

区域低碳创新系统理论与实践研究

——
基于全球气候变化的思考

陆小成 著



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摘 要

全球气候变化是事关生态与环境保护、能源与水资源管理、食物安全和人类健康,事关人类社会可持续发展的重大问题,是人类社会生存和发展所面临的巨大挑战。国际社会比以往任何时候都更加深刻地体会到必须把减缓和适应气候变化行动纳入各国社会经济发展规划之中,改变经济发展方式,依赖科学技术特别是低碳技术创新与进步。如何化解经济快速发展对资源、能源消耗的高度依赖,如何跨越资源、能源的瓶颈约束是我国面临的主要难题,中国既需要较大的温室气体排放空间,也有保护地球气候的义务。中国区域经济发展要走出一条低消耗、低排放、高效益、高产出的新型工业化道路,是对世界可持续发展和应对气候变化的积极贡献。基于此背景,本书探讨区域低碳创新系统的理论与实践问题。研究的主要内容及创新点表现在以下几个方面:

第一,对区域低碳创新系统的相关理论进行梳理。区域低碳创新系统的提出是基于全球气候变化、低碳经济、生态经济、创新系统等理论发展的基础上提出来的。创新系统理论已经成为国内外创新研究的热点,而全球气候变化越来越引起全人类的高度关注,低碳经济、生态经济等理论一直是学术界研究的重要理论焦点。结合创新系统理论与全球气候变化、低碳经济、生态经济等理论之间的交叉与关联,构成了区域低碳创新系统的理论基石。

第二,区域低碳创新系统的内涵与特征研究。提出区域低碳创新系统的理论分析框架,探讨区域低碳创新系统的基本内涵、主要特征、分类、结构及其功能等。所谓区域低碳创新系统,指的是在特定区域内,与低碳技术创新全过程相关的政府、企业、高等院校、科研机构、中介服务机构、金融机构等组织机构和制度与机制等实现条件构



区域低碳创新系统理论与实践研究

成的网络体系。区域低碳创新系统结构主要表现为低碳创新环境、创新主体、资源配置之间的相互关系以及内在的运行机理。区域低碳创新系统的功能可以从不同的角度进行分类,在宏观层面主要表现为经济、政治、社会的功能;从微观层面,主要包括纵向和横向两个角度,纵向层面考察主要表现为产业—区域—跨区域功能;横向层面考察主要表现为技术、制度、管理、文化等功能。

第三部分,区域低碳创新系统的环境要素研究。主要从自然环境、制度与政策环境、市场环境、社会文化与教育环境、国际环境等层面探索区域低碳创新系统的外部影响因素。自然环境是构建区域低碳创新系统的基础,涉及到对资源能源承载力、环境污染等问题的反思。区域低碳创新系统是在一定的社会制度和政策环境下形成的,主要包括经济体制、科技体制及相关政策环境等。市场环境影响主要表现在:市场是检验低碳创新成功与否的试金石;有序的市场环境减少低碳创新的不确定性;市场竞争迫使企业低碳创新。社会文化环境影响表现为:影响低碳创新的教育水平、人力资本积累、价值定位和消费习俗、隐性知识转化、知识溢出与文化认同等。国际环境影响主要表现在国际气候谈判、国际低碳技术差异、国际知识流动等方面。

第四部分,区域低碳创新系统的主体选择研究。主要包括企业、政府、科研院所和中介服务机构。企业是区域低碳创新系统的核心主体,要发挥企业的核心主体地位,需要重视和发挥企业在低碳创新投入、创新活动、成果应用等方面的主体地位。政府是区域低碳创新系统的政策创新主体。科研院所是区域低碳创新系统的知识源泉。中介服务机构是区域低碳创新系统的知识桥梁。

第五部分,区域低碳创新系统的资源配置研究。资源配置主要包括政府和市场两种作用力。低碳创新资源配置必须发挥要素市场的作用,主要包括风险资本市场、技术市场和中介服务市场等力量。区域低碳创新的政府资源调控主要包括:提供知识基础设施、创办低碳科技园区和低碳创新孵化器等。加强政府资源与市场资源的有机



整合,应构建低碳科技公共服务平台。

第六部分,区域低碳创新系统的运行机制研究。区域低碳创新系统作为一种开放的动态创新系统,它的演进发展受到区域低碳创新系统外在减排压力和内在低碳技术市场需求动力的多重驱动。区域低碳创新系统的动力要素主要体现在环境、主体、资源等多个层面,包括国际减排压力与低碳政策激励机制、低碳技术创新和低碳产品需求机制、创新主体竞争与合作机制、创新网络学习与低碳知识外溢机制、区域低碳创新协同激励机制、低碳科技传播与公众参与创新机制等。

第七部分,以北京为例,提出区域低碳创新系统的政策选择。北京建设区域低碳创新系统是应对全球气候变化、实现低碳发展的重要战略选择。北京建设区域低碳创新系统具有自身发展的现实基础,也存在观念、能源消费、技术、制度、国际合作等方面的诸多困境。北京建设区域低碳创新系统的政策选择主要体现为:树立低碳创新系统理念,建设低碳创新示范工程;制定低碳创新发展规划和低碳路线图;整合首都低碳科技资源,构建低碳科技公共服务平台;加强低碳技术创新,提高低碳竞争力;加强低碳产业布局和制度创新,促进发展方式转变;加强低碳创新国际合作,构建区域协调互动机制;倡导低碳消费和低碳生活,构建低碳创新型社会。

关键词:全球气候变化;低碳经济;区域低碳创新系统;政策选择



ABSTRACT

The global climate change is a matter of ecological and environmental protection, energy and water management, food safety and human health, human and social sustainable development related to the major issues of survival and development of human society face enormous challenges. The international community is more than ever insight into the need to mitigate and adapt to climate change action into national social and economic development plans, changes in economic development, rely on science and technology, especially low-carbon technology innovation and progress. How to resolve the rapid economic development of highly dependent on resources and energy consumption and how the cross of resources and energy bottleneck are the major problems facing our country. China not only needs the larger space of greenhouse gas emissions, but also has the obligation to protect the Earth's climate. China's regional economic development should be out of a low consumption, low emission, high efficiency and high output of the new road to industrialization, and is the world's sustainable development and positive contributions to climate change. Based on this background, the book explores theory and practice issues of the regional low-carbon innovation system. The main content and innovation in the following areas:

Part I, we sort out the relevant theories about the regional low-carbon innovation system. The proposed of the regional low-carbon innovation system is the theoretical development of the initiative based on the global climate change, low carbon economy, ecological economics, in-



novation systems. The innovation system theory has become a hot spot at home and abroad, and global climate change has drawn increasing attention of all humanity, and the low-carbon economy and ecology economic theory have always been an important theoretical academic research focus. It is the combination of the innovation system theory and global climate change, low carbon economy, ecology and economic theory to form the theoretical foundation of the regional low-carbon innovation system.

Part II, we studied on the definition and the characteristics of the regional low-carbon innovation system. We present the theoretical analysis framework of the regional low-carbon innovation system, and studied on the basic definition, the main features, classification, structure and functions. The so-called regional low-carbon innovation system is defined as a specific area, with the relevant of the entire process of the low carbon technology innovation, to achieve the conditions posed by the network of the governments, the businesses, the universities, the research institutes, the intermediary agencies, the financial institutions and other organizations and other conditions of the institutions and mechanisms to achieve of a network system. The structure of the regional low-carbon innovation system is mainly for the low-carbon innovation environment, innovative subject, the relationship between resource allocation and the internal operation mechanisms. The functions of the regional low-carbon innovation system can be classified from different angles, such as, at the macro level, mainly for economic, political and social functions. From the micro level, including vertical and horizontal angles, and the vertical level, mainly inspection for the industrial and regional and the cross-regional functions, and the horizontal level visits mainly for technical, institutional, management, and cultural functions.

Part III, we studied on the environmental elements of the regional low-carbon innovation system. It is to explore the external factors mainly



from the natural environment, institutional and policy environment, market environment, social culture and educational environment, international environmental and other aspects of the regional low-carbon innovation system. The natural environment is the basis of the construction of the regional low-carbon innovation system, involving the carrying capacity of resources and energy, and environmental pollution problems in the reflection. Regional low-carbon innovation system is formed in a certain social system and policy environment, including economy, science and technology system and related policy environment. The impact of the market environment mainly manifested in these areas, such as the market is testing the touchstone of the success of low-carbon innovation, and the orderly market environment is to reduce the uncertainty of low-carbon innovation, and the market competition is forcing the companies to low-carbon innovation. The impact of social and cultural environment include these aspects the level of education of low-carbon innovation, human capital accumulation, value orientation and consumption practices, tacit knowledge transfer, knowledge spillovers and cultural identity and so on.

Part III, we studied on the main options of the regional low-carbon innovation system, such as the enterprise, the government, the research institutes and the intermediary service agencies. The enterprise is the main core of the regional low-carbon innovation system, and the enterprise should play the core dominant position, and we need to focus on and to play in the dominant position of the investment, the innovation activities, and the results application and other aspects of the low-carbon innovation. The government is the policy innovation model of the regional low-carbon innovation system. Research institutes are the knowledge sources of the regional low-carbon innovation system. Service agencies are the bridge of knowledge at the regional low-carbon innovation system.



Part V, it is the resources allocation of the regional low-carbon innovation system. The resources allocation include both government and market forces. Low-carbon innovation resources allocation must play the role of market factors, including venture capital market, the technology market and intermediary services. The government resources regulation of the regional low-carbon innovation are including to provide the knowledge infrastructure, the founder of low-carbon technology parks and incubators and other low-carbon innovation. We should strengthen the organic integration of the government resources and market resources, and should be established the public services platform for low-carbon technology.

Part VI, we studied on the operation mechanisms of the regional low-carbon innovation system. as an open dynamic innovation system, the evolution and development of the regional low-carbon innovation system, have the multiple drive powers by an external low-carbon emission reduction pressure and the intrinsic motivation of the market demand of the low-carbon technologies. The dynamic factors of the regional low-carbon innovation system is mainly reflected the environment, subject, resources and other aspects. They are including: The international pressure of the low-carbon emission reduction and the policy incentives mechanism, and the low-carbon technology innovation and demand mechanism of low-carbon products, and the innovation competition and cooperation mechanism, innovation, learning and knowledge spillover mechanism of low-carbon, and the collaborative incentives mechanism of the regional low-carbon innovation and the communication and public participation mechanisms in low carbon technology innovation.

Part VII, to Beijing, for example, we studied on the policy options of the regional low-carbon innovation system. Beijing is building a regional low-carbon innovation system to address global climate change and



achieve low-carbon development in an important strategic choice. Beijing building the regional innovation system with its own low-carbon development foundation in reality. There are also the many difficulties such as ideas, energy consumption, technology, systems, international cooperation. The policies option to construct the regional low-carbon innovation system in Beijing are including as these aspects: We should establish the general concept of low-carbon innovation system, and build the demonstration projects on the low-carbon innovation, draw up the development planning and roadmap of the low-carbon innovation and integrate the low-carbon technology resources to build low-carbon technology platform for public service, and we should strengthen the low carbon technology innovation and improve the competitiveness of low carbon and strengthen the low-carbon industrial layout and the institutional innovation, and promote the development patterns, and strengthen the international cooperation on the low carbon innovation and build regional mechanisms for coordination and interaction, promote low-carbon consumption and low-carbon life for the construction of low-carbon innovation society.

KEY WORDS: Global Climate Change; Low-carbon Economy; Regional Low-carbon Innovation System; Policies Option