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Energy policies for managing China's carbon emission

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ABSTRACT

The well-documented close relationship between economic growth and energy use indicates that the emergence of a country as an economic power cannot occur without increased in energy use. But just as the scale of China's rise as an economic power has no clear parallel in history, its conflict between economic growth and energy use has also shattered all precedents. This planet's future energy scenario hinges on the ability of this decoupling. The question this Policy Forum addressed is how to find the optimum way to accomplish this decoupling through government directive (government-centered command and control approaches, or CAC) or market forces (market-based instruments, or MBI). It concludes that market, rather than government can decide the optimum way to decouple China's economic growth from energy use. Facilitating this decoupling driven by market force requires getting the prices right for energy.

Contents

1. Introduction

The well-documented close relationship between GDP growth and fossil energy use and attendant carbon emission [1–6] indicates that the emergence of a country as a major economic power cannot occur without increased in energy consumption and concomitant carbon emission. With one-fifth of the world's population, China's rise as an economic power is unprecedented in the history of human society. The conflict between economic growth and energy use and attendant carbon emission has also shattered all precedents. In a hypothetical scenario in which carbon intensity (carbon emission per unit of GDP) keeps pace with GDP growth rate, by 2030, China would be emitting as much carbon as the world as a whole is emitting today [7].

China has set energy conservation and efficiency as a priority strategy since the 1980s to decouple energy use and economic growth, in redirecting the basic energy policy from "focus on energy exploitation" to "making efforts simultaneously to energy conservation and exploitation it while giving top priority to the former" [8–11]. Article 4 of the Energy Conservation Law of the PR China states that "Energy conservation is a long-term concept of strategy of the state for national economic development".

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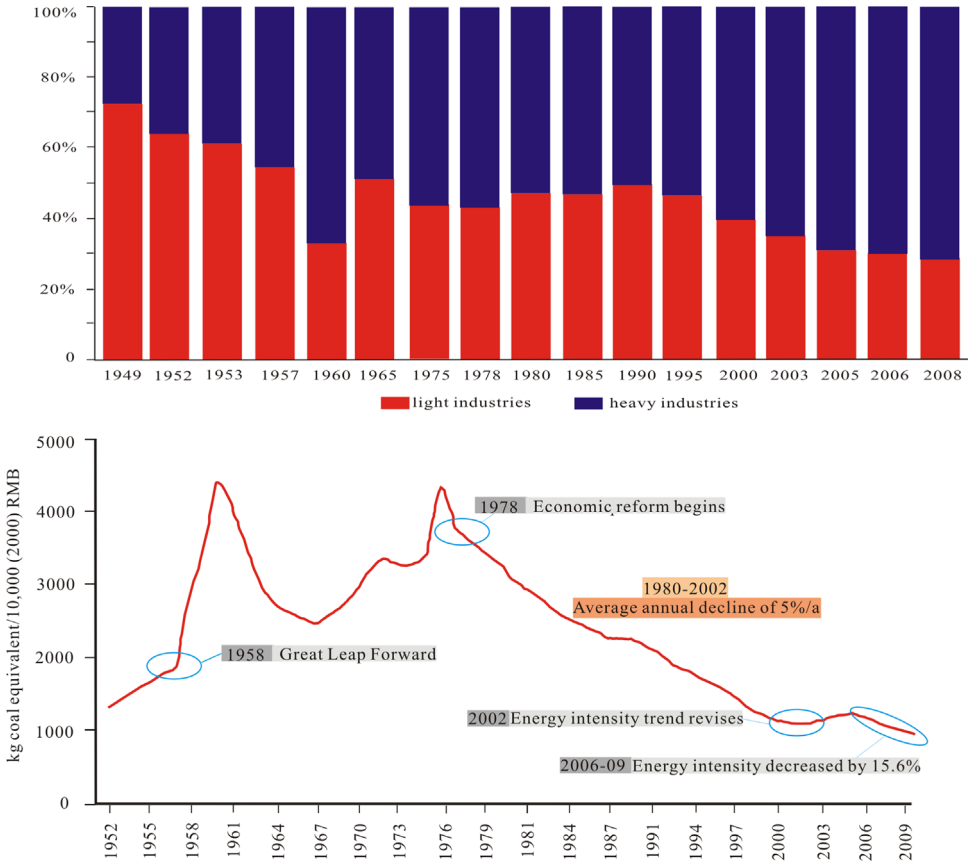

Fig. 1. (Up) the proportion of light and heavy industries between 1949 and 2008 in China [12]; (down) energy consumption per GDP between 1952 and 2009 in China [17,31,32].

From 1980 to 2000, China relied mainly on light industry to spur growth [12–14] (see Fig. 1a). This contributed to a big improvements in energy efficiency even as the economy expanded rapidly [10,13,15,16]. Gross domestic product quadrupled (nearly 10%/a), while energy use only doubled (almost 5%/a) [17] (see Fig. 1b). However, the accelerated urbanization and industrialization have contributed to a rise in energy consumption equivalent to GDP growth between 2000 and 2005 [13,17]. The accelerated urbanization and industrialization drove cement output from 597 million tons in 2000 to 1069 million tons in 2005, accounting for 45% of the world total [17,18]; the crude steel production increased from 128 to 353 million tons from 2000 to 2006, equivalent to 31% of the world total [19]. Correspondingly, the energy demand rapidly increased from 1000.6 million toe (ton of oil equivalent) in 2001 to 1572.2 million toe in 2005 [20]. In 2006 alone, 102 gigwatts of new generating capacity was added, an increment substantially larger than the entire electric power system of UK to power an increasingly demanding China [21].

To re-decouple economic growth and energy use, government-centered command and control approaches (GCAC) have been adopted. Market forces have been weakened, and the administrative coercive forces have been strengthened since 2006 [22–25]. For example, China pledged in the 11th five year covering years 2006–2010 to cut energy intensity (energy consumption per unit GDP) by 20% in 2010 relative to the value of 2005. China's energy intensity fell by 15.6% from 2005 to 2009, but rose 3.2% in the first quarter of 2010. After this disappointing result, central government warned in May that it would use an "iron fist" to meet the goal. In the eyes of the local leaders, improving energy efficiency became a matter of government duty, superseding in importance GDP growth or other political achievements. Officials were in fear losing their jobs if the energy-saving target was not met. Local officials competed to impress their superiors with enthusiastic energy cuts—sometimes with surprising outcomes. Chinese steel, cement and other energy-intensity factories were kept on hold and thousands of homes in some areas were left without electricity as local governments ordered power cuts to meet the energy-saving target [26,27]. In Anping, a town of 600,000 in Hebei province, hospitals, schools, residents and even traffic lights had their power cut or disrupted for almost 10 days after the provincial government announced stricter energy saving measures. The central government stepped in to ensure that power was restored, but other counties in Hebei continue to implement similar far-reaching cuts. In one area famous for its entrepreneurship, draconian cuts led to a closing of factories. The Ouhai district of Wenzhou in Zhejiang province, announced a mandatory policy for small manufacturers to "close for 10 days, open for five days" for the remainder of 2010. Similar policies were implemented across the country [26–30]. Even worse, as temperatures plunge below zero, the residential heating system in Linzhou, a small and nondescript city in the central province of Henan, was turned off to accomplish energy-saving targets set by the central government. All that the city's million or so citizens could do was shivering or go out and buy electric space heaters [30].

At issue is if decoupling should continue to rely on the GCAC, or turn to MBI (Market Based Instruments)? Would switching to MBI work well in China? After setting out the characteristics and nature of GCAC, this paper provides an in-depth analysis of the effects, foundations, barriers and the priority action of MBI in China. Finally some recommendations are offered for MBI implementation in China.

2. GCAC in China

2.1. Main characteristics of GCAC in China

In OECD countries (Organisation for Economic Co-operation and Development), command and control approaches (CAC) tend to force all companies to behave the same according to standards regardless