



Reforming the Chinese Electricity Supply Sector: Lessons from International Experience

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Under the current Five Year Plan (FYP13: 2016-2020) China's electricity sector is undergoing a major transition from a state managed system to a market price based one, following the publication of the No.9 document of March 2015 which re-launched a new push for 'power market reform' in China.

This paper focuses on the international lessons for China in the light of the current round of power market reforms and paying attention to the particular context of the Chinese electricity system. It examines these lessons drawing on fourteen electricity reform experience points drawn from Joskow (2008) and Pollitt and Anaya (2016) and makes use of extensive interaction with the Chinese electricity policy community.

A key driver of the current reform is the high price of electricity for industrial customers relative to the US. We identify four major savings within the power sector that would bring down prices for industrial customers. These are **reform of dispatch** (which might reduce coal use by up to 6% and allow industrial prices to fall by 1-2%); **increasing the efficiency of the grid companies** (which might reduce industrial prices by 2-3%); and **rebalancing charges away from industrial to residential customers** to better reflect underlying system costs (which might reduce industrial prices by up to 5%) and **reducing the high rate of investment in generation/networks** by \$10bn per year could also reduce prices for industrial customers by of the order of 3%. None of the savings are easy to deliver because they have significant re-distributional implications. However, they have been achieved in many other countries, albeit over a period of up to 10 years. They suggest that the non-fuel cost gap - amounting to 12% of the current Chinese industrial electricity price - that we identify between China and the US can be eliminated.

If the gap with the US is to be further reduced, this would take a comprehensive reform of the coal sector (and of value added taxation in the electricity sector). Rationalisation of the coal sector might reduce costs to those in the US, and this would substantially close the remaining price gap. A combination of tax changes or cheaper sources of energy (e.g. shale gas) could further reduce the price differential.



China needs to view electricity market reform in the context of what it can do for the rest of the Chinese economy and resist vested interests within the sector that would seek to limit its rationalisation. A key part of this is the opportunity to simultaneously rationalise the coal production sector (which has 4.3m employees, slightly more than the whole electricity sector), by reducing coal demand and improving coal sector productivity. The decoupling of electricity policy from national procurement strategies for fossil fuel and nuclear technologies was a key driver of cost reduction towards new investment in Europe and the US. An additional impetus to reduce Chinese dependence on coal for power production might be the rapid recent decline in the reserves to production ratio for Chinese coal.

China has devolved a lot of energy investment decisions to the provinces. This has favoured provincial coal mines and encouraged the pursuit of energy independence among the provinces. This is because coal production and coal generation contribute to provincial GDP targets, and local coal mines and coal generation contributes to provincial tax revenue. This undermines a regional/national market emerging to the extent that is fully beneficial to the national economy. We recommend that the central government has to strongly regulate interprovincial electricity trade and encourage its development.

The government's current capacity to regulate a competitive power sector is limited. There is a shortage of well-qualified/well-trained staff (accountants, economists and lawyers), who can administer and regulate the institutions of the market, partly due to low public sector salaries (relative to SOE salaries). There continues to be a need to reduce the power of the State Grid Corporation in setting/frustrating policy in favour of well-resourced and independent (of the industry) civil servants. We suggest that this could be achieved by transferring some of the research functions of State Grid to the central government, and treating State Grid as an interested party with its own internal financial incentives (like generators) in policy discussions.

We find that now is a good moment to push forward with reform. Final prices are high (for industry and this is a major driver of reform because of low US industrial energy prices). The electricity industry is profitable relative to underlying costs (which have fallen in line with commodity price falls). Pilot wholesale markets are showing price reductions for industrial customers. There is also environmental pressure to end wind curtailment (which is very high) and mostly due to the hours based contracts held by coal fired power plants. We observe that the moment may of course pass if commodity prices start rising.

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