Case & Project Experience

The Role of NERA Economists in Nuon/Reliant and *Nuon v. NMa*

Nuon is a leading Dutch energy utility with a large share of the local electricity and gas retail markets. It possessed some generation capacity and a long-term contract with an independent power plant at Rijnmond. In order to achieve a more balanced portfolio of generation and retail, Nuon wished to acquire Reliant Energy Europe, one of the major electricity generators in the Netherlands. On 2 April 2003 Nuon notified its acquisition of rival Reliant to the Dutch competition authority (Nederlands Mededingingsautoriteit, or NMa).

The NMa opened an in-depth investigation, which led it to the conclusion that the combination of the two companies' generation assets would create or strengthen a dominant position in electricity wholesaling. To obtain conditional clearance, Nuon therefore undertook to hold a series of "virtual power plant"[1] ("VPP") auctions for 900 MW per annum for five years.

Nuon began to hold such auctions in late 2004,[2] but also appealed the NMa's merger decision[3] at the Court of Rotterdam.

After a detailed review of the economic analysis that the NMa had relied upon, including a complex merger simulation model that the NMa had commissioned from external economic consultants, the Court annulled the NMa's merger decision.[4]

NERA provided several expert reports to Nuon, during the merger investigation by the NMa and as part of the appeal.

The Major Issues

As part of its review, the NMa commissioned external economic consultants to model the way in which the electricity market would operate before and after the merger, including the possibility of certain remedies. Based on game theory, the model ("SPARK") attempted to implement a supply function equilibrium ("SFE") approach,[5] which would then predict strategic behaviour in an oligopolistic market setting.

The SFE approach assumes that generators compete by submitting a "supply function" to the market, i.e. by offering different output levels at different prices. Such an approach is generally regarded as a better representation of the electricity industry, given that a generator firm may possess a variety of plants with different unit costs and limited capacities. Efficient generation requires that the plants with lowest marginal cost are used first, while more expensive plants are dispatched to generate only when demand is higher.

The NMa's Merger Simulation

The theoretical literature on supply function equilibria generally does not assume a particular "shape" for the supply function bids by the market participants, and allows a continuous spectrum of strategies. However, in order to simplify the calculation of the model's results, the practical implementation of the SFE approach typically assumes a limited set of strategies, and limits what types of supply functions are admissible.

The SPARK model assumed that the large generators would offer their generation capacity at a multiple of marginal cost, where the multiple could be chosen from 17 numbers between 1 (i.e. price equals marginal cost) and 15 (i.e price equals fifteen times marginal cost). The smaller generators were assumed not to behave strategically and thus to offer their capacity at marginal cost.

The model then considered every possible combination of strategies from the strategic generators and identified outcomes that were "Nash equilibria", i.e. outcomes in which no individual generator would wish to change its strategy, given the strategies of the others. Using this type of model, the NMa simulated the market outcome for various levels of demand and reported the resulting Nash equilibria for both the pre-merger ownership structure and assessing a combined Nuon/Reliant.

NERA's Role

Much of the argument in the case surrounded the question of whether the NMa had applied the theory of non-coordinated (unilateral) effects, while the Dutch legal framework was still based on the dominance test.[6]

The evidence provided by the SPARK model was a key component in the Court's decision as to whether Nuon's acquisition of Reliant led to the creation or strengthening of a dominant position. Unable to view the model that was built by the NMa's external consultants, NERA built a "shadow model" based on the description of SPARK, and then investigated the properties of this shadow model.

First, this check revealed that the outcomes selected by SPARK crucially depended upon the model's assumptions about the strategies available to each company. Generators were only allowed to choose their mark-up multiple from a limited set of numbers, often with large steps between two strategies. As a result, in many combinations of strategies, one generator could not undercut its rivals without dropping its price by a large amount. This restriction led to many situations where SPARK identified a Nash equilibrium, but where a small price reduction—which was ruled out by the model's assumptions— would be profitable, so that the Nash equilibrium was in fact not sustainable. NERA accordingly concluded that the particular SFE model commissioned by the NMa was not a reliable basis for analysing the likely effects of the Nuon/Reliant merger.

Second, even on the assumption of valid Nash equilibria, NERA commented on the NMa's interpretation of the results from SPARK. As is frequently the case in game theory, the model produced many different Nash equilibria for a given market constellation.[7] To overcome the multiplicity of outcomes, the NMa's economic advisers summarised their results in terms of price ranges and averages (medians). The NMa then took the change in median prices as an indicator of the effect of the merger.

NERA pointed out that neither the model nor the NMa and its advisers provided any basis for determining which equilibrium would actually occur. In other words, the NMa's approach represented an arbitrary interpretation of the results from SPARK. This is shown in Table 1 below:

Table 1

	pre-merger	post-merger
maximum price	44	44
median price	30	36
minimum price	20	22

The NMa's methodology of selecting the median price as the likely market outcome would indicate a price rise of 20%. Yet, the evidence is also consistent with the possibility of a constant price level, or even a reduction by 50% (from 44 to 22).[8]

These findings meant that the results of the SPARK model commissioned by the NMa (e.g. 44) were unreliable and that the NMa's interpretation of the results was ultimately arbitrary and ad hoc.

Outcome of the Case

The Court of Rotterdam decided that the NMa had not provided sufficient evidence to support its case. The Court's comments have a direct bearing on the use and interpretation of merger simulation models in future cases. It is clear that quantitative analysis only improves the quality of analysis and decisions, if the employed methodologies are firmly based on economic principles, and not on ad hoc "common sense" rules. In fact, as the quantitative techniques used in merger control become ever more complex, it will be increasingly important to check for model robustness and to spot the hidden assumption that does not fit economic theory or the facts of the marketplace.

The NMa has appealed the judgement.

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Notes

[1] The term "virtual power plant" reflects the contracts' similarities with real power plants.

[2] Nuon also negotiated the transfer of its long-term contract with the Rijnmond power plant (800 MW) to another Dutch utility, ENECO Energie. As a result, the NMa reduced the amount to be auctioned from 900 MW to 200 MW per annum. At the beginning of 2005 the NMa concluded in the light of market developments that Nuon's obligation to auction capacity may cease to apply entirely from 2006 onwards.

[3] NMa decision, Case 3386 Nuon/Reliant Energy Europe, 8 December 2003.

[4] Court of Rotterdam, Nuon v NMa, LJN: AT6440, 31 May 2005.

[5] Supply function equilibria were developed by Paul D. Klemperer and Margaret A. Meyer (Supply Function Equilibria in Oligopoly under Uncertainty, Econometrica, Vol. 57, 1989, No. 6, pp. 1243-1277.), and subsequently applied to the electricity industry, e.g. by Richard Green and David Newbery (Competition in the British Electricity Spot Market, Journal of Political Economy 100 (5), 1992, pp. 929-953). A SFE model ("MARS") was also employed by the European Commission in its review of the Sydkraft/Graninge merger (Case No COMP/M.3268, 29 September 2003).

[6] A similar issue arose in the Airtrous/First Choice merger inquiry (Case No IV/M.1524, 22 September 1999) and the subsequent appeal (Court of First Instance, Airtours v Commission, Case T-342/99, 6 June 2002). In Airtours the question concerned unilateral effects and collective/joint dominance (in the sense of tacit collusion). In Nuon the corresponding question focused on unilateral effects versus single-firm dominance.

[7] Paul D. Klemperer and Margaret A. Meyer (Supply Function Equilibria in Oligopoly under Uncertainty, Econometrica, Vol. 57, 1989, No. 6, pp. 1243-1277.) demonstrate the existence of a unique equilibrium under certain circumstances. However, the necessary assumptions for that result were not satisfied by the factual circumstances of the market.

[8] The merger might represent a disturbance that shifts the industry from a pre-merger equilibrium with the maximum price to a post-merger equilibrium with the minimum price. Only if the pre-merger maximum price was below the post-merger minimum price would it be possible to infer a price rise with certainty.

About NERA

NERA Economic Consulting (**www.nera.com**) is a global firm of experts dedicated to applying economic, finance, and quantitative principles to complex business and legal challenges. For over half a century, NERA's economists have been creating strategies, studies, reports, expert testimony, and policy recommendations for government authorities and the world's leading law firms and corporations. We bring academic rigor, objectivity, and real world industry experience to bear on issues arising from competition, regulation, public policy, strategy, finance, and litigation.

NERA's clients value our ability to apply and communicate state-of-the-art approaches clearly and convincingly, our commitment to deliver unbiased findings, and our reputation for quality and independence. Our clients rely on the integrity and skills of our unparalleled team of economists and other experts backed by the resources and reliability of one of the world's largest economic consultancies. With its main office in New York City, NERA serves clients from more than 25 offices across North America, Europe, and Asia Pacific.

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