

A review of electricity markets and reforms in Russia

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ABSTRACT

The power industry in Russia has undergone one of the most ambitious reform programs implemented in the world. This paper reviews the background, targets, and measures taken in the major stages of the reform, outlines the current state of the Russian power sector and analyzes the results of the reform. It is concluded that given the current economic situation to provide large investments, Russian authorities had to undertake some market intervention, which had some side effects on the competitiveness of the market. By 2018, the urgent need for the investment was removed. The authorities have improved some important regulations, while some of the key non-market mechanisms are still maintained.

1. Introduction

The electricity sector is important to any country. The price and the reliability of electric power significantly influence the cost of production in many sectors of the economy and have great importance for households. With the aim to stimulate the provision of more reliable and fair-price electric power for economic activities, in the 1980s many countries began to reform state-owned or vertically-integrated electric power industry towards privatization and competitive markets (Rudnick, 2016; Jamasb and Pollitt, 2005; Glachant, 2009; Borenstein and Bushnell, 2015).

Russia was not an exception to the global trend. From the beginning of the 1990s until now, the Russian power sector has also undergone several stages of changes. Two major reforms were undertaken: the first occurred from the dissolution of the USSR until circa 2000, when the reforms of the whole country drove the electric power industry from a planned scheme to a nation-owned monopoly enterprise. The second reform refers to the progress after 2000, when the vertically-integrated monopoly was restructured, and the market was liberalized.

For Russia, the background of the reform has its uniqueness. The reforms started after the dissolution of the USSR, when the country was undergoing a drastic move away from centralized economic planning. The pace of the reforms in different industries varies greatly and the power industry of Russia went through, probably, the most drastic changes in the world. Even though the planned major steps of the reform have finished, the Russian power sector is still going through

changes. However, the papers on Russia's electricity market reform are rare (International Energy Agency, 2014; International Energy Agency, 2012; Shiryayeva, 2009; Boyko and Gubanov; Gore et al., 2012; Kuleshov et al., 2012; Cooke, 2013; Chernenko, 2013; Boute, 2013), specifically, there's no literature on the recent trends of the Russian power sector. This paper provides a comprehensive review of the reforms in Russia's electric power industry since 1992, describes its up-to-date spatial and organizational structure, as well as the way markets, are operating. More importantly, it also summarizes the achievements and the current challenges of the reforms and provides some insights into the future pathways of the Russian electricity market.

2. Brief introduction to the Russian electric power industry

The Russian Federation is the world's largest country across Europe and Asia. Its European part occupies about 25% of the area, while the other 75% area is in Asia. The Unified Power System (UPS) of Russia lies across 69 regions, and consists of seven interconnected power systems (IPs) (Fig. 1). (System Operator of the UPS). There are 220/500kV transmission lines among the IPs. The network infrastructure is comparatively well developed in the densely populated Central IPS. While Eastern and Siberian IPs are less developed and the former has a very weak connection to the neighboring Siberian IPS, so the Eastern IPS usually operates separately from the other IPs.

In 2017, the total electricity generation was about 1060 000 GWh (System Operator of the UPS, 2018). This is one of the highest levels

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Fig. 1. Interconnected power systems of Russian UPS (System Operator of the UPS).

since 1991, when the USSR experienced dissolution and the industrial output slowdown led to lower electricity demand and lower electricity supply (Fig. 2).

Russia's installed capacity is the fifth largest in the world after China, the United States, India, and Japan. The total installed interconnected capacity in the UPS reached 244 GW by 2017, with fossil-fuel power plants accounting for 58.6% (160.2 GW), hydropower for 17% (48 GW), and nuclear capacity for 18.7% (27.9 GW) (Ministry of Energy of Russian Federation, 2017). The wind and solar plants occupy a trivial portion (less than 0.05%) of the capacity mix.

3. Restructuring of the power sector since 1992

3.1. 1992–1998: reforms in the preparatory period

Before 1992 all energy assets belonged to the Ministry of Fuel and Energy. After the dissolution of the USSR, the fast privatization process overwhelmed all branches of the Russian economy, and the power industry was not an exception. At first, the electric power industry of Russia was transformed into a set of vertically integrated regional companies, named as “Energos”. Considering the issues of industry's integrity and national security, the federal government established the Joint Stock Company of Unified Energy System of Russia (RAO-UES), which acquired most of the assets of the regional Energos (Chernenko, 2013; Maxim et al., 1997). The RAO-UES, as a vertically integrated nation-wide monopolistic entity, owned two-thirds of the generation capacity and all the high-voltage (330kV+) grids. The regional Energos (some also vertically integrated) owned low-voltage grids and some local generation plants. All nuclear plants were independent of RAO-UES and operated by the government-owned company “RosE-nergoAtom”.

In this phase, the reformists' aim was first to create a structure in which a number of the vertically integrated companies and some independent power stations (sometimes owned by the government) would trade electric energy between each other. Such a structure was regarded as an intermediate step towards a more competitive market. However, the actual process of reform took much longer than expected, so the industry structure stayed at this intermediate stage for a long period.

During the 1990s, the monopolistic and highly regulated power sector of Russia was facing the following problems:

1) Low operational efficiency

The RAO-UES controlled most of the generation capacity, while a substantial portion of the capacity was still under regional Energos as competitors of RAO-UES. The RAO-UES, acting as the owner of large portions of generation and dispatcher of the transmission system, would often dispatch its own plants in priority, considered unfair.

2) No pricing schemes

In the 1990s, there was a wholesale electricity market, namely the Federal Wholesale Electricity and Capacity Market (FOREM) (Kennedy, 2003), but it was, in fact, an inter-regional energy transaction system without competition and flexible pricing scheme. Each region sold surplus energy or bought energy to fill in supply deficits at prices determined by the Federal Energy Commission. Although with the name “market”, the FOREM did not play as an actual electricity wholesale market.

The electricity price in FOREM was also extremely low and could not act as a reflection of real production costs. Due to the very low electricity prices, the power industry had long suffered from financial deficiency, which severely affected normal operation, maintenance, and investment (International Energy Agency, 2012).

3) Payment problem

Besides the low electricity prices, the low customer payment rate exacerbated the burden of the industry. In the early 1990s, due to economic collapse and hyperinflation (where the currencies largely gave way to barter), some Energos were getting just 5% of payments in rubles (Shiryaeva, 2009). The overall payment rate of the electricity bills was as low as 6%–8% (International Energy Agency, 2012). The debt of consumers was more than 100 billion rubles, and more than 20 companies were teetering on the edge of bankruptcy (Shiryaeva, 2009).

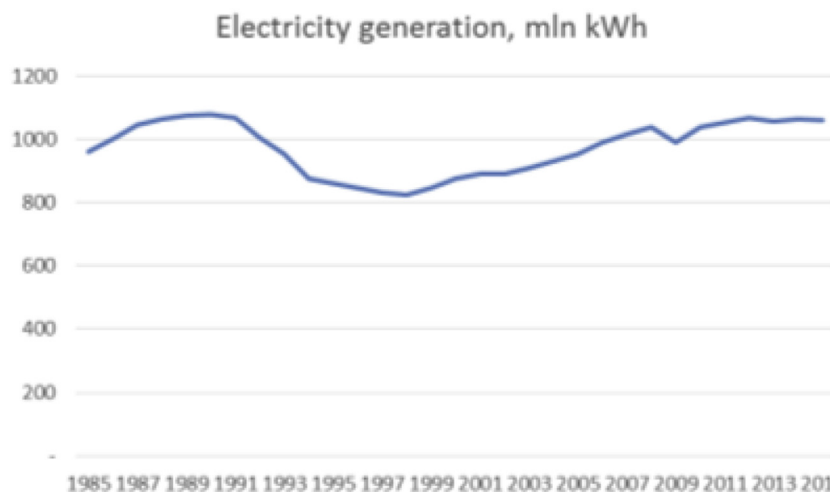


Fig. 2. Yearly electricity generation of Russia Source: created by authors based on BP data (Petroleum, 2017).

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