



Industrial transformation and green production to reduce environmental emissions: Taking cement industry as a case

LÜ Yong-Long^{a,*}, GENG Jing^b, HE Gui-Zhen^a

^a State Key Laboratory of Urban and Regional Ecology, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing 100085, China

^b Eco-Civilization Research Center, Sanya University, Sanya 572022, China

Received 24 June 2015; revised 8 October 2015; accepted 16 October 2015

Available online 26 October 2015

Abstract

Industrial transformation and green production (ITGP) is a new 10-year international research initiative proposed by the Chinese National Committee for Future Earth. It is also an important theme for adapting and responding to global environmental change. Aiming at a thorough examination of the implementation of ITGP in China, this paper presents its objectives, its three major areas, and their progress so far. It also identifies the key elements of its management and proposes new perspectives on managing green transformation. For instance, we introduce a case study on cement industry that shows the positive policy effects of reducing backward production capacity on PCDD/Fs emissions. Finally, to develop different transformation scenarios for a green future, we propose four strategies: 1) policy integration for promoting green industry, 2) system innovation and a multidisciplinary approach, 3) collaborative governance with all potential stakeholders, and 4) managing uncertainty, risks, and long-time horizons.

Keywords: Industrial transformation; Green industrial policy; Backward production capacity; Cement industry; China

1. Introduction

The increasing danger of catastrophic global environmental change and other aspects of environmental mismanagement have given rise to concerns about economic development exceeding the Earth's carrying capacity. In order for the government's environmental objectives to be attained in parallel with positive economic development, a transformation of industry is needed. Many international organizations and developed countries have proposed various ideas and

initiatives such as green growth, green economy, green transformation, green structural transformation, sustainable transformation, and green industrial policy (Lütkenhorst et al., 2014; OECD, 2013; UNEP, 2011; WB, 2012). The term “green structural transformation” refers to a change in the national economy in which carbon-intensive industrial sectors decrease their share of the gross domestic product (GDP) while businesses with low carbon intensity increase their share. Green transformation refers to processes within industries and/or companies that lead to reduced environmental change impact (GA, 2014). Since the 1990s, industrial transformation has been one of the core science projects of the International Human Dimensions Program (IHDP) (Vellinga and Herb, 1999) which has been integrated into the new initiative Future Earth. Significantly, the Fifth IPCC Assessment Report (Working Group III) devotes a whole chapter to Assessing Transformation Pathways that proposes new scenarios based on data from over 1000 new scenarios published since the IPCC Fourth Assessment Report (IPCC, 2014).

* Corresponding author.

E-mail address: yllu@rcees.ac.cn (LÜ Y.-L.).

Peer review under responsibility of National Climate Center (China Meteorological Administration).



China is struggling to prevent even more environmental pollution and natural disasters that stem, in part, from more than 30 years of unchecked economic growth and industrial development. Though considerable efforts have been made, many environmental problems remain unsolved and yet more new problems have emerged, such as climate change, the loss of biodiversity, overuse of energy and natural resources, environmental risks, and industrial emissions (He et al., 2012, 2014; Oosterveer et al., 2006). Consumption of natural resources and utilization of the environment as a sink for emissions still exceed acceptable long-term levels. With the rapid industrialization of the last 20–30 years, the most common industrial emissions, including CO₂, industrial smoke dust, have increased continuously in China, while industrial COD discharge has decreased rapidly (Fig. 1). As one of the world's most fossil-dependent and carbon-intensive economies, China has the highest CO₂ emissions of any country.

The challenges of global environmental change and resource restriction call for urgent green transformation for sustainable industry development in China (NDRC, 2007; UNEP, 2013). The China State Council released the first Industrial Transformation and Upgrading Plan 2011–2015 in 2012. The Plan defined the focus of China's industrial development over the next five years as transforming China's extensive development practices to a new model driven by technological innovation and domestic demand and consumption, with an emphasis on environmental protection, smart manufacturing, and manufacturing services. Likewise, in a recent flagship report, the National Plan on Global Climate Change (2014–2020), the National Development and Reform Commission (NDRC, 2014) argued that the transition toward a low-carbon, sustainable economic system constitutes a radical transformation involving the radical changes of restructuring the composition and organization of the country's industries and optimizing the energy structure. The latest Opinions on Accelerating the Construction of Ecological Civilization enacted by the CPC Central Committee and the

State Council in April 25, 2015 again emphasized the industrial transformation and greening industries.

Industrial emissions are closely linked with global environmental change. Thus, ITGP came to be established as a priority by the Chinese National Committee for Future Earth (CNC-FE), a new 10-year international research initiative to develop the knowledge to respond effectively to the risks of and opportunities for global environmental change and to support transformation toward global sustainability in the coming decades. The main aim of this study is to provide a thorough examination of the ITGP project in China. It is structured as follows. Section 2 presents three major areas of the project, their objectives and goals. Section 3 describes current progress on industrial transformation with a case study of the cement industry. The conclusions and new perspectives are presented in section 4.

2. Research objectives and major contents

The sustainable transformation of industry will involve a broad spectrum of environmental and social factors, including changes in the production and consumption systems and in the incentive structure that shapes the natural, social, and ecological system. Thus, the goals of the ITGP and this study are as follows.

2.1. Research objectives

The objectives of the ITGP can be summarized as follows:

- (1) To identify the major impacts of global environmental change on industrial development in China.

Because of China's vast size and diverse geographic conditions, the impacts of global environmental change in China will vary. However, the main emphasis in environmental change research and policy has been defining the nature of

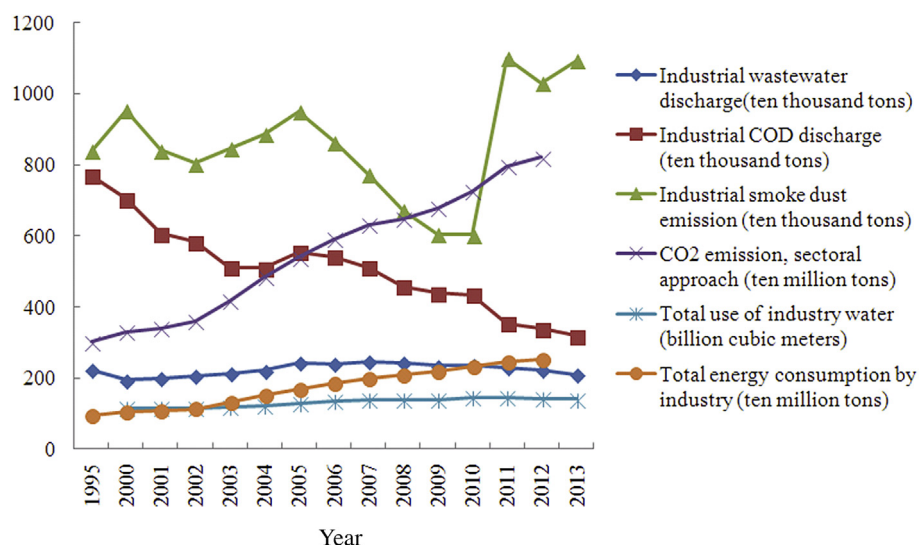


Fig. 1. Primary industrial emissions and resource use in China from 1995 to 2013. Data sources: OECD/IEA (2001–2015), NBSC (1996, 2001–2014).

Download English Version:

<https://daneshyari.com/en/article/4673576>

Download Persian Version:

<https://daneshyari.com/article/4673576>

[Daneshyari.com](https://daneshyari.com)