

## *Too Big to Fail in the Electricity Sector*

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### INTRODUCTION

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There have always been certain sectors that are critical for the functioning of society. Examples include hospitals, gas, railways, electricity, etc. Such sectors used to be state-owned, or subject to strict regulation. But over the last decades many of these have been deregulated and privatized, with the creation of markets and competition (Newbery, 2002).

However, what happens when one or more key companies of these industries face bankruptcy, threatening the availability of the service? While this issue has received attention since the start of the privatization process, the discussion has remained very much theoretical, with occasional problems being solved on a case by case basis. The situation changed drastically in 2007/2008 when the USA mortgage crisis created a snowballing effect, causing a global collapse of the financial sector to become a realistic prospect.

During the decade following this crisis the financial sector was subject to a close scrutiny, with particular attention to the influence of individual financial institutions on the overall system. In addition to a general tightening of regulation and oversight, there was a focus on identifying system critical institution; these became the subject of careful monitoring, and were required to increase their capitalization to increase their solvency, so as to reduce the risk of a rerun of the financial crisis.

In this paper we address the following question: given the essential role of electricity in today's society, is there a need for a similar critical evaluation of the electricity sector to ensure security of supply? While the electricity sector does not have the same global inter-connectedness as the financial sector, it has become increasingly connected. The failure of a major generator or distributor, leading to reduced access to electricity or even large-scale blackouts would have devastating effects, spreading well beyond national boundaries. As was the case in the financial sector, public intervention would be required to prevent such a disastrous event.

### COMPANY FAILURES IN THE ELECTRICITY SECTOR

Over the past twenty years the electricity sector has faced a number of potential large or critical failures. We discuss three examples to illustrate the cost and consequences of such events.

Maybe the best-known case is the shortages in California at the beginning of the century. For a number of reasons, which have been studied extensively, California faced a situation where limited supply drove up wholesale prices, while the regulated retail prices did not reflect these price increases in the short term. Consequently, distribution companies were forced to operate at a loss, and found themselves on the edge of bankruptcy. The State of Californian state intervened by issuing bonds to raise capital to rescue these companies (Sweeney, 2002). Fifteen years later the Californian taxpayers are still paying off these loans.

A similar case occurred in the UK, where the company owning the nuclear plants in England and Wales almost went bankrupt in 2002. The company, which was privatized in 1996, started facing problems around 2000: the combination of a low electricity price, problems with long-term contract with British Nuclear Fuels and technical problems with several reactors led to the need for a state injection of almost three billion Euros; the bondholders took over the company and the shareholders lost most of their investment (Taylor, 2007).

A more recent example concerns the troubles faced by Electricaribe, a subsidiary of Gas Natural Fenosa. Electricaribe is a distributor in the north of Colombia, which in 2016 was running out of cash, due among others to the fact that it was unable to collect payment for over 25% of its electricity production. The company became unable to satisfy the minimum quality requirements specified in its contract with the regulator and its suppliers demanded to be paid in advance to supply electricity. The parent company did not manage to turn around the problems and refused to refinance the company as it could not get guarantees from the local government concerning payment of future electricity supplies. Eventually the state was forced to take over the company to ensure that the two and half million customers would continue to receive electricity (El Pais, 2016).

As illustrated by these examples, in the electricity sector system critical companies are not allowed

to go bankrupt; the state intervenes to prevent potentially disastrous consequences, such as millions of people being suddenly deprived of electricity, an event which, at least in the developed world, would ensure the fall of governments. However, such interventions are costly and in the end it is the taxpayer who foots the bill. This raises the question of if and how such situations can be prevented.

### RECOGNIZING WHEN AN ORGANIZATION IS TOO BIG TO FAIL

When should a generator in the electricity market be considered as “too big to fail”? Below we discuss three elements that could guide such a decision.

The capacity margin is a key indicator of capacity adequacy, which is critical for security of electricity supply (SoES). A first approach for evaluating the criticality of a generator thus consists of a direct comparison between its share of installed capacity and the capacity margin. A company whose share of installed capacity or generation is close to the capacity margin should be considered critical, as its failure would endanger SoES. However, before deciding whether or not to declare a generator critical, its size should be put into a wider perspective by considering the availability of substitutes. For instance, a country might be able to import significant volumes of electricity at short notice, at reasonable prices. This would require sufficient cross-border transmission capacity and neighbours with excess generation capacity; one example is the size of the cross-border capacity between Finland and Russia (Ochoa and Gore, 2015).

Another sign is low profitability, which provides an early warning signal well before a company's financial viability is threatened. A natural reaction to decreasing profitability is an attempt to control costs, with preventive maintenance and general upgrades often being the victims of such cost-cutting exercises. This increases the likelihood of unscheduled down-time due to technical failure, a frequent cause of cascading blackouts. There are recent examples in Colombia where generators paid for to provide reserve capacity (firm energy) were unable to produce at full capacity when required to do so during a period of shortages (El Tiempo, 2015).

Internationalization of electricity companies is another potential risk factor. A company might suffer financial strain following the failure of investments in another jurisdiction, distant from the home country. Or a subsidiary may be let down by its (financially sound) foreign parent company, as was the case in the Colombian example discussed above.

This short discussion of these three elements is meant as an illustration of the type of indicators one should look for when attempting to identify companies that are “too big to fail”; there clearly are other equally important elements which cannot be discussed in this short note due to space limitations.

### CONCLUSION

What should the regulators and policymakers do to prevent companies from becoming too big to fail, thus avoiding the costly intervention these may entail? There is unfortunately no simple answer to this question.

Let us start by identifying situations which should be prevented from occurring. Firstly, a moral hazard situation (which many claim occurred in the financial sector), where large companies (and their share- and bondholders) are convinced that the government will bail them out whatever happens, should be avoided. Such a belief induces companies to take excessive risks, as it limits the downside if things don't work out. In the British Energy case discussed above the government saved the company, but the shareholders lost most of their investment; this illustrates that it is possible to intervene without creating a moral hazard situation.

Secondly, regulators should prevent companies from become a too dominant player. This can be achieved by a strict regulation of mergers and acquisitions in the industry: a merger or acquisition resulting in company's capacity getting close to the reserve margin should be stopped.

Thirdly, in a situation where a large company already exists (e.g. the incumbent company) and there is no desire to break it up, several measures can be implemented: capital requirements (for international companies), plant maintenance schedules, a request to dispose of certain units, etc.

Finally, while two of the three examples we mentioned occurred a decade or more ago, we should not conclude that such events belong to the past. If anything, the combination of decarbonisation of electricity markets, low commodity prices and efforts to decrease demand put the profitability of major market players at risk. The first warning signs are starting to appear: in Europe several gas plants have been closed down. As a consequence, regulators are forced to intervene, e.g., through capacity mechanisms. While saving small companies or providing limited capacity incentives is feasible, emer-

gency intervention to bail out a major player could have dramatic consequences for the economy of a country or a region. It is thus of paramount importance to identify and monitor closely “to big to fail” companies in the electricity sector.

### **References**

- El Pais, 2016. Colombian government takes over Spanish-controlled power firm [WWW Document]. ElPais.com. URL [http://elpais.com/elpais/2016/11/16/inenglish/1479287784\\_294236.html](http://elpais.com/elpais/2016/11/16/inenglish/1479287784_294236.html) (accessed 5.29.17).
- El Tiempo, 2015. Dos térmicas paran y se eleva temor de apagón (Two thermal power plants stop and the fear of blackout rises) [WWW Document]. ElTiempo.com. URL <http://www.eltiempo.com/economia/sectores/produccion-termoelectrica-en-colombia/16412123> (accessed 7.12.16).
- Newbery, D.M., 2002. Privatization, Restructuring, and Regulation of Network Utilities. The MIT Press.
- Ochoa, C., Gore, O., 2015. The Finnish power market: Are imports from Russia low-cost? Energy Policy 80, 122–132. doi:10.1016/j.enpol.2015.01.031
- Sweeney, J.L., 2002. The California Electricity Crisis, 1st ed. Hoover Institution Press.
- Taylor, S., 2007. Privatisation and Financial Collapse in the Nuclear Industry: The Origins and Causes of the British Energy Crisis of 2002, 1 edition. ed. Routledge, London ; New York.

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## *Interviews with IAEE Leaders Past and Present*

*To mark the Association’s 40<sup>th</sup> Anniversary we asked IAEE’s present leadership and Past Presidents, who have been actively involved within IAEE for many years, about what IAEE meant to their careers and how they perceived the Association’s evolution over the past years.*

*By Olga Pushkash, Administration Manager, Norwegian School of Economics NHH*

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