Russia's power market reforms at the crossroads

Sylvia Beyer

A decade of efforts were made to reform and liberalize the Russian electricity sector, with the unbundling of electricity networks and generation, the creation of an institutional governance framework and a wholesale electricity market, together with the privatization of generation assets. These changes attracted national and foreign investment into new generation capacity. In 2013, the government decided to launch a process to reform the Russian electricity market; this was planned to last until 2015. In 2014, discussions were still taking place over the ideal market design. Looking ahead, this reform is crucial for the modernization of the power sector, notably for the renewal of Russia's large fleet of thermal power plants which were built 50 to 70 years ago. Up to 2035, around 80 per cent of nuclear capacity will reach the end of its lifetime and 78 per cent of hydropower plants will be in need of refurbishment. The *IEA World Energy Investment Outlook 2014* estimates that the electricity sector in Russia will require investment of $411 billion in generation and $202 billion in networks by 2035.

The International Energy Agency (IEA) recently released *Russia 2014*, an in-depth review (IDR) of Russia's energy and climate policies. The report examines the Russian electricity market, its achievements, shortcomings, and challenges, and provides recommendations for the future direction of reforms with regard to energy networks and retail and wholesale markets. The IEA has been following Russian electricity market reforms since 2002. This article reflects on the latest findings from the IDR and the challenges of wholesale power market design.

'… THIS REFORM IS CRUCIAL FOR THE MODERNIZATION OF THE POWER SECTOR, NOTABLY FOR THE RENEWAL OF RUSSIA'S LARGE FLEET OF THERMAL POWER PLANTS …'

Creation of the OREM

The creation of the wholesale energy and capacity market, the OREM (in Russian, *Optovyi Rynok Electroenergii i Moshchnosti*), with a separate energy and capacity market, is a major achievement, as is the creation of the Russian day-ahead-market; the day-ahead-market covers 95 per cent of the supply in two price zones in Europe and Urals, and Siberia. Russia has chosen to remunerate capacity in two separate markets, while avoiding price spikes in the energy market. The capacity market has two main elements:

- a targeted out-of-market capacity contract to secure new capacity up to 2018 on the basis of preselected projects (in Russian, *Dogovor o Predostavleny Moshnosty* or DPM) and
- annual capacity auctions for existing capacity.

Capacity prices are capped in the areas where there is market concentration. The market is fragmented in 23 free-flow areas, with regulated price caps in 18 free-flow areas. Currently, capacity auctions are carried out on an annual basis, taking a conservative approach on grid stability and medium-term supply/demand outlook by the system operator. There is no dedicated deep and liquid financial market for energy in Russia. To some extent, financial derivatives (futures contracts of electric power) can be traded on the Derivatives Market of Moscow Energy Exchange by participants in the OREM and retail electric power market.

Much attention in the reform debate is focused on the capacity market. The options discussed include: moving to an energy-only market with 100 per cent bilateral contracts, extending the current capacity auctions to a longer-term horizon (four to five years), or the introduction of a new DPM. Other reform options include the introduction of a capacity-balancing market to hedge volume risks, in the absence of a deep and liquid financial market.

Experience of other countries

Other jurisdictions around the world have faced similar challenges with regard to modernizing the electricity sector and have decided to introduce capacity payments. For example, in the UK around 12 GW of old coal- and oil-fired plants are to be retired by end of 2015 and almost all nuclear capacity in the coming decade. The UK Electricity Market Reform gained much international attention as it introduced a wide range of regulatory measures to secure investment and renewal. By the end of 2014, the UK is to launch a capacity market and so-called contracts for difference. These contracts are designed to secure investment in renewables, new nuclear, or carbon capture and storage over the next 15 years through a kind of feed-in tariff which remunerates the difference from the regulated strike price. As a second element, capacity auctions are to be introduced for all generation units, including renewables, electricity storage, and voluntary demand reductions; these provide payments for a one- to three-year period and include penalties for non-availability. In addition, environmental regulation and emission performance standards for coal-fired power plants have been introduced.

Experience in other jurisdictions shows the benefits of a longer term horizon for capacity auctions. In North America, PJM, the largest wholesale electricity market in the world (covering 13 states and the District of Columbia), launched a new Reliability Pricing Model (RPM) with a three year auction period, amid decreasing reserve margins and short-term markets. Experience from the first auction shows diversity of ownership, new investors (including financial investors), and a focus on investment in new gas-fired power plants. The RPM auction has been successful in the procurement of energy efficiency and flexible demand response.

Possible direction for reform

PJM is the world's biggest power market and relies on a highly competitive wholesale design which guides market players by strong competitive price signals. Ten years after liberalization, however, Russia is far away from having a fully competitive wholesale market. Instead, Russia has chosen a strong regulatory approach which has one inbuilt characteristic – it necessarily leads to more regulatory arrangements. The day-ahead-market is only partly competitive, as electricity trade dynamics largely reflect inflexible unit commitment, and while Russia has a sophisticated balancing system with around 8,400 nodes, it is far from using this potential through locational signals or nodal pricing, let alone demand-side response. Russia has a market-based renewable support system which can be easily integrated into a more competitive and open capacity market.

What do the recent changes mean for the future direction of reforms in the Russian electricity market? Should Russia maintain its current design, move towards a competitive energy-only market and phase-out regulated capacity mechanisms, or target capacity payments to modernization?

'TEN YEARS AFTER LIBERALIZATION, HOWEVER, RUSSIA IS FAR AWAY FROM HAVING A FULLY COMPETITIVE WHOLESALE MARKET.'

The market – exit and entry

The UK example brings us to the short- to medium-term priorities of Russian power sector reform. This relates to effective exit and entry into the market. A well-functioning Russian electricity market can ensure competitive and affordable energy supplies, in particular to Russia's large energy-intensive industrial sector and households. Russia is competing with Asia and the USA, and electricity prices drive global competitiveness.

First, power demand outlook and securing required investment. Russian electricity market fundamentals have changed over time. During the 2000s, electricity demand was growing rapidly at a 6 per cent average rate per year and expectations were equally high for the future. However, in the coming decade, power demand growth is likely to stay flat at 2–3 per cent per year. Future demand may not drive investment into the retirement of around 149 GW of gas, coal, and nuclear generation capacity (out of a total installed capacity of 223 GW in 2012) up to 2035 (IEA's 2013 *World Energy Outlook*).

Second, the difficulty of decommissioning old thermal power plants used in combined cycle. Currently, the Russian government restricts generators' decommissioning – considering constraints in system operation, congestion, a lack of longer-term visibility of electricity network expansion, and the primary need for heating, rather than electricity availability during winter periods.

We understand that the Russian power market will need to secure both sufficient entry and exit capacity. Can the current market design unlock those investments needed for modernization?

Decommissioning

For the decommissioning of old plants the government may consider setting emission performance standards or other environmental regulation to mandate renovation or closure in a specific timeframe. However, to avoid the problem of premature closure, before a new plant comes online, the government may indeed need to order plants to stay online if they are system relevant, but reduce their hours for the period where capacity constraints and heat demand are important.

The government should ensure that locational signals can encourage modernization and renovation at the right time and location – this would include generation, grids, and demand-side response. Generation and network adequacy, together with grid investment, will need to be coordinated across the price and non-price zones between the grid companies, the system operator, and market participants in order to remedy network constraints. There is good potential for the electricity market to become this coordinator, by increasing the transparency from nodal pricing at its 8,400 nodes. With the exit of old capacity there is a chance for the market to choose a cost-effective combination of new grids and power plants.

Capacity increases

The DPM mechanisms were considered as being transitory, to secure incremental capacity by 2018; they should be phased out when no longer needed. They attracted investors who committed themselves to investments in new plants in return for privatization. There are several disadvantages: the mechanism is costly, it is inflexible to adjust capacity to the changing market, and the market dynamics have changed with a lower demand outlook. The DPM is closed to new entrants, if it is a list of pre-selected projects. It also ignores renewable capacities.

Prospects for Russia's capacity market

During the modernization period, the capacity market should be reformed to remunerate the renewal and maintenance of capacity on the basis of competitive tenders – in, for example, a three to five year competitive capacity auction of new and old capacity. As network congestions are being lifted between market areas, free-flow areas should be further merged into larger capacity trading zones to encourage competitive entry. It should be especially noted that Russia has a large potential for market-based demand-side response. Instead of forced load shedding, voluntary demand-side response can secure flexible balancing services. At the same time, Russia should continue efforts to develop a financial market, for market participants to hedge their risks.

At the wholesale market level, there is no need for a revolution in Russian electricity market design, but an evolution towards a more competitive, transparent, and efficient electricity market is definitely needed.

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