
Exploring Results:
CGLCC Index primary category example
行业分析示例

Energy & Power

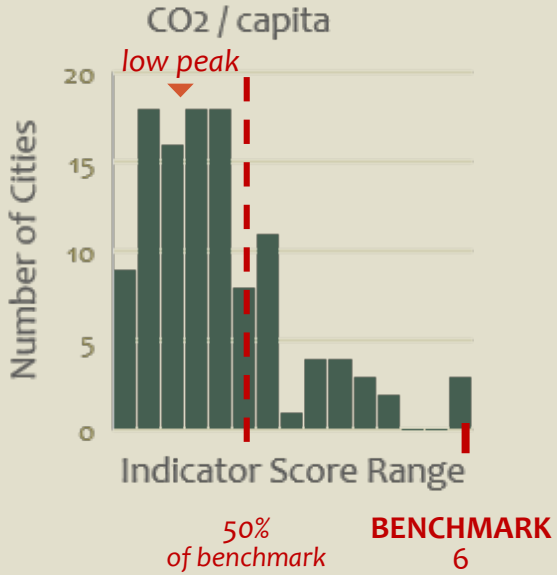
行业分指数分布
Category Scores Histogram
115 sample cities' distribution



指标得分和基准值差距
Indicator Scores vs Benchmark
3 indicators in E&P category
115 sample cities



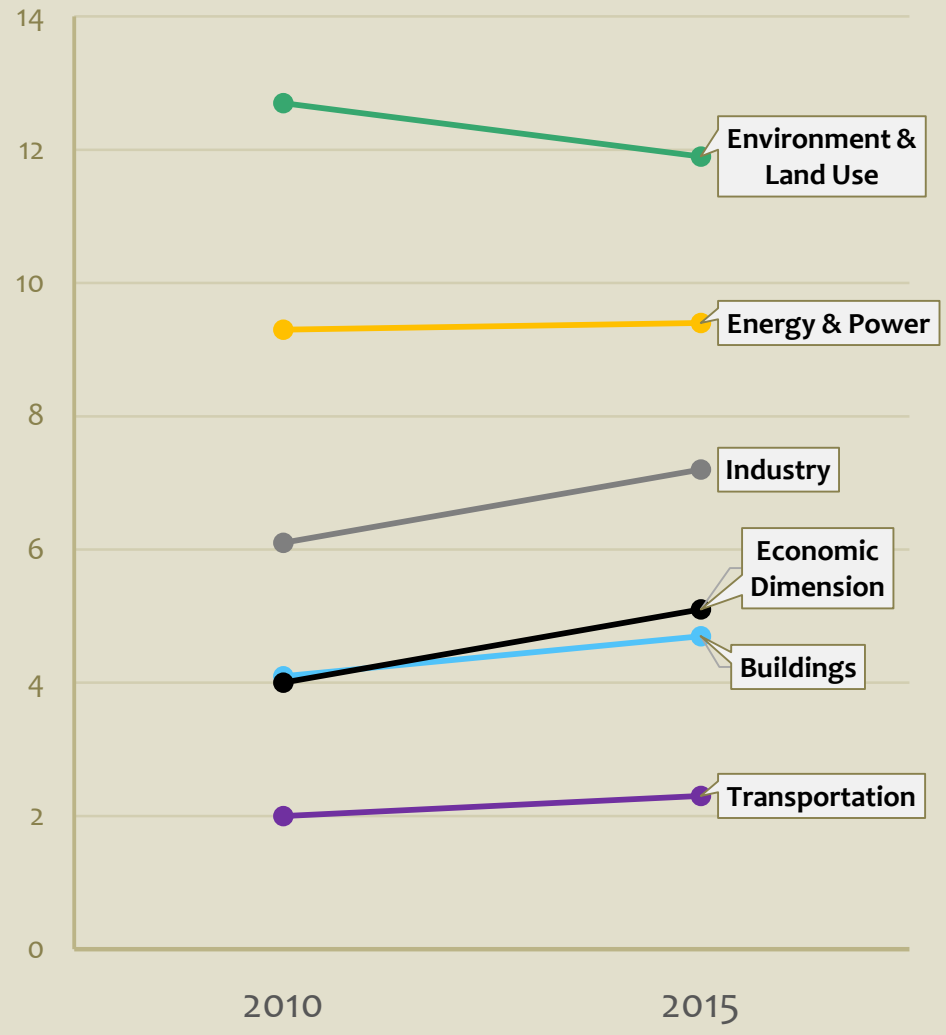
指标得分分布
Indicator Scores Histogram
One indicator from E&P category
115 sample cities' distribution



Exploring Results: Index Category Change

Most categories improved in Chinese cities, form 2010-2015

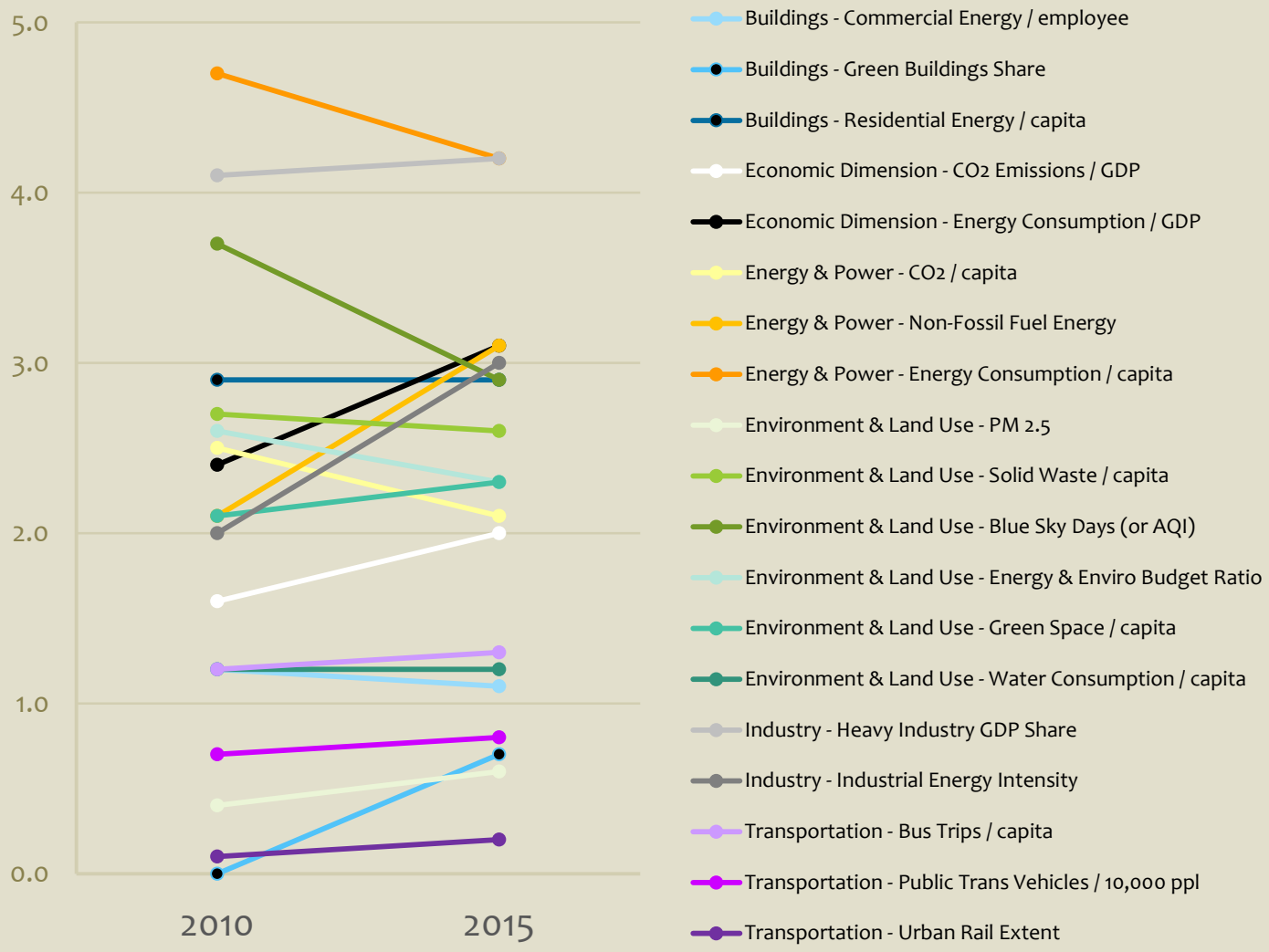
大部分指数得分改善



- 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 各指数表现不一致



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

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

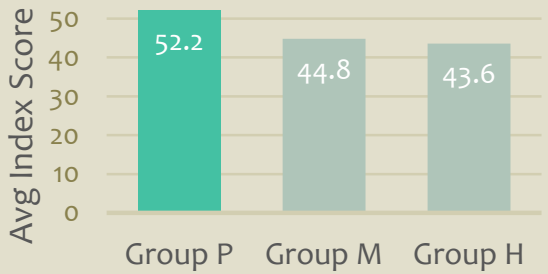
- 8 out of 19 index indicators have score decrease, 2010-2015

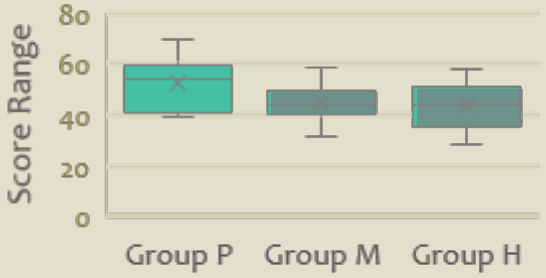
  Biggest drop in score is -21% (Blue Sky Days , AQI)

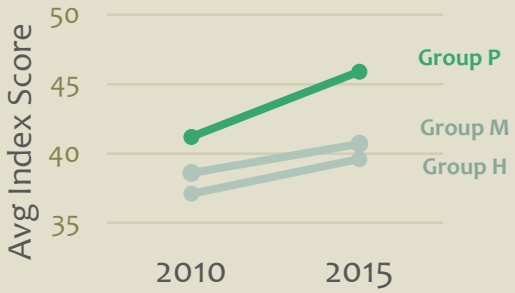
Exploring Results:
City Group Scores
不同城市分类分析

Larger, Wealthier, Developed cities *have better, faster scores in the CGLCC Index.*

Economic Groups

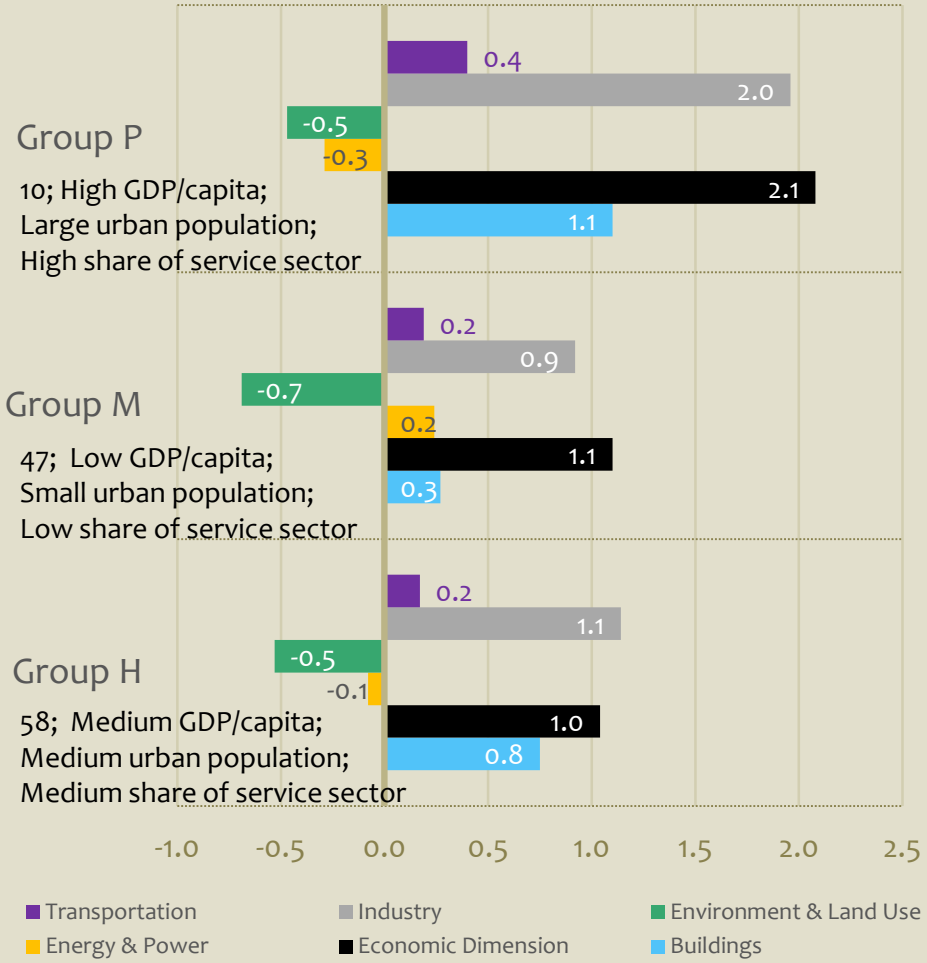






Group Score Changes, by Category

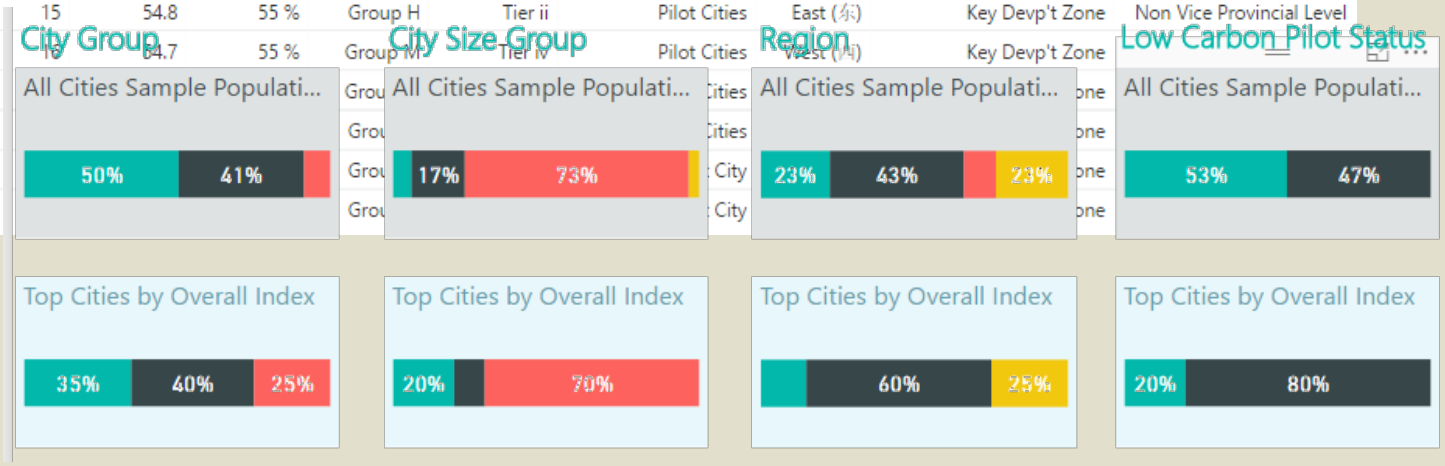
- Environmental and Power sector remain challenging for cities
- Cities have focused on improving industry structure and economic energy/carbon intensity, yet still far from benchmark



Exploring Results:
Top Scoring Cities
最佳城市分析

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

City Name	Overall Rank	Avg Score of Cities	I to Imax Ratio	First City Group	First City Tier-2013	First Low Carbon Pilot Status (groups)	First Region	First City Functional Zone	First City Admin Level
Shenzhen	1	69.7	70 %	Group P	Tier i	Pilot Cities	East (东)	Optimized Devp't Zone	Vice Provincial Level
Xia'men	2	66.0	66 %	Group P	Tier ii	Pilot Cities	East (东)	Key Devp't Zone	Vice Provincial Level
Changde	3	58.5	58 %	Group M	Tier iii	Non Pilot City	Central (...	Key Devp't Zone	Non Vice Provincial Level
Nanning	4	58.2	58 %	Group M	Tier ii	Non Pilot City	West (西)	Key Devp't Zone	Non Vice Provincial Level
Haikou	5	57.7	58 %	Group H	Tier ii	Pilot Cities	East (东)	Key Devp't Zone	Non Vice Provincial Level
Ganzhou	6	57.5	58 %	Group M	Tier iii	Pilot Cities	Central (...	Key Devp't Zone	Non Vice Provincial Level
Guangzhou	7	57.5	57 %	Group P	Tier i	Pilot Cities	East (东)	Optimized Devp't Zone	Vice Provincial Level
Shantou	8	57.4	57 %	Group H	Tier ii	Pilot Cities	East (东)	Key Devp't Zone	Non Vice Provincial Level
Jieyang	9	56.7	57 %	Group M	Tier iii	Pilot Cities	East (东)	Key Devp't Zone	Non Vice Provincial Level
Guilin	10	56.3	56 %	Group M	Tier iii	Pilot Cities	West (西)	Key Devp't Zone	Non Vice Provincial Level
Zhanjiang	11	55.8	56 %	Group M	Tier iii	Pilot Cities	East (东)	Key Devp't Zone	Non Vice Provincial Level
Beijing	12	55.5	55 %	Group P	Tier i	Pilot Cities	East (东)	Optimized Devp't Zone	Municipality
Hangzhou	13	55.3	55 %	Group P	Tier ii	Pilot Cities	East (东)	Optimized Devp't Zone	Vice Provincial Level
Nanchang	14	54.8	55 %	Group H	Tier ii	Pilot Cities	Central (...	Key Devp't Zone	Non Vice Provincial Level
Wenzhou	15	54.8	55 %	Group H	Tier ii	Pilot Cities	East (东)	Key Devp't Zone	Non Vice Provincial Level
Guangyuan	16	54.7	55 %	Group M	Tier iv	Pilot Cities	West (西)	Key Devp't Zone	
Jiangmen				Grou		Cities			one
Kunming				Grou		Cities			one
Chengdu				Grou		City			one
Yangzhou				Grou		City			one



Exploring Results：
Policy for Low-Carbon Performance 政策分析

- Pilot cities are establishing more climate policy, more energy planning, and more public outreach than non-pilot cities 试点城市比非试点城市执行更多气候政策，能源规划以及政策推广项目
- The top performers in Policy and Outreach are located in nearly every region of China 政策方面得分较高的城市广泛分布于各类经济地理区
- Most cities do not have detailed energy plans, nor do they have authority over power generation to pursue renewable energy大多城市没有设立能源规划，可再生发电常不在市政府管辖区内
- None of the Chinese cities analyzed for the *City Index* have yet completed climate change adaptation or resilience plans尚没有城市建立气候适应及韧性相关政策

Key Findings 研究主要发现

- Chinese Cities have considerable room to improve

  城市绿色低碳状况改善空间巨大

  Especially in the economic, transportation, & industry dimensions

- Currently Economic, Energy, + Industry categories drive index scores

  目前经济结构、能源和工业政策是主要的驱动力

  Urban energy and economic structure are key part of low-carbon transition

- Buildings and transport are challenged by rapid urbanization

  建筑和交通行业随着快速城镇化进程，挑战愈加明显

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

  各种类型城市都可能在现有基础实现优秀的绿色低碳表现

  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

Contribution 研究贡献

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

- The CGLCC Index is useful to compare China's cities to global and domestic benchmarks, on multiple green + low-carbon dimensions.通过指数进行低碳和绿色多维度的国际国内比较
- The index helps in identifying promising opportunities, and in understanding key challenge areas. 通过指数确认低碳绿色转型的重点领域
- National and Local governments can use CGLCC Index scores to prioritize policies and financial support; and to promote city exchanges and learning 城市自我诊断体系，判断政策、财政、能力建设支持的优先排序
- Ranking motivates cities to learn from each other 城市比较有助于城市之间相互学习

Limitations + Next Steps 研究局限及下一步工作

Some Known Limitations

- Data availability limitations
- Missing certain indicators such as urban form dimensions, livability, water quality and urban consumption etc

CGLCC Index Next Steps

- Work with cities to improve data collection scope and calibration 提高数据精准度和收集广度
- Update index regularly; track cities' progress 定期更新指数
- Build index into open, online platform 开放的城市"诊断"工具
- Analyze policy implementation processes 深入分析政策实施过程

End

Thank You