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# Implementation of energy-saving policies in China: How local governments assisted industrial enterprises in achieving energy-saving targets



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## HIGHLIGHTS

- We employ a case study-based approach to study policy implementation in China.
- Local governments have played a major role in implementing energy-saving policies.
- Local public agencies collaborated in implementing five types of policy measures.
- Local policy measures reduced barriers to energy saving at industrial enterprises.
- Enterprises and local governments work together to achieve energy-saving targets.

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## ABSTRACT

Local governments have replaced the national ministries that are in charge of various industries to become the primary implementer of energy-saving policies in China since 2000. This paper employs a case study-based approach to demonstrate the significance of local governments' policy measures in assisting industrial enterprises with energy-saving activities in China. Based on the longitudinal case of the Jasmine Thermal Electric Power Company, this paper hypothesizes that sub-national governments have played a major role in implementing energy-saving policies in China since the 11th Five-year-plan period. A wide range of provincial and municipal agencies collaborated in implementing five types of policy measures – informational policy, skill building, improved enforcement of central directives, price adjustment, and funding – that reduced barriers to energy saving and motivated active pursuit of energy-saving activities at industrial enterprises. The case study demonstrates how an enterprise and local governments work together to achieve the enterprise's energy-saving target. The authors will investigate the hypothesis of this paper in the context of multiple case studies that they plan to undertake in the future.

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## 1. Introduction

Energy-saving policy in China has significant global impact. Since 2000, China's energy consumption has more than doubled (World Bank, 2012). In 2010, China overtook the United States to become the world's largest energy consumer, accounting for 19% of global energy consumption (International Energy Agency (IEA), 2010). As China becomes more affluent and urban, its citizens will consume more energy (Qi et al., 2013). Recognizing the unsustainable pace of growth

in energy demand and its consequences for the environment, security, and global climate change, China released the 11th National Economic and Social Development Five-Year Plan in 2006, which established a mandatory energy-saving target: a 20% decrease in national average energy intensity (i.e., energy consumption per unit of GDP) by 2010 (National Development and Reform Commission (NDRC), 2006a; Energy Information Administration (EIA), 2008). By 2010, China reversed its rising energy trend from the 2000–2005 period and reduced energy intensity by 19.1%, slightly short of the 20% target (Qi et al., 2013; Andrews-Speed, 2009).

In China, policy performance often depends on implementation. In the 1980s and 1990s, the implementation of energy-saving policy in China relied on numerous national ministries (Qi, 2013; Appendix A in supplementary material). With these ministries

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abolished by 2000 as the central government reorganized itself during its adaptation to a market economy, local governments<sup>1</sup> assumed responsibility for implementing energy-saving policies under the so-called target responsibility system (TRS).<sup>2</sup> Specifically, the 20% national average energy intensity reduction target was to be met using “responsibility contracts,” which assign energy-saving targets to lower levels of governments and key energy-consuming enterprises<sup>3</sup> and hold government officials and enterprise leaders accountable for target performance through an evaluation system, linking the local implementation of central policies to financial bonuses and career advancement of local cadre (Lo and Wang, 2013; Zhao and Ortolano, 2010; Zhou, 2010).

In response to the barriers to industrial energy saving in China, including the relatively low priority of energy saving for enterprise managers (Chen and Porter, 2000; Li et al., 2013), the lack of systematic knowledge about energy-saving opportunities (Fleiter et al., 2012; Schleich, 2004), the insufficient energy management system (Chen and Porter, 2000; Fang and Zeng, 2007), incentives to continue production at small low-efficiency facilities (Price et al., 2011), and difficulties raising funds for energy-saving projects (Wang et al., 2008; Zhao and Ortolano, 2010), local governments in China instituted and implemented a series of policies and programs since the 11th Five Year Plan (FYP) period (Zhou et al., 2010; Zhang et al., 2011). This paper investigates whether and to what extent local governments’ implementation of energy-saving policies have alleviated barriers and facilitated energy-saving activities at industrial enterprises in China as well as whether the same trends will apply during the 12th FYP period.

Historically, gathering empirical evidence about energy policy implementation in China has been difficult due to limited access to data. This paper contributes to the existing literature by employing a case study-based approach to demonstrate the impact of sub-national governments’ implementation of energy-saving policies on energy-saving activities at industrial enterprises. Based on a longitudinal case study of the Jasmine Thermal Electric Power Company (JTEPC), the authors hypothesize that sub-national governments have played a major role in implementing energy-saving policies in China. A wide range of provincial and municipal agencies collaborated in implementing five types of policy measures – informational policy, skill building, improved enforcement of central directives, price adjustment, and funding – that reduced the barriers to energy saving and motivated the active pursuit of energy-saving activities at industrial enterprises. The authors will investigate the hypothesis in the context of multiple case studies that they plan to undertake in the future.

## 2. China's industrial energy-saving policies

The industrial sector consumes more than 70% of total energy in China (National Bureau of Statistics (NBS), 2010; 2011). Therefore, energy-saving policies have traditionally focused on the industrial sector. This section reviews representative national energy-saving policies for industrial energy efficiency during the 11th FYP period, followed by a discussion of local governments’ policies for industrial energy saving.

<sup>1</sup> Local governments in China refer to all levels of sub-national governments, such as provincial governments and municipal governments. In this study, we use local governments and sub-national governments interchangeably.

<sup>2</sup> For an extended discussion of the target responsibility system, please see Tsui and Wang (2004), O'Brien and Li (1999) and Zhou (2010).

<sup>3</sup> According to the Energy Conservation Law in China, key energy-consuming enterprises refer to enterprises that consume a minimum of 5000 tce a year.

### 2.1. National policies for industrial energy saving

During the 11th FYP period, the central government of China launched several policies for industrial energy saving (Zhou et al., 2010). The three most representative policies are the Top-1000 Enterprise Program, the Ten Key Energy-Saving Projects, and the Obsolete Capacity Retirement Program.

The national government launched the Top-1000 Enterprise Program in 2006 to achieve energy savings of 100 Mtce by 2010 (National Development and Reform Commission (NDRC), 2006b). The program originally covered the 1008 most energy-intensive enterprises in 9 major energy-consuming industries, each consuming a minimum of 180,000 tce annually. The Top-1000 Enterprise Program was implemented under the target responsibility system (TRS). The National Development and Reform Commission (NDRC) divided the national energy savings target among all provinces and signed responsibility contracts with provincial governments, specifying the provincial governments’ energy-saving targets, rewards and penalties (Price et al., 2010). Target setting for provincial governments considers several factors, including industrial structure, total energy consumption, energy productivity, energy mix, and the stage of economic development (China Sustainable Energy Program (CSEP), 2007). Each provincial government divided the targets among the Top-1000 Enterprises within its jurisdiction, mainly based on each enterprise's share of energy consumption among all Top-1000 Enterprises, adjusted for the enterprise's potential for technological progress<sup>4</sup> (LESO, 2012). Provincial governments signed responsibility contracts with Top-1000 Enterprises within their jurisdictions (Appendix B in supplementary material) and assessed the target performance of the Top-1000 Enterprises against a scoring table<sup>5</sup> (Appendix C in supplementary material). Local governments and enterprises were rewarded or penalized depending on their target performance, which has become part of the criteria matrix for evaluating local governments and their officials as well as major energy-consuming state-owned enterprises (SOEs) and their leaders<sup>6</sup> (Lo and Wang, 2013; Zhou et al., 2010). Energy-saving targets for local governments and SOEs are binding and follow the “one item veto” rule (yipiao-foujue), meaning that if a government or SOE fails to

<sup>4</sup> For instance, if Enterprise A accounts for 0.5% of total energy consumption of all Top-1000 Enterprises, then the energy savings target assigned to Enterprise A will be approximately 0.5% of the energy savings target for all Top-1000 Enterprises, i.e., 100 Mtce. Therefore, the energy savings target for Enterprise A would be  $0.5\% \times 100 = 0.5$  Mtce. However, if the efficiency level of Enterprise A is already quite high and potential for further efficiency upgrade is limited, then the resulting target will be lowered accordingly.

<sup>5</sup> Local government agencies responsible for energy saving review self-examination reports submitted by the enterprises and organize an assessment group comprised of experts from a variety of energy-relevant agencies and research institutes to conduct on-site inspection of the enterprises before making a final assessment (Li et al., 2013). However, because assessment experts were not full-time inspectors and were only able to commit a few hours at an enterprise each year, the final assessment was largely based on self-examination reports, followed by fine-tuning by the assessment group during on-site inspections (JTEPC, 2013a; JTEPC, 2013b; Placidity Energy Saving Office (PESO), 2013).

<sup>6</sup> Local governments and SOEs that meet or exceed energy-saving targets in the responsibility contract will be commended and given awards in national energy-saving commendation events. Subordinate governments that fail to meet targets assigned by their superior governments are required to submit a written report to their superior government within one month of the release of the assessment result. The written report includes a detailed rectification plan and specifies the timeframe for rectification. The NDRC suspends authorization and approval for energy-intensive projects in these regions. SOEs that fail to meet energy-saving targets will receive a formal notice of criticism from the NDRC and media exposure. In addition, these SOEs need to submit written rectification reports to their corresponding provincial governments. Government officials in regions that fail to meet their targets and leaders in SOEs that miss their targets will not receive promotions or honorary titles or participate in annual award evaluation programs. They are also held accountable if rectification proves ineffective.

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