

Restructuring the Chinese Electricity Supply Sector: An assessment of the market pilot in Guangdong Province

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Overview

In March 2015 the No.9 document was published by the China State Council and this began a new round of national electricity sector reforms in China. These reforms focus attention on reducing the price of electricity to industrial customers via the introduction of markets for wholesale power and the introduction of competition in the retailing of electricity.

This paper focuses on how the market reforms are progressing in China's largest province: Guangdong. It builds on our earlier paper on Chinese power market reform (Pollitt et al., 2017). This paper aims to assess progress with reform, and what Guangdong is learning about how electricity market models need to be adapted for its own particular circumstances. We pay close attention to the international experiences of electricity market reform documented in Joskow (2008) and the detailed features of well-designed wholesale electricity product markets discussed in Stoft (2002). The paper highlights what the lessons from the market pilot experiences in Guangdong are for both the province itself and for the rest of China. The paper draws on the experience of Chinese stakeholders, to identify what are the key problems to be overcome in bringing about a successful electricity reform transition in the World's most significant electricity system. The paper offers some recommendations for next steps in the reform process at the provincial level and is intended to be a positive contribution to on-going debates about the detailed implementation of electricity sector reform in China and to be a platform for future discussion and informed input on the appropriateness of international reform experience in the Chinese context.

The rest of the paper is organized in 5 sections. In Section 2, we begin with a discussion of the background to the reforms in Guangdong, including a discussion of the characteristics of the power system in Guangdong. Section 3 discusses how the power market pilot actually works in Guangdong and whether the current market design is in line with power markets we see elsewhere. Section 4 explores the extent to which power market reform has brought new players into the electricity system in Guangdong. Section 5 considers the effects of the reform on the operational and investment decisions of firms in the sector. In sections 3 to 5 we aim to provide some international context, as background to our analysis of the reform effects observed to date. Section 6 offers some points for improvement in the light of the existing market design and its observed effects.

Methods

The paper draws on fieldwork undertaken in Guangdong, which involved interviews with a significant number of industry stakeholders. For each of sections 3, 4 and 5, we begin with a summary of international reform experience, then discuss how this experience applies to the actual market situation in Guangdong, drawing on our fieldwork.

Results

One striking thing is the lack of transparency of the final retail price in different areas of Guangdong. Retailers are unaware of the final prices that their customers actually pay. This is because this is still the responsibility of the incumbent retailer, China Southern Grid (CSG).

Three agencies are responsible for regulation of the power sector in Guangdong. All three bodies are responsible for monitoring of how competitive the market is. There would seem to be a lack of clear responsibility for monitoring competition in the power market between different branches of government. An independent regulatory agency at the provincial level should be responsible for market participant licensing, market design changes, the setting of regulated network charges and the monitoring of competition.

The introduction of new retailers into the power system has had three positive effects. First, it has improved understanding of the nature of the electricity product and customers have been made more conscious of pricing and

energy management. Second, the government has gained an understanding of what it means to move from an administered price to a market price. Third, retailers have improved service quality to customers relative to CSG.

The ownership of generation in Guangdong is concentrated with the largest company (Yudean) having around 35% market share of capacity, with the next largest firm having 20%. Yudean is a national big 5 generator, but is significantly concentrated within the CSG area. This is true not only of total capacity, but also in terms of peak generation. This suggests there may be some value in swapping assets between state owned generators to create more competition in bidding.

A significant problem is that there is too much demand relative to supply in the partly liberalised market. This results in retailers simply bidding the regulated price of power with a slight discount on the final amount of energy that they want to purchase in order to reduce the market price (due to the price determination process, explained below). The price that is paid to generators and retailers is determined by a formula which calculates the share of the savings attributable to winning bidders in the auction. This is not an efficient uniform price auction such as we see in most wholesale electricity markets around the world. We demonstrate how the current market design can be gamed.

Finally, market reform in Guangdong should have implications for neighbouring provinces. Neighbouring, Yunnan has very low retail prices for power. A fully functioning power market which included Yunnan and Guangdong would involve hydro generators in Yunnan getting much higher wholesale prices for their power.

Conclusions

1. There is a need to acknowledge value of assets in generation will go down with the introduction of a market which reduces prices. If necessary there should be a reallocation of assets between state owned generators to increase competition and spread the value loss.
2. In Guangdong, there is a need to move to a day-ahead market for all generation and to integrate this with dispatch. Partial monthly contract markets have successfully encouraged the creation of a new set of market actors – retailers – but they are not generating a proper set of price signals for operation and investment.
3. It would seem sensible to experiment more fully in one Chinese province. A genuine market pilot needs a full set of wholesale electricity markets applied to all generation and demand. This is not the case in any existing pilot, including in Guangdong.
4. The probability of reversal of power market reform in China seems higher than in many other jurisdictions due to the lack of progress over a 5-year time period and the lack of legislative underpinning of the reform itself. There needs to be a sense of urgency in reform lacking due to the longer political cycle in China (10+ years) of one Presidency. Without this the risk that reform is derailed without being satisfactorily completed is high.

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