(2012－2013)

Annual Greenbook for Sustainability of 35 Big Cities in China and 16 Cities in Yangtze River Delta

中国城市可持续发展绿皮书

中国35个大中城市和长三角16个城市可持续发展评估

诸大建　何芳　霍佳震　等著

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内 容 提 要

本书针对当前中国城镇化的问题，在梳理城市可持续发展及其评估理论的基础上，运用发展和生态“两个半球”的思路，将城市人类发展水平与生态投入放在一个框架下进行分析，构建了可持续发展评估指标体系和评估基本模型，并就其中涉及的数据收集与处理的具体方法进行详细说明。全书聚焦中国35个大中城市和16个长三角城市，评估解读了各个城市的生态投入及人类发展指标，进行了城市可持续发展分类，运用数据包络方法分析了城市可持续发展效率，进一步提出推动城市可持续发展的改进模式和优化路径。本书另外一个亮点是把中国4个代表性大城市与金砖国家的8个巨型城市进行了可持续发展状况的比较，为中国城市可持续发展评估融入国际标准和创立平台做出了开拓性的尝试和准备。

本书立足实际、体系完善、数据翔实、解读到位、案例丰富、分析深刻，表达形象直观。适合政府管理人士以及从事城市管理、可持续发展、经济发展等相关人士阅读，也可供科研院校相关领域研究者参考。

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《中国城市可持续发展绿皮书》
编委会

序言一

1987年联合国环境与发展委员会提出“既满足当代人的需求，又不对后代人满足其自身需求的能力构成危害的发展”的可持续发展战略，并在1992年“环境与发展”大会上将其定为各国未来长期发展战略。1994年经国务院批准的《中国21世纪议程》，是全球第一部国家级《21世纪议程》，它从我国的基本国情和发展战略出发，提出促进社会、经济、资源、环境以及人口、教育相互协调的可持续发展总体战略和政策措施方案。

今年是中国提出可持续发展国家战略的20周年，联合国人居署为迎接2016年的第三次人居大会发起了世界城市运动（World Urban Campaign），提出了“建设一个设施完备、繁荣昌盛、可持续发展的城市”的口号，对城市可持续发展的理解也更加全面和深入。可持续发展已经得到全球各界的认同，并已经成为全人类共同的愿景。

城市可持续发展评估是国内外研究的热点话题，一直被国际社会认为是促进可持续发展的重要措施。在1987年世界环境与发展委员会发布的《我们共同的未来》报告中就提出应“开发用于测定和评估发展进程的方法”，在1992年联合国通过的《21世纪议程》、2002年通过的《约翰内斯堡执行计划》中均提出应遵循各国国情和优先领域开展这方面的工作。多年来，联合国系统、民间团体、学术界等就此问题进行了不懈的努力。在此背景下，《中国可持续发展绿皮书（2012—2013）》（以下简称《绿皮书》）应运而生，在可持续发展评估领域做了新的探索。

以“可持续发展评估”为主题，《绿皮书》围绕可持续发展的两个半球和脱钩发展的理论，提出了城市可持续发展分类评估模型。根据中国35个大中城市和长三角16个城市的指标数据对城市进行四象限分类评估、效率评估，并在此基础上针对中国城市的发展状态提出相应的可持续发展模式和改进路径。譬如研究团队究发现，广州、深圳、南京、太原等城市，普遍具有“人类发展水平高但是生态投入消耗大”的特征。这一特点很清晰地呈现于一张坐标图上，横坐标代表“城市人类发展水平”，纵坐标代表“城市生态投入”，根据城市可持续发展评估结果，这些城市均位于该坐标右上区域，该区城市都是“高投入高产出”的欠持续发展方式，其改进路径需选择“提高质量”的B模式。而位于左上区域的乌鲁木齐、银川、呼和浩特

等城市则处于“高投入低产出”的不可持续发展状态，其改进路径需选择“提质＋扩容”的D模式。

如果说科学、创新的理论基础保证了本书高水准的研究成果，那么，成熟有效的研究方法和翔实有效的数据则进一步提升了《绿皮书》的实践意义与参考价值。此外，图文并茂也是本书的主要特色之一，书中的图表形象直观、丰富多样、可视化强，如采用了长于表达数据差异与分布的玫瑰图、效率前沿面、象限划分图等图表，进一步增加了本书的可读性。

《绿皮书》所提供的理论、实证及政策建议可以帮助城市管理者和城市研究者了解城市可持续发展状态，是可持续发展战略制定的基础，对中国城市转向新型城镇化具有重要的政策意义，是同济大学及其经济与管理学院面向社会开展城市可持续发展研究的重要成果。我深信凭借同济大学经济与管理学院的研究平台，以及研究人员科学、严谨的创新精神，通过不断完善，“城市可持续发展绿皮书系列”将成为同济大学及其经济与管理学院的一大品牌成果。

中国科学院院士

上海市规划委员会城市发展战略委员会主任委员

2014年8月

序言二

中国正在进行的城镇化是人类历史上史无前例的，未来 20 年城镇化将是中国经济增长、经济转型和社会发展的重要切入点和引擎。2014 年 3 月中共中央和国务院出台了《国家新型城镇化规划(2014—2020)》，对未来如何很好地推进城镇化建设进行了规划和展望，是中国城镇化转型发展的重要里程碑。选择怎样的城镇化路径对中国未来的经济、社会状况和面临的资源环境问题至关重要。

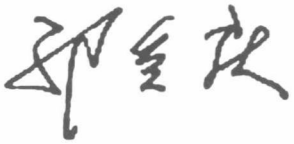
城镇化进程的加快，带来了巨大的经济效益，然而经济社会发展与资源浪费、环境污染倒挂的问题仍然十分严峻。上期《中国城市可持续发展绿皮书(2011—2012)》曾指出："一些高投入高产出城市若不尽早改变发展模式，可能带来人口过度膨胀、资源枯竭、环境急剧恶化、社会分化急剧加速等恶果，进而令城市文明陷入困境。"中国城市可持续发展"现在在哪里"、"应该去哪里"以及"如何去那里"等问题，已经成为现阶段国家关注的重点。很欣喜地看到《中国城市可持续发展绿皮书(2012—2013)》即将出版，研究团队带着高度的时代感和使命感，对中国城市可持续发展进行了系统、科学的评估及模式路径研究。

本书针对当前中国城镇化的问题，在梳理城市可持续发展及其评估理论的基础上，运用发展和生态"两个半球"的思路，将城市人类发展水平与生态投入放在一个框架下进行匹配分析，构建了可持续发展评估指标体系和评估基本模型。聚焦中国 35 个大中城市和 16 个长三角城市，评估解读了各个城市的生态投入及人类发展指标，进行了城市可持续发展分类，运用数据包络方法分析了城市可持续发展效率，并进一步提出推动城市可持续发展的改进模式和优化路径。本书另外一个亮点是将研究对象进行了拓展，把中国 4 个代表性大城市与金砖国家的 8 个巨型城市之间的可持续发展状况做了比较，为中国城市可持续发展评估融入国际标准和创立平台做出了有益的尝试。

有别于国内城市可持续发展的流行评估研究，本书强调了"城市发展应该用尽可能少的生态投入取得尽可能大的人类发展"的思想，并以此为基础对我国大中城市可持续发展进行评估，在理论创新、实证研究和政策研究方面均做出了新的探索。在评价方法上科学运用了数据包络模型，进行了效率评价及其路径优化选择，评价所采用的城市数据翔实可靠，研究

结论具有合理性和参考价值。

本书基于同济大学经济与管理学院优质的研究平台，凝聚了研究人员创新思想和大量心血，是可持续发展领域的高水准研究成果。我积极推荐政府管理者、规划者、运营者以及科研工作者、大学师生等所有可持续发展问题的关注者阅读本书。期待《中国城市可持续发展绿皮书》的成果能够切实为中国城市可持续发展实践提供有益借鉴和参考。



中国工程院院士

中国工程院管理科学与工程委员会副主任委员

2014 年 8 月

执行摘要

《中国城市可持续发展绿皮书(2011—2012)》出版后,受到不少好评。不少研究城市的学者认为,两个半球的评估思路有新意,对诠释和指导新型城镇化发展有用处。联合国开发署中国办公室,武汉市,深圳市,西门子亚洲城市能力中心等国际组织、政府和跨国公司,与我们讨论合作事宜。说明这个方向的研究是有学术需求和社会需求的,这激励了本年度报告的研究和写作,希望在理论上和政策上有进一步的探索和改进。本年度报告在理论阐发、指标选择、数据来源、研究对象、政策建议等方面有了新的挖掘和拓展,以下是对本期绿皮书四个方面新探索的概括和摘要。

(1) 理论挖掘。我们一直强调,任何评估研究总是取决于理论预设,对城市可持续发展的评估研究更是如此。不同的理论预设导致不同的评估标准,进而得到不同的评估结果。当前,大家都认同城市可持续发展涉及经济、社会、环境三个方面,但是对可持续性的评估却存在弱可持续性和强可持续性两种非常不同的思路。弱可持续性的思路,强调可持续性是经济、社会、环境三个领域的加总,不管对经济社会发展具有支撑作用的关键自然资本优化还是退化,只要加总后的总绩效是进步的,就是可持续发展的。强可持续性的思路,除了要求三个方面的加总大于零,进一步要求关键自然资本是非退化的,或者其消耗是在地球阈值之内的。用前者评估中国城市可持续发展,许多沿海城市因为有高的经济增长,尽管生态资源环境存在退化,研究结果加总后,常常被认为是可持续发展的。用后者评估就不一定能够得出如此的结论。

我们的研究基于强可持续性的理论预设,强调可持续性发展的关键是要求经济社会发展与自然资本消耗实现脱钩,在地球可以支撑的阈值内实现好的发展。因此,不是把城市可持续性分为三个可以相互替代的部分进行加总,而是分为性质和要求不同的上下两个半球进行比对,上面是代表经济增长和社会发展的人类发展半球,下面是代表资源消耗和环境排放的生态投入半球,根据两个半球的匹配情况判断城市发展的可持续性。如果发展半球超过了生态半球的承载能力,即使经济社会发展水平很高,也是不可持续的发展;而生态供给有余但是经济社会的发展半球远远滞后,则是可持续的不发展。从这个角度看中国沿海或

者中部地区相对发达城市，虽然有高的经济增长和人类发展，由于生态环境超过了某种阈值，就不能认为是可持续发展的。

2013年党的十八届三中全会，在生态文明的制度建设中提出了生态红线的概念，这使得我们的评估研究具有了很强的现实意义和针对性。就我国城镇化需要向新型城镇化转型而言，我们说中国过去30年的城市化是土地蔓延和环境不友好的城市化，而不是人口导向和环境友好的城市化，就是说中国城市以土地消耗和资源消耗为标志的生态投入是高的，但是以人口进城和公共服务为特征的人类发展是低的。因此未来的政策重点，是要加大发展半球的人口城市化，控制生态半球的土地城市化。

(2) 指标深化。围绕可持续性的两个半球和脱钩发展的理论，本年度报告在指标选择与评估方法上，作了三个方面的深化工作。

一是在指标选择上的增加。在发展半球方面，我们采用联合国人类发展观念倡导的人均GDP、人均预期寿命、人均教育年限等3个指标，作为城市人类发展指数(UHDI)的基本指标。在生态半球方面，针对当前我国城市发展面临资源消耗和污染排放两个方面的挑战，我们在上期报告提出的资源消耗指标基础上，增加了污染排放指标，用包括水资源消耗、能源消耗、土地资源消耗和水污染排放、大气污染排放、固体废物排放等9个指标，形成城市生态投入指数(UEII)的基本指标。

二是数据可靠性上的改进。尽管对政府统计存在争议，我们坚持评估研究所涉数据主要出自有权威性的政府出版物，本书中的大多数数据来自《中国统计年鉴》、《中国城市统计年鉴》、《中国环境统计年鉴》以及各相关城市统计年鉴。对于统计年鉴中未列出的数据，则通过查找相关城市相关部门颁布的规划、报告等官方文件搜取，如《国民经济与社会发展统计公报》、《社会事业发展第十二个五年规划》、《教育事业发展统计公报》、《教育事业发展第十二个五年规划》、《教育事业发展中长期规划》、《城市环境状况公报》等。

三是数据标准化的计算。在计算中国城市发展半球的人类发展指数时，为了便于与国际上城市人类发展指数(HDI)的研究做比较，本期报告中的人类发展指数(HDI)计算方法有更新，采用了联合国开发计划署(UNDP)在《2010人类发展报告》中颁布的新的人类发展指数(HDI)公式，使我们研究的中国城市人类发展水平与国际上的城市更具有可比性。

(3) 实证发现。在研究对象上，我们继续针对中国35个大中城市(省会和副省级城市，未包含拉萨和台北)以及长三角核心区16个地级及其以上城市开展有连续性的研究，希望以后能够进行时间序列上的比较。此外，本期报告还扩展到了对金砖国家8个城市的数据收集与统计，与4个中国城市进行了比较。报告主要通过三个方面的实证研究，分析研究中国城市的可持续性特征、演进与变化。

一是运用以上两个半球评估理论12个指标，分别研究这些城市的人类发展指数和生态投入指数，并进行排名和解读，分别划分出四种不同的发展水平。研究发现，北京、广州、上

海、深圳、大连、天津、厦门等7个城市具有高的人类发展水平，而乌鲁木齐、南京、银川、太原、呼和浩特、广州、深圳等7个城市具有高的生态投入水平。

二是运用人类发展—生态投入象限分类法，分析我国主要城市的人类发展与生态投入的耦合情况或离散现状，参照相应的国际发展水平，将被评估城市划为“低生态投入低人类发展”、“低生态投入高人类发展”、“高生态投入低人类发展”以及“高生态投入高人类发展”四大类。其中，低生态投入高人类发展属于可持续发展的目标类型。本期的报告，非常高兴地发现，天津、厦门、武汉、杭州、北京、上海、大连、宁波、沈阳、长沙、青岛等11个城市属于低生态投入高人类发展的可持续发展类型。同时也发现呼和浩特、银川、乌鲁木齐等3个城市属于高生态投入低人类发展的类型。显然，高人类发展与中国沿海地区经济发达地区的城市有很大的相关性，而中西部地区的发展中城市具有相对低的生态投入也是可以理解的。要解释的是，中国西北部3个城市不具有高的人类发展却具有高的生态投入，它们大多具有资源型城市的特征。

三是采用国际上较为成熟的数据包络分析方法(DEA方法)，对所评估城市的可持续发展效率进行测算，研究在所属类型中城市生态投入和福利产出之间的关系是否达到最优。按照2012—2013年的统计数据，发现在可持续发展效率前沿面上，被评估城市中北京和青岛2个城市具有相对高的城市可持续发展效率，而其他城市均需要或者通过减少生态投入，或者通过提高人类发展，或者两者同时进行，进一步提高城市可持续发展的效率。

四是为了便于开展国际比较，本期报告收罗新兴国家中巴西利亚、圣保罗、里约、加尔各答、孟买、德里、开普敦、德班等8个巨型城市的数据，运用我们的理论与评估模型进行了计算，与北京、上海、广州、深圳等4个中国代表性大城市一起，形成了金砖5国12个城市的可持续发展状况比较。

(4) 政策建议。对城市可持续发展的评估研究是要判断“现在在哪里”的问题，政策建议是要说明“应该去哪里”以及“如何去那里”的问题。本研究的基本政策意义很明显，强调城市发展要从单一的衡量经济社会发展，转向在提高人类发展的同时减少生态投入。但是这个双元驱动发展模型的政策意义对于不同城市是不同的。

发达国家对城市可持续发展的研究，曾经识别出城市发展的两种轨迹，即先是从低生态投入低人类发展走向高生态投入高人类发展的A模式，或是从高生态投入高人类发展转向低生态投入高人类发展的B模式。我们的政策研究指出，在中国这样的发展中国家，存在着用不超过阈值的生态投入提高人类发展水平的跨越式发展即C模式的可能。因此在实证研究发现中国城市类型的基础上，绿皮书针对各类城市的特点，提出了四种有关改进模式和优化路径的政策建议，即：在可持续发展区间做持续优化的S模式，不降低人类发展水平但要大幅度减少生态消耗的B模式，在生态消耗不超过一定阈值的提高人类发展的C模式，以及在两个方面同时努力的B+C兼有的D模式，例如本期研究发现的呼和浩特、银川、乌鲁木

齐等3个城市，需要采取后者的模式。

对照党的十八大等文件基于国土生态功能分区提出的“重点发展区”和“优化发展区”等两种类型，我们认为，对于沿海发达地区的大多数城市，大多数已经接近生态承载能力的拐点，目前需要采用B模式的转型发展道路，在保持和提高人类发展水平的同时努力降低生态消耗，这是优化发展区的含义；对于中西部正在崛起中的城市，我们建议采取C模式的跨越式发展方式，要努力在生态投入不超过阈值的情况下提高人类发展水平，避免走生态投入先增加后减少或所谓“先污染、后治理”的传统发展A模式道路，这就是重点发展区的含义。希望这种有中国情景意义的研究，能够对中国城市的可持续发展转型，走上大家希冀的新型城镇化道路，可以产生有价值的政策意义。

Executive Summary

In the well-received *Annual Greenbook for Sustainability of 35 Big Cities in China and 16 Cities in Yangtze River Delta* (2011 - 2012), the bi-hemispherical assessment method in terms of human development to ecological cost has been highly recognized among urban studies scholars as innovatively applicable to the understanding of China's new type of urbanization and the decision-making process. Since its publication we have been approached for further cooperation by international and governmental organizations and multinational corporations, such as UNDP China office, City Councils of Wuhan and Shenzhen, and Siemens Cities Center of Competence Asia, indicating that the research is both academically and socially applauded. Therefore, this annual report and the new green book, summarized here in the following four sections, makes new extensions in theoretical development, selection of indicators, data sources, research subjects, and policy recommendations to further explore and improve both the theory and the policies.

(1) Theoretical development. We have always stressed that assessment studies are first subject to their theoretical pre-assumptions, especially studies on sustainable urban development in which the guiding theory leads to a set of assessment criteria that will predetermine the results. Presently, it is agreed upon that sustainable urban development has its economic, social and environmental dimensions, but when it comes to the assessment, there are differences between a Weak version and a Strong one. The Weak sustainability ideas, with its emphasis on sustainability as the sum of economic, social and environmental factors, does not reckon with the optimization or deterioration of critical natural capital — one of the pillars in economic and social development. For those who share Strong sustainability ideas, however, it is not enough to just have the sum to be bigger than zero — sustainability requires the non-degeneration of critical natural capital, or the consumption of it that is within the planetary boundaries. An assessment method based on the former will place many coastal cities in China on the high end of sustainability due to their highly visible economic growth. But the result will be much less rosy if the assessment method is otherwise, since that growth comes along with the degradation of ecological environment.

Our research is based on the theoretical presumptions of the Strong sustainability, emphasizing an economic and social development benignly within the planetary boundaries and unhooked from critical natural capital consumption. So urban sustainability is not a matter of addition of three mutually replaceable factors, but is divided into two contrastive hemispheres with the upper human development hemisphere representing economic growth and social development, and the lower ecological supporting hemisphere representing resource consumption and pollutions emitted into the environment. If we see from the contrast the upper half goes beyond what the lower half can accommodate, the development cannot be regarded as sustainable no matter how prominently its economy grows; but if the upper half lags far behind the lower half, we can call it sustainable non-development. In that light, the more developed coastal and central cities in China, those that are enjoying high economic growth and human development, may not be considered sustainable because their development has gone beyond certain boundaries of the ecological environment.

In the Third Plenary Session of the Party's Eighteenth National People's Congress, the concept of ecological redline was put forward for the first time as part of the institutional construction of an ecological civilization, giving our assessment study a strong practical significance and relevance. With respect to the new type of urbanization the country is now seeking, our suggestion is that the focus of the future policies should be the urbanization of the population in the development hemisphere, and a well-controlled land urbanization in the ecological hemisphere. Because the old type of urbanization in the past three decades has been land urbanization-based and resource-consuming, rather than population-oriented and environment-friendly. Compared with its high ecological input, we see a rather humble ascent in the human development that should feature the growth and improvement in urban population and public services.

(2) **Indicator modification.** Based on the theories of "sustainability hemispheres" and "unhooked development", this annual report offers three modifications on the selection and evaluation of indicators.

First, new indicators have been added. For the development hemisphere, we have adopted the human development concept advocated by the United Nations, and added three indicators as basic ones into the Unban Human Development Index (UHDI): per capita GDP, the average life expectancy, and average years of schooling. For the ecology hemisphere, in addition to the resource consumption indicators we offered last year, we added pollution discharge indicators since resource consumption and pollution discharge both are the biggest challenges for urban development today. The Urban Ecological Input Index (UEII) is now a system of 9 basic indicators, including water consumption, energy consumption, land resources consumption and water pollution discharge, solid waste discharges, air pollution emissions, etc.

Second, data reliability is improved. Although there is controversy over governmental

statistics, we still insist that our assessment studies use data from authoritative governmental publications, therefore most of the data in the current study are from the *China Statistics Yearbook*, *China Urban Statistics Yearbook* and *China Environmental Statistics Yearbook*, and the statistics yearbooks of the relevant cities. As for the data not included in the yearbooks, we try to locate them from relevant urban planning reports and other official documents issued by the relevant departments, such as *National Economic and Social Development Statistics Bulletin*, the *Twelfth Five-Year Plan for Social Development*, *Education Development Statistics Bulletin*, the *Twelfth Five-Year Plan for Education Development*, *Long-term Education Development Plan*, and *Urban Environment Status Quo Bulletin*, etc.

Third, data calculation is standardized. When calculating the human development index in the China Urban Development hemisphere, we have adopted the new Human Development Index (HDI) formula promulgated in the 2010 *Human Development Report* by the United Nations Development Program (UNDP) so that it is easier to compare Chinese cities'HDI with that of the other cities in the global community.

(3) Empirical findings. In our study, we continue to target 35 cities in China (provincial capitals and sub-provincial cities, not including Lhasa) and 16 cities on the prefecture-level and above in the core area of the Yangtze River Delta, hoping to see a chronological comparison in the future. In addition, this annual report also extends its data collection to eight cities from the other BRICS countries, in comparison with four Chinese cities. The report offers an analysis of the characteristics, evolution and changes of sustainability in Chinese cities through empirical research from three aspects.

First, using the 12 indicators of the bi-hemispherical assessment method mentioned above, we studied, ranked and interpreted the UHDI and UEII of these cities. Four different levels of development have been categorized. The study finds that seven cities can be classified as high UHDI cities: Beijing, Guangzhou, Shanghai, Shenzhen, Dalian, Tianjin and Xiamen, while seven cities as high UEII: Urumqi, Nanjing, Yinchuan, Taiyuan, Hohhot, Guangzhou and Shenzhen.

Second, we use the human development-ecological input quadrant classification method to analyze the discrete and coupling status quo of these two factors in China's major cities, with reference to the corresponding international level of development. Cities under evaluation are thus classified into four types as "low ecological input and low human development", "low ecological input and high human development", "high ecological input and low human development", and "high ecological input and high human development", with the second to be the ideal type of sustainable development. It is rather inspiring to find that such 11 cities as Tianjin, Xiamen, Wuhan, Hangzhou, Beijing, Shanghai, Dalian, Ningbo, Shenyang, Changsha and Qingdao belong to this type. The study also finds that Hohhot, Yinchuan, and Urumqi belong to the third type. Obviously, there is a high correlation between the high human development and economic development in the

coastal areas in China, and the developing cities in the mid-western regions with a relatively low ecological input is understandable. It is worth explaining that three cities in northwestern China show the characteristics of resource-driven development where a high ecological input is coupled with a human development that is not necessarily high.

Third, a more sophisticated data envelopment analysis (DEA) method popular in the global community has been adopted to assess the efficiency of the sustainable development of the Chinese cities to see if there is an optimal relation between ecological input and well-being output. According to statistics from 2012 to 2013, it is found that on frontier of the sustainable development efficiency, Beijing and Qingdao have gone the farthest, while other cities can increase their efficiency by reducing their ecological input, or raising human development, or doing both simultaneously.

Fourth, this annual report has included data of eight newly emerging megacities from other developing countries such as Brasilia, Sao Paulo, Rio, Calcutta, Mumbai, Delhi, Cape Town and Durban. Based on our theory and assessment model, 12 cities from the 5 BRICS countries, with Beijing, Shanghai, Guangzhou, and Shenzhen from China, have been compared with regard to their sustainability.

(4) Policy recommendations. Assessment study on urban sustainable development belongs to the realm of "Where are we now" question, while policy recommendations the realms of "Where should we go" and "How can we go there". This research has a very conspicuous policy implication, i. e. , we should emphasize an urban development with low ecological input and high human development, one that steers away from a single focus on the economic development. However, policy implications of this dichotomy development model will be different for different cities.

Research on sustainable urban development in developed countries has identified two trajectories of urban development, namely, Plan A that ascends from low ecological input and low human development to high ecological input and high human development, and Plan B that evolves from high ecological input high human development to low ecological input and high human development. Our policy research points out that in developing countries such as China, there is the possibility for Plan C that will ensure leaps and bounds in human development without going beyond the boundaries of ecological input. For that matter, based on the empirical research that has classified Chinese cities into four categories, this green book proposes four types of policy recommendations concerning modes and paths: Plan S that focuses on the continuous optimization in the range of sustainable development, Plan B that substantially reduces eco-consumption without compromising human development, Plan C that improves human development with eco-consumption within the planetary boundaries, and Plan D, especially for such three cities as Hohhot, Yinchuan, and Urumqi, a combination of Plans B and C.

With reference to the "key development areas" and "optimized development areas" proposed in the Party's Eighteenth National People Congress report and other official

documents concerning the land-based ecological functions, we hold that the majority of the cities in the developed coastal areas are now approaching the turning point of the ecological capacity. Therefore Plan B will be advisable for them since it is what is meant by "optimized development area" to maintain and improve the level of human development and reduce the ecological consumption. For the emerging cities in the mid-western regions, based on our understanding of the focal meaning of the "key development area", we recommend Plan C, because we must strive to improve the level of human development within the eco-threshold to avoid repeating the traditional Plan A that is known as "pollution first, treatment later". We hope that our study based on the scenarios in China can have valuable policy implications for the country's sustainable development transformation and the new type of urbanization that all Chinese people have been longing for.