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# 重构

# 中国低碳城市评价指标体系：

## 方法学研究与应用指南

RECONSTRUCTION OF  
CHINA LOW-CARBON CITY  
EVALUATION INDICATOR SYSTEM:

A Methodological Guide for Application

本报告由瑞士发展合作署资助

中国社会科学院城市发展与环境研究所 著

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Produced by the Institute for Urban and Environmental Studies,  
Chinese Academy of Social Sciences

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著 者 / 中国社会科学院城市发展与环境研究所

出 版 人 / 谢寿光

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责任编辑 / 蔡莎莎

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# “节能减排与可再生能源丛书”

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# 序

1950年9月14日，瑞士与中国建立外交关系。建交60多年来，中瑞高层互访频繁，经贸合作水平不断提升，教育、科技、旅游、人员培训等领域交流持续深化。在发展对华关系上，瑞士走在欧洲前列，创造了许多“第一”。瑞士是最早与中国建交的西方国家之一。中国对外开放的大门刚刚打开时，瑞士企业就率先走进中国市场，并最先在中国建立合资工业企业。瑞士还是最早承认中国完全市场经济地位的欧洲大陆国家。这些敢为“第一”的背后，是中瑞两国关系始终蕴涵着的开拓进取、不断创新精神。

气候变化引起世界各国广泛关注，成为当今人类社会面临的共同问题。瑞中签署了有关气候变化的合作备忘录。中国在大力推进生态文明建设，积极应对气候变化，低碳发展等方面成效显著。瑞士赞赏中国积极应对气候变化的政策、行动与成就，愿与中国进一步加强相关政策对接和务实合作，将气候变化领域的交流合作打造成为双边关系的新亮点，为携手应对气候变化这一全球性挑战做出贡献。

2010年6月瑞士发展合作署与中国相关机构共同开展了“中国低碳城市项目”，旨在加强城市规划与市政管理能力建设，通过广泛参与，制定城市低碳发展远景、发展战略、行动计划和监督体系，推动低

碳城市建设；在城市间开展最佳实践交流，分享科技知识与经验；开发综合全面、富有中国特色的低碳标准与管理体系；促进可再生能源、绿色建筑和可持续的交通体系建设等。项目开展3年来，银川、德州、眉山、北京东城区、保定、昆明、云南剑川7个城市（地区）已加入该项目，有力地推动了中国低碳城市建设。

中国社会科学院城市发展与环境研究所是中国低碳经济与低碳城市研究的先行者与领跑者，在瑞士发展合作署资助下，承担了“中国低碳城市评价指标体系研究”，旨在研究借鉴欧洲能源奖以及瑞士能源城市项目的成功经验，结合中国城市发展实际，共同推动中国低碳城市建设进程走向规范化。我们欣喜地看到，通过3年的深入研究，项目组重构中国低碳城市评价指标体系，完成了有方法学支撑的中国低碳城市评价指标体系框架及应用指南，并在山东德州、河北保定、云南昆明等案例城市进行了成功测试。

时值国务院总理李克强先生访问瑞士之际，研究成果即将付梓。我要对中国社会科学院城市发展与环境研究所潘家华所长及其研究团队和全体作者表示诚挚的谢意，对他们的成果表示热烈祝贺。目前，中国政府已启动两批国家低碳省区和低碳城市试点工作，其他地区和城市的低碳转型实践也在如火如荼地展开。相信该研究成果的出版将对指导案例城市低碳发展实践将发挥积极的推动作用。

查斐 博士

瑞士驻华大使馆发展与合作参赞

2013年6月5日

# Foreword

As one of the first few western countries, Switzerland established diplomatic relations with China on September 14, 1950. Since then, trade and economic cooperation have steadily increased, and collaboration in various fields including education, tourism, training, sciences and technology have substantially strengthened. There have been frequent high-level visits between the two governments over last years. Upon China's reform and opening-up, Swiss companies took the lead entering China's market and established joint venture industrial enterprises. Switzerland was also the first continental European country to recognize China's full market economy status. All these were the result of the pioneering and innovative spirit that has been embedded in the Sino-Swiss bilateral relations.

While climate change has become the common challenge for human society and attracted widespread concern around the world, Switzerland and China signed a memorandum of cooperation on climate change. China has achieved remarkable results for low-carbon development as it has been vigorously promoting the construction of ecological civilization and actively responding to climate change. Switzerland appreciates China's progressive

climate change policies, broad actions and various achievements and is willing to work with China to further strengthen cooperation on policies and pragmatic projects. Such cooperation in the field of climate change will be the new highlights for the two countries' bilateral relation, and will contribute to the course of addressing global climate challenges.

In June 2010, the Swiss Agency for Development and Cooperation launched the “Low-carbon City in China” project jointly with its Chinese partners. The project aims at building capacity for urban planning and municipal management, developing vision, strategy, action plan and supervision system to promote low-carbon urban construction, enabling best practice exchange and knowledge sharing, developing comprehensive China-specific low-carbon standards and management systems, and promoting the development of renewable energy, green buildings and sustainable transportation. Since the launch of the project, seven cities ( Yinchuan, Dezhou, Meishan, Dongcheng District in Beijing, Baoding, Kunming and Jianchuan ) have joined the project over three years, constituting a strong impetus to China's low-carbon city construction.

The Institute for Urban and Environmental Studies of the Chinese Academy of Social Sciences is a leading institute for low-carbon economic researches and low-carbon city development consulting. The Institute for Urban and Environmental Studies has been cooperating with the Swiss Agency for Development and Cooperation towards the development of a new “China Low-carbon City Evaluation Indicator System”. Such research aims at studying and learning from European Energy Award and the Swiss Energy City experiences and at applying their lessons learnt to guide China's low-carbon



city construction under due consideration of China's context. We are very pleased to see that, through three years of in-depth research, the project team has proposed a low-carbon city evaluation indicator system for China, completed a framework and application guidelines to evaluate low-carbon cities with methodological support, and successfully tested them in pilot cities including Dezhou, Baoding and Kunming.

Right at the time when China's Prime Minister Li Keqiang is visiting Switzerland, the report on this research has become ready for publication. I would like to extend my sincere appreciation and warm congratulations for the hard work accomplished by the project team under the direction of Professor Pan Jiahua, Director-General of Institute for Urban and Environmental Studies of the Chinese Academy of Social Sciences. The Chinese government has recently started two batches of low-carbon pilot provinces and low-carbon pilot cities, followed by numerous other regions and cities that are also aiming at a progressive transition to low-carbon society. I believe that this publication will provide a very valuable guidance to China's low-carbon urban development practice.



Counselor for Development and Cooperation

Swiss Embassy

June 5, 2013

# 前 言

低碳经济既是一个理论问题又是一个实践问题，既需要理论指导也需要实际解决方案。城市是国家经济发展的主要载体，国家低碳经济目标的实现最终需要具体落实分解到低碳城市建设中来。随着国内低碳省市的试点工作蓬勃发展，越来越多的城市开始根据自身特点提出低碳发展专项规划和相应政策。然而各界对于低碳城市的概念理解各异，如火如荼的低碳经济实践也呼唤着建立一套综合评价指标体系。

从2008年起，中国社会科学院城市发展与环境研究所率先在国内开展了中国低碳城市指标体系研究。在对低碳经济进行概念界定的基础上，构建了以低碳产出、低碳消费、低碳资源和低碳政策为维度的衡量指标体系，并在广元市、吉林市、深圳市和黄石市等一些城市的低碳发展路线图研究中得以应用，被一些媒体视为中国低碳城市的评价标准。

作为中国与瑞士在气候变化领域合作的重要组成部分，2010年，瑞士发展合作署在中国发起“中国低碳城市项目”，并委托中国社会科学院城市发展与环境研究所，借鉴国际经验，深化拓展“中国低碳城市评价指标体系研究”，共同推动中国低碳城市建设走向规范化。通过

近三年的研究，编制完成了有方法论支撑的中国低碳城市评价指标体系框架及应用指南。

作为中瑞合作低碳城市项目为中国城市开发的评价工具，中国低碳城市评价指标体系及应用指南借鉴了欧洲能源奖以及瑞士能源城市项目的成功经验，基于中国国情进行调整，并在山东德州、河北保定、云南昆明、四川眉山、宁夏银川、北京市东城区进行了测试。

中国低碳城市评价指标体系由指标清单、低碳城市评估报告和城市行动计划三大部分组成。三者相辅相成，指标清单又分为主要指标体系和支持指标体系两大评价工具，也是整个指标体系的核心；评估报告是产出结果，是对案例城市低碳建设行动的阶段性总结；行动计划是建议，也是城市在下一轮低碳建设中改进的依据。

中国低碳城市指标体系的评价方法学的理论基础来自管理体系领域耳熟能详的“PDCA”（plan, do, check, action）理念。通过“规划—执行—检查—处理”这一周而复始的循环，逐渐总结成功或失败的经验，在下一轮循环中不断改进。该指标体系的最大特点是不仅能够反映城市低碳发展现状，还能够在考虑城市地域特点和资源禀赋的同时兼顾城市向低碳转型的努力程度，帮助城市了解其低碳发展的现状与差距，发现问题，找出优势与劣势，借鉴先进城市成功经验，进而科学地推动中国城市低碳转型进程。

作为一项探索性和前沿性的研究工作，我们不断对项目研究目标与研究方向进行调整。在研究过程中，瑞士发展合作署前参赞梅尔（Walter Meyer）先生深入介入了项目研究并给予了具体的技术指导，王丽艳博士、刘可先生、白晨曦博士、李扬女士、白洁女士也为项目执行给予巨大支持。特别要感谢现任参赞菲利普（Philippe Zahner）先生，他在项目执行每每进入困境之际，总是能够提出建设性的解决方案，为

项目取得最终成果起到至关重要的作用。

感谢中国低碳城市项目管理办公室对项目的支持，张瑞杰主任、靳青经理、翁维力经理、解洪兴经理、王波勇经理不仅具备专业知识，而且具有很高的研究热情，他们协调了本研究的所有调研工作，并全程参与指导。

感谢中国低碳城市项目试点城市山东德州、河北保定、云南昆明、四川眉山、宁夏银川、北京市东城区政府对本项目研究的配合与支持。在中国低碳城市项目管理办公室的协调下，项目组多次前往上述试点城市进行座谈调研，测试指标体系和收集数据。特别要感谢德州市节能监察支队、保定市低碳经济研究院、昆明市低碳发展研究中心、眉山市质量监督局、银川市发改委、北京市东城区发改委和产促局相关领导和同人对项目组的大力支持。

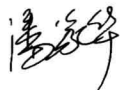
特别要感谢瑞士专家 Robert Harbaty 先生对项目的贡献，他带来了欧洲的先进理念和方法；特别要感谢国家发改委气候司蒋兆理处长对本项目研究的指导和充分肯定，让我们及时了解国家需求并充满研究动力。

中国社会科学院城市发展与环境研究所潘家华所长为项目总负责人，庄贵阳研究员为项目执行负责人，朱守先副研究员负责项目协调工作。中国社会科学院城市发展与环境研究所张莹副研究员、熊娜博士、崔玉清博士、袁路博士生、周亚敏博士、李庆高级工程师、穆昊明博士、梁本凡研究员先后参与到项目研究工作中，并做出重要贡献。

潘家华研究员、庄贵阳研究员和朱守先副研究员曾在多种场合（国内外会议和论坛）上推介本项目研究成果。在 2011 年 12 月德班联合国气候变化大会上，项目组把项目简介在“中国角”以及中国社

会科学院可持续发展研究中心展台分发，并在相应边会上推介研究成果，引起很多与会代表的关注并索要研究成果。“三年磨一剑”的成果终于要与读者见面了，我们欣喜之余，更希望有更多的城市能够将本项目的指南用于城市低碳管理，我们也愿意进一步为城市的低碳发展提供智力支持。

中国社会科学院城市发展与环境研究所

 所长

2013年5月30日

## **Preface**

The development of low-carbon economy requires both theoretical guidance and practical solutions. Cities are the major agents to achieve national economic development, hence national goals of low-carbon economy development will eventually need to break down to city level and cannot be achieved without concrete implementation of low-carbon urban construction of the cities. With the domestic low-carbon pilot provinces and cities booming, more and more cities began to put forward low-carbon development plans and policies based on their characteristics. However, with all the different understanding of the concept of low-carbon city and unguided practice, there is an urgent need to develop a comprehensive evaluation indicator system.

Since 2008, Institute for Urban and Environmental Studies in Chinese Academy of Social Sciences took the lead in China's low-carbon city indicator system researches. On the basis of defining the concept of low-carbon economy, the institute constructed an indicator system consisting four clusters of indicators: low-carbon output, low-carbon consumption, low-carbon resources and low-carbon policies. Such indicator system system has been tested in several cases including the low-carbon roadmap development for

Guangyuan City, Jilin City, Shenzhen City and Huangshi City. Some media reported this indicator system as “China’s low-carbon city evaluation criteria”.

As an important component of the cooperation between China and Switzerland in the field of climate change, Swiss Agency for Development and Cooperation in China launched the “China Low-carbon City Project” in 2010 and entrusted the Institute for Urban and Environmental Studies in Chinese Academy of Social Sciences to learn from international experience and further develop “China Low-carbon City Evaluation Index/indicator System” in order to provide standards and guidance for China’s low carbon city construction. After nearly three years of research, the institute developed low-carbon city evaluation framework with methodological support for China and its application guidance.

This index/indicator system is a tool developed with the funding of Sino-Swiss low-carbon city project with the target of guiding China’s low-carbon city development. Such index/indicator system was developed through learning from the successful experience drawn in European Energy Award and Swiss Energy City Project with adjustments based on China’s actualities. The indicator system has been tested in several cities, including Dezhou city in Shandong, Baoding in Hebei, Kunming in Yunnan, Meishan in Sichuan, Yinchuan in Ningxia, and Dongcheng District in Beijing.

“China Low-carbon City Evaluation Index/indicator System” consists of three integral and inter-connected parts - a list of indicators, low-carbon city assessment report and action plans for the case study cities. The core of this index/indicator system, the list of indicators, is further divided into two parts - major indicators and supporting indicators. Evaluation report is the result of

application of the index/indicator system as well as a review and summary for the pilot cities' low-carbon city construction, while the action plans provide recommendation for future improvement.

The theoretical basis of methodologies for “China Low-carbon City Evaluation Index/indicator system” is the well-known “PDCA” in management science. Through the continuous “Plan - Do - Check - Action” cycle, experience could be summarized and lessons could be learned for future improvement. The most important feature of this indicator system is that it is not only able to evaluate the status of low-carbon urban development, but also to measure the efforts of the cities enables while taking into account their different geographical features and natural resource endowment. The indicator system could help cities to understand their current achievements, to identify their strengths and weaknesses, to learn from the successful experience of other cities, so that they could advance their low-carbon transition process in a more efficient way.

As this is an exploratory and cutting-edge research, throughout this project there had been several adjustments of research objectives. During the study, Mr. Walter Meyer, former Counsellor in Swiss Agency for Development and Cooperation was extensively involved in the project and provided detailed technical guidance. Moreover, Dr. Wang Liyan, Mr. Liu Ke, Dr. Bai Chenxi, Miss Li Yang and Miss Bai Jie also gave great support for the project implementation. We would like to extend our special thanks to Mr. Philippe Zahner, the incumbent Counsellor, who always found constructive solutions whenever the project encountered difficulties and stalled. He played a critical role helping the project to finally succeed.



The support given by the project management office is highly appreciated. Mr. Zhang Rui Jie, director of PMO together with project managers Ms. Jin Qing, Ms. Weng Weili, Mr. Xie Hongxing and Mr. Wang Boyong are professionals with both expertise and enthusiasm for the research project. They coordinated and participated in all field trip studies of this project.

We also acknowledge the support provided by government officials in pilot cities, including those from Dezhou, Baoding, Kunming, Meishan, Yinchuan and Dongcheng District in Beijing. Under the coordination of PMO, the research team conducted several field trips in these pilot cities for interviews, indicator testing and data collection. Special thanks to Dezhou Energy Monitoring Commission, School of Economics and Management in North China Electric Power University, and the carbon indicator system research team in Kunming Low-carbon Development Research Center.

We owe the success also to Mr. Robert Harbaty, a Swiss expert who brought in advanced concepts and methodologies from Europe, and to Mr. Jiang Zhaoli, Division Chief in Department of Climate Change in National Development and Reform Commission, who provided both guidance and motivation for the project team.

Mr. Pan Jiahua, director-general of Institute for Urban and Environmental Studies in Chinese Academy of Social Sciences, was the director of the research team. Mr. Zhuang Guiyang (Senior Research Fellow) was the acting team leader, and Mr. Zhu Shouxian (Associated Research Fellow) took responsibilities for overall coordination of the project. Ms. Zhang Ying (Associated Research Fellow), Dr. Xiong Na, Dr. Cui Yuqing, Dr. Yuan Lu, Dr. Zhou Yamin, Mr. Li Qing (Senior Engineer), Dr. Haoming,