



Ownership unbundling in electricity distribution: The Russian experience

Tuomo Summanen^{a,*}, Heli Arminen^b

^a LUT School of Energy Systems, Lappeenranta University of Technology, P.O. Box 20, FIN-53851, Lappeenranta, Finland

^b LUT School of Business and Management, Lappeenranta University of Technology, P.O. Box 20, FIN-53851, Lappeenranta, Finland



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ABSTRACT

Russia is the first and thus far only country that has separated ownership of electricity distribution and transmission and then, a few years later, reunified these services under one company. We examine the impact of these changes on the quality of service in electricity networks and the operating costs of electricity distribution companies. We find no evidence that ownership unbundling increased the service quality in electricity networks. Furthermore, our results indicate that ownership unbundling resulted in higher operating costs for electricity distribution companies. This study thus contributes to discussion on the importance of the balance of structural remedies and transparent independent regulation in the development of competitive energy markets in emerging market economies.

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1. Introduction

The energy sector is undergoing significant change, both technical change in the form of more decentralized energy production and greater production of renewable energy and structural change resulting from reform of policy and the regulatory setting. The dynamic and uncertain operating environment has created considerable challenges for energy companies, policy makers, regulators and consumers, not only in developed markets but also in emerging markets and developing countries.¹ As a response to these challenges, many advanced economies reformed, already a couple of decades ago, their previously vertically integrated electricity supply industry and separated electricity supply into a structure consisting of (1) competitive generation and retail and (2) monopoly transmission and distribution. Many emerging market economies, including Russia, have also undertaken reform of their

electricity supply industry.

Russia, as is well known, is a significant player in the energy sector: the electrical energy market is the fourth largest in the world; Russia is the world's second largest producer of natural gas; and the country is one of the world's largest oil producers. The energy sector accounts for approximately one fifth of Russia's GDP, half of federal budget revenues, and up to two-thirds of the country's export earnings.² Thus, Russia's future prospects — economic, social and political — are heavily dependent on developments in the energy sector, nationally and internationally.

The Russian electricity market was reformed between 2003 and 2008. Specifically, the vertical electricity supply monopoly, RAO UES, was liquidated in 2008 and mandatory ownership unbundling³ between generation and retail of electricity and network activities of transmission and distribution was put into effect. Wholesale markets for electricity were fully liberalized in 2011. The true extent and impact of these reforms remain unclear. Some studies conclude that Russia has reached its main goals for electricity reform in disintegration of the vertical electricity supply

* Corresponding author.

E-mail addresses: tuomo.summanen@lut.fi (T. Summanen), heli.arminen@lut.fi (H. Arminen).

¹ Osorio et al. [24] discuss increasing complexity and security issues in deregulated electricity systems that arise from pricing and investments based on market signals, increased interconnectedness with other countries and a growing share of renewable energy generation. They propose an integral framework to analyse interdependencies and security of electricity supply.

² See Russia Economic Report [25] and Simola and Solanko [26].

³ Ownership unbundling in the electricity industry is when a separate company owns and operates the network assets (distribution and/or transmission) and this company is then not allowed (or only with severe limitations) to also own non-regulated generation and/or retail activities.

monopoly, indicating that the liberalization has succeeded [1]. Other studies, however, argue that Russia failed to create a fully competitive market. (Institute of Natural Monopolies Research [36]). Somewhat surprisingly, and despite their importance, the Russian energy market and Russian energy policy, and particularly the electricity sector, remain relatively understudied. In particular, there is a lack of empirical studies that examine and evaluate Russia's electricity reform efforts. One goal of this research is thus to assess the success and effectiveness of Russia's electricity market reforms by empirical analysis of the performance of the electricity distribution sector.

Russia is one of very few countries that have implemented mandatory ownership unbundling of electricity distribution from the rest of the electricity supply industry.⁴ It seems, however, that although the Russian state remained the majority shareholder in the distribution holding company, it was not able to govern the distribution network effectively. Indeed, there is plenty of anecdotal evidence in the Russian press about weak management and coordination problems in electricity distribution. As a result of these difficulties, the Russian government decided to bundle the transmission and distribution networks at the end of 2012⁵ and create one state-owned company, called Joint Stock Company Russian Grids, to manage both transmission and distribution. The company was later renamed Rosseti, Public Joint Stock Company (PJSC ROSSETI).⁶

Russia seems to be the first country to have decided to bundle ownership of transmission and distribution networks after having previously mandated their separation, which makes the case particularly interesting. Why did this happen? Is this change of direction specific to Russia alone? Further, do the costs of the coordination problems associated with managing separated power system units outweigh the benefits of potential efficiency gains from a disintegrated system, more generally, in emerging markets? Are there lessons that can be applied to developed economy markets? In this work, we will empirically examine the effects of these structural reforms on the Russian electricity supply industry, focusing specifically on the impacts of ownership unbundling on electricity distribution as measured by operating costs and service quality of the electricity distribution networks.

Previous literature based on data from developed countries indicates that structural reforms such as mandatory separation of ownership of electricity distribution from vertical electricity system can reduce the operating costs of electricity distribution companies and increase the quality of service in electricity networks. However, as discussed in more detail in the literature review, evidence for the positive effects of these structural reforms is mixed even for developed countries. Knowledge concerning emerging market

economies is even more limited. We do not know, and here we identify a knowledge gap in current understanding, for example, how structural reforms in electricity distribution, which is a monopolistic function, affect the quality of service and operating costs of electricity distribution companies in emerging markets, where law enforcement in particular and institutional quality in general are weak and there are difficulties reconciling the interests of the individual with the common interest. Anecdotal evidence does seem, however, to indicate a greater incidence of problems because of the more challenging coordination. Existing empirical research has not addressed and explained what happens in emerging markets when electricity distribution is separated mandatorily from the rest of electricity system by ownership unbundling.

Russian electricity sector reform is a particularly important area of research because of the size of the Russian electricity sector, the world's fourth largest, and because the reform was done in a textbook manner, that is, with mandatory ownership unbundling of generation, transmission, distribution and retail. The scope of the Russian electricity reform, its ambitious goals and the speed of its implementation were quite exceptional globally. The reform sought to create a cost-efficient electricity distribution sector by setting up independent stock exchange listed regional electricity distribution companies. Independence and incentives for shareholders and management should, in theory, have encouraged cost-effective behaviour by the distribution companies.

To the best of our knowledge, the consequences of mandatory ownership unbundling in electricity distribution in emerging markets have not been analysed to any significant extent. Therefore, our first contribution is address this research gap by analysing ownership unbundling in the Russian context. Our second contribution is related to measurement of service quality. We construct a new relative indicator to measure quality of electricity distribution: electricity requests not connected divided by kilowatt-hour (kWh). Especially in emerging markets, where gaining access to the electricity supply can be a long and bureaucratic process, this indicator reflects the technical quality of the electricity grid as well as the service quality provided by the companies and the administrative environment.

The structure of this paper is as follows. In section 2, we provide an overview of relevant literature on vertical integration and vertical disintegration in the electricity sector and describe Russian interregional and regional electricity distribution companies. In section 3, we present and discuss the data used in the study. Section 4 reports the results of analysis of the effects of ownership unbundling on service quality and operating costs, and in section 5, we draw conclusions and consider the implications of the Russian experience.

2. Previous literature on vertical integration, vertical separation and the Russian context

2.1. Literature review

Traditionally, the electricity industry was considered to have strong vertical integration economies or economies of scope. The studies of [2] and Joskow and Schmalensee [3] challenged this view: it was claimed that the efficiency benefits of competition (in generation) can outweigh the costs of vertical separation.

Researchers have long recognized that vertical separation of an integrated electricity system has costs that arise from coordination of the parts of the formerly integrated system. Brunekreeft [4]; for example, draws attention to the costs of flawed coordination. In a competitive separated approach, the actions of decentralized actors must be coordinated externally by a market mechanism. However,

⁴ There are several forms of unbundling: functional, legal and ownership. Few countries have adopted a mandatory ownership unbundling of electricity distribution from the rest of the electricity supply industry. New Zealand enforced mandatory ownership unbundling of electricity distribution in 1998, and Russia in 2008.

⁵ November 22, 2012, the President of the Russian Federation signed the Decree No.1567 "About Open Joint Stock Companies "Russian Grids". March 23, 2013, IDGC Holding JSC, was officially renamed Joint Stock Company Russian Grids (<http://www.rosseti.ru/en>).

⁶ Rosseti, Public Joint Stock Company (PJSC ROSSETI) is one of the largest electricity network companies in the world. The company maintains 2.30 million km of electricity transmission lines and 496,000 substations with a transformer capacity of more than 773 GW. In 2015, the net electricity supply to consumers amounted to 720.5 billion kWh. Companies in the Rosseti Group have 216,000 employees. PJSC ROSSETI has 37 subsidiaries and affiliates, including 14 interregional distribution grid companies and a main network company. The Russian state, owns 87.9% of the share capital. Rosseti networks distribute 75% of Russian electricity. The remaining 25% of electricity is distributed by regional and municipal networks by the Ministry of Defence and Ministry of Transportation (<http://www.rosseti.ru/en>).

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