

The Dragon awakens: Innovation, competition, and transition in the energy strategy of the People's Republic of China, 1949–2017



Long Zhang^{a,c,d}, Benjamin K. Sovacool^{b,c,*}, Jingzheng Ren^e, Adrian Ely^b

^a School of Business, Xinyang Normal University, Xinyang 464000, China

^b Science Policy Research Unit (SPRU), School of Business, Management, and Economics, University of Sussex, United Kingdom

^c Department of Business Development and Technology, Aarhus University, Denmark

^d School of Economics and Management, China University of Geosciences, Wuhan 430074, China

^e Department of Industrial and Systems Engineering, The Hong Kong Polytechnic University, Hong Kong Special Administrative Region, China

ARTICLE INFO

Keywords:

China
Energy security
Energy sustainability
Energy strategy

ABSTRACT

Based on a mix of original archival research and an extensive literature review, this article assesses the history of the People's Republic of China's national energy policies since 1949. We divide this history into six phases: Emergence (1949–1957), Socialist construction (1958–1965), Turbulence (1966–1978), Reform (1979–2000), Contestation (2001–2014), and Transition (2015–present). Over the whole history of more than sixty years, China's energy production and consumption grew at a surprising speed, while energy intensity exhibited early fluctuations and a subsequent gradual decrease after the turbulence phase. In tracing this history, the article offers new historical and policy insights into the world's largest developing country and a theoretical contribution to the role of the state in shaping economy and society through energy policy. The article lastly offers an in-depth exploration of how command-and-control style administrative intervention and low levels of market liquidity have had a prophylactic effect on innovation and competition.

1. Introduction

Since the formal birth of the People's Republic of China (PRC) in 1949, the nation has grown considerably in terms of its economic and social development. Whilst the country's outstanding and prolonged economic growth over the last forty years has drawn significant scholarly attention (Naughton, 2007; Zheng et al., 2008; Yueh, 2013), one key driver of such advancement has been studied in less detail: energy production and use.

Energy supply and utilization, including its interaction with technology, has long been recognized for its central role in economic growth (Kaufmann, 1992; Daly, 1997; Ockwell, 2008; Simieniuk, 2016) and in the broader shaping of societies (Urry, 2014). These insights raise questions about state power and influence (Tyfield, 2014), but few if any studies illuminate the role of deliberate state intervention in shaping energy systems and simultaneously shaping economy and society. This paper contributes to filling this gap by drawing on archival data and relating the history of China's energy strategy (with shifting political objectives) to the country's changing economy over the six decades since the birth of the Republic. In so doing, it provides an important historical framework for understanding China's current efforts to transition to a lower carbon economy – a question of

scholarly interest (Shen, 2016) and of global concern (Liu, 2016; Gallagher, 2009).

In its nascent days as a sovereign communist country, the PRC confronted devastation and poverty caused by war and social unrest. Sixty years later, almost all statistics have shown that China is the world's largest energy consumer, the biggest emitter of greenhouse gases, the fifth largest producer of oil, seventh largest producer of natural gas, and the largest producer of coal. Thus, from 1949 to the present, China's centrally planned economy progressed through periods of industrialization and modernization, with rapidly expanding energy production and consumption. For example, from 1952 to 2014, China's energy production rose from 48.7 million tons of coal equivalent (Mtce) to 3600 Mtce (National Bureau of Statistics of China (NBSC), 1999, 2014), an ascent graphically depicted in Fig. 1. Over this period, China's energy production and consumption increased by a factor of about 75, with an average annual growth rate of 7.3%. During most of this time, this country was self-sufficient in its energy production. However, since the 1990s, the gap between production and demand has expanded, leading to an escalated dependence on imported fuels, mainly oil (Nolan et al., 2004). In fact, China has been a net oil importer since 1993, and dependence on imported oil rose to 60% in 2014 (British Petroleum, 2015). Despite its

* Correspondence to: Aarhus University, Denmark.

E-mail address: BenjaminSo@hih.au.dk (B.K. Sovacool).

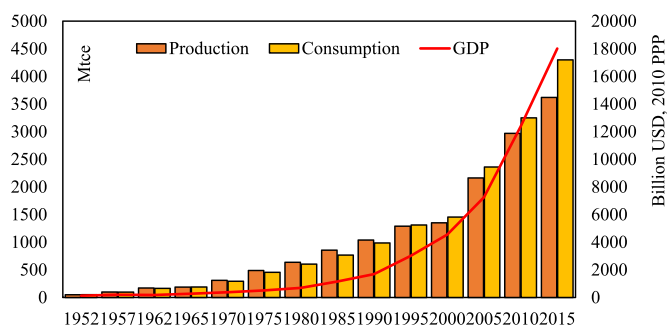


Fig. 1. Energy production and consumption in the People's Republic of China, 1952–2015. Note: Mtce = million tons of coal equivalent. Source: Compiled by authors based on data from China Statistical Yearbook.

prodigious coal resources, China even emerged as a net coal importer in 2009, when it imported more than 100 Mt of coal that year (British Petroleum, 2010). Over the period examined, the Chinese energy system underwent a major transformation. In 1952, the mix of energy consumption was composed by 95% of coal, but in 2013, it was composed by 66% of coal, 19.4% of oil, 5.8% of natural gas and 9.8% of other energy sources (National Bureau of Statistics of China (NBSC), 1999–2014).

In this article, we explore a variety of supply and demand side changes in China's energy strategy over the previous decades. These relate to periods of political and social unrest, the transformation from a planned to market economic system, and the challenge of global and international situations. In doing so, the article attempts to make multiple contributions. Firstly, it offers historical and policy insight into the world's largest developing country. China has become the world's largest energy consumer and producer for several years, contributing to 23% of world energy consumption in 2014 (British Petroleum, 2015). That same year, it strikingly contributed to 61% of the world's total increases in annual energy consumption.

Secondly, tracing the history of Chinese energy strategy reveals the source of several remaining health and social challenges including air pollution, economic competitiveness, and the emission of greenhouse gases. For instance, China is among the countries with the lowest rates of energy efficiency in the world, and one study estimated its efficiency was 10% lower than the average for developed countries (Crossley, 2013).

The article lastly offers an in-depth exploration of how command-and-control style administrative intervention and low market liquidity have resulted in lack of comparative progress in innovation and competition. China's model of a planned economy is meticulously examined against the backdrop of national priorities such as energy security, and energy sustainability, providing a historical framework for understanding current efforts to transition to a low carbon economy.

Our primary source of data for this article was historical records and archives. We analyzed national Energy Statistics Yearbooks and some other statistics materials available only in Chinese (and mostly only in print) since 1952, using libraries in Beijing. We also relied on archives recording the main decisions and policies of the Chinese Government, sources admittedly edited by the CPC Literature Research Center but published by the Central Literature Publishing House in the 1990s. We then supplemented these sources of material with peer-

reviewed assessments of the history of Chinese energy policy and security, especially those from the energy studies literature and online Chinese databases such as China National Knowledge Infrastructure (CNKI). Our results suggest that most research has focused on China's recent energy security concerns, with the "earliest" studies tracing the economic reforms of the late 1970s (Hang and Tu, 2007; Zhao and Hong, 2010). In this paper, we try to go much further back to 1949 and present this chronicle through an original assessment of six historical phases.

2. Six phases of Chinese energy strategy: 1949–2017

The essence of the Chinese communist state during the nascent years of its energy planning apparatus lay in state management of public assets, or direct government intervention in the economy. Despite this interventionist approach steered by sequential Five-Year Plans (FYPs), there is much variety in the genesis and evolution of national Chinese energy strategy. We divide the history of the last 60 years into six phases: Emergence (1949–1957), Socialist construction (1958–1965), Turbulence (1966–1978), Reform (1979–2000), and Contestation (2001–2014), and Transition (2015–present) (see Fig. 2).

2.1. Emergence (1949–1957)

At the birth of the People's Republic of China, the nation was emerging after years of war and turmoil, as well as a fairly high degree of political and social chaos. Thus, early planners focused intently on economic recovery and the establishment of industrial infrastructure. Due to the effects of conflict, energy production in China continued to decline from 1948 to 1949, with coal and electricity production only half of their highest pre-war levels. Once the new government had been formed it set up the Ministry of Fuel and Industry as a national energy governing body. It tried to resurrect inherited coal, oil, and electricity supply stations, forecast additional production plans, and direct investment into the fuel and power sectors.

During this period of economic recovery, the government took a series of largely favorable measures which had a noticeable, positive affect on energy strategy. By 1953, the economy had almost recovered to pre-1949 levels, and the government established its first FYP, which aimed at laying the foundation for a socialist industrial system. From the very beginning, the government took the former Soviet Union as its exemplar. Thus, it focused on the goal of energy production and directed investment to heavy industry, including raw materials and mechanical manufacturing. During the first FYP, the energy industry received 28.7% of national industrial investment, including 12% directed towards the electricity sector, 11.9% to the coal sector, and 4.8% to the oil sector (CPC Literature Research Center, 1992a). Since economic policy focused on industrial production, planners suggested that the growth of the energy sector should be even higher than that of core assets such as steel. In terms of hydropower development, policy paid more attention on the construction of small- and middle-sized hydropower plants, and tried to build a few large ones to prepare for future expected increases in demand for electricity.

However, the demand for coal turned out to be much greater than expected, because the economy grew much faster than anticipated. In order to meet the demand for energy, the government strictly controlled

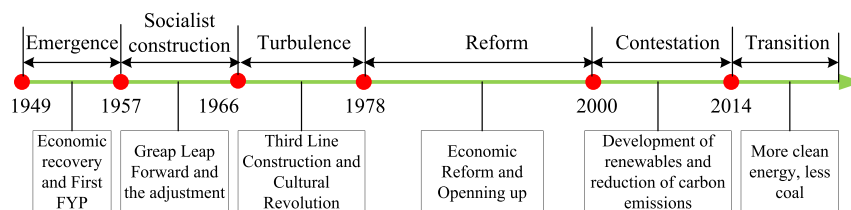


Fig. 2. Six historical phases of the People's Republic of China's energy strategy.

Download English Version:

<https://daneshyari.com/en/article/5105629>

Download Persian Version:

<https://daneshyari.com/article/5105629>

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