Global Arbitration Review

The Guide to Damages in International Arbitration

Editor
John A Trenor

Fourth Edition

The Guide to Damages in International Arbitration

Fourth Edition

Editor

John A Trenor

Reproduced with permission from Law Business Research Ltd
This article was first published in January 2021
For further information please contact Natalie.Clarke@lbresearch.com

Publisher
David Samuels

Account Managers
Marta Jurkowska and Samuel Romp

Editorial Coordinator
Gavin Jordan

Production Operations Director
Adam Myers

Head of Content Production
Simon Busby

Copy-editor
Caroline Fewkes

Proofreader
Emily Casswell

Published in the United Kingdom
by Law Business Research Ltd, London
Meridian House, 34-35 Farringdon Street, London, EC4A 4HL, UK

www.globalarbitrationreview.com

ISBN 978-1-83862-212-1

Printed in Great Britain by
Encompass Print Solutions, Derbyshire
Tel: 0844 2480 112

Acknowledgements

The publisher acknowledges and thanks the following for their learned assistance throughout the preparation of this book:

ALIXPARTNERS

A&M GMBH WIRTSCHAFTSPRÜFUNGSGESELLSCHAFT

BDO LLP

BERKELEY RESEARCH GROUP

CEG EUROPE

CET GROUP OF COMPANIES

CHARLES RIVER ASSOCIATES

CORNERSTONE RESEARCH

FRONTIER ECONOMICS LTD

FTI CONSULTING

HABERMAN ILETT UK LTD

HOMBURGER

KING & SPALDING LLP

LONDON BUSINESS SCHOOL

MCDERMOTT WILL & EMERY UK LLP

NERA ECONOMIC CONSULTING

ONE ESSEX COURT

ORRICK HERRINGTON & SUTCLIFFE LLP

OXERA CONSULTING LLP

SECRETARIAT

THE BRATTLE GROUP

THREE CROWNS LLP

VICTORIA UNIVERSITY, FACULTY OF LAW

WHITE & CASE LLP

WILMER CUTLER PICKERING HALE AND DORR LLP

WÖSS & PARTNERS

Contents

Part II: Procedural Issues and the Use of Damages Experts

Part III: Approaches and Methods for the Assessment and Quantification of Damages

Preface

This fourth edition of Global Arbitration Review's *The Guide to Damages in International Arbitration* builds on the successful reception of the earlier editions. As explained in the introduction, this book is designed to help all participants in the international arbitration community understand damages issues more clearly and to communicate those issues more effectively to tribunals to further the common objective of assisting arbitrators in rendering more accurate and well-reasoned awards on damages.

The book is a work in progress, with new and updated material being added to each successive edition. In particular, this fourth edition incorporates updated chapters from various authors and contributions from new authors, including a chapter on damages issues in light of covid-19. This fourth edition seeks to improve the presentation of the substance through the use of visuals such as charts, graphs, tables and diagrams; worked-out examples and case studies to explain how the principles discussed apply in practice; and flow charts and checklists setting out the steps in the analyses or the quantitative models. The authors have also been encouraged to make available online additional resources, such as spreadsheets, detailed calculations, additional worked examples or case studies, and other materials.

We hope this revised edition advances the objective of the earlier editions to make the subject of damages in international arbitration more understandable and less intimidating for arbitrators and other participants in the field, and to help participants present these issues more effectively to tribunals. We continue to welcome comments from readers on how the next edition might be further improved.

John A Trenor
Wilmer Cutler Pickering Hale and Dorr LLP
November 2020

Part IV

Industry-Specific Damages Issues

26

Damages in Gas and Electricity Arbitrations

Wynne Jones, Christoph Riechmann and Stefan Lochner[1]

Introduction

The nature of damage in the electricity and gas sectors can be quite disparate depending on the part of the value chain in which the dispute has arisen. Damage can relate to competitive parts of the value chain, such as generation (electricity) and supply (electricity and gas). It can also relate to regulated activities such as transmission, distribution or support for generation from renewable energy sources. It would be too wide-ranging to try to cover the full breadth of our experience in electricity and gas disputes so we focus in this chapter on the estimation of damage relating to competitive parts of the value chain.

As with many, if not all, other sectors, damage in electricity and gas supply most commonly arises through breach of contract. If a party has entered into a contractual obligation to supply electricity or gas that it does not fulfil, the buyer under the contractual arrangement may incur damage. Similarly, the seller may incur damage under a contractual arrangement if the buyer refuses to fulfil its obligation to accept delivery and pay the agreed price. Reasons for the non-fulfilment may be manifold, ranging from a 'simple' unwillingness (for example, because of commercial reasons) to technical issues (for example, resulting from delays in constructing a power plant that was supposed to generate electricity to be sold under a contract).

Damage relating to supply may also arise as a result of expropriation of an asset by government or state authority, for example, the unreasonable withdrawal of an operating licence of a power plant.

Damage can also arise out of breaches of competition law. A party may have held a dominant position in the relevant market (either as a single firm or jointly with other market players), which allowed it to impose conditions that it would not have been able

1 Wynne Jones and Christoph Riechmann are directors and Stefan Lochner is a manager at Frontier Economics Ltd.

to impose had it been subject to the constraints of effective competition. An abuse of a dominant position may take the form of unfair prices or trading conditions, which causes damage to the counterparty. Although these types of claims are most commonly dealt with through national courts, they have also arisen in arbitration. Complexities of damage relating to breaches of contractual arrangements also apply to damage resulting from breaches of competition law.

The propensity for disputes regarding damage in the electricity and gas sector to arise, and the complexity in estimating the damage, may be relatively greater than in other sectors because of the specific nature of electricity and gas. In particular, the sectors are characterised by the following:

- Large up-front and sunk investments – The generation of electricity or the production and delivery of gas typically requires the construction of long-lived dedicated infrastructure (for example, a power plant or long-distance gas pipeline). Consequently, investors will often seek to secure their investments with long-term (sales) contracts, which can imply similar long-term contracts further down the value chain. Long duration contracts mean that any persistent breach of contract obligations may create significant damage. Similarly, long asset lives mean that expropriation of an asset or the underperformance of an asset may create significant damage. Long-lived assets and long duration contracts also potentially increase the complexity of estimating damage, if it means the value of gas or electricity must be projected many years into the future.
- The limited ability to store electricity and gas – This leads to the value of gas or electricity potentially varying substantially over time, further complicating the estimation of damage. Electricity is difficult and expensive to store. Even with the limited storage technologies that exist, such as pumped storage and batteries, the supply of electricity from all sources (including storage) needs to be balanced second by second with the demand for electricity. Similarly, the supply of gas also needs to be balanced with demand, albeit for slightly longer timescales given the possibility of linepack. Since the demand for electricity and gas varies over time, the value of electricity and gas also varies over time – from one hour to the next or from one day to the next. Similar considerations apply seasonally, with electricity and gas prices being highest in the period of the year when demand is highest.[2] This variation in demand also means that contractual arrangements for electricity or gas delivery often include a more or less precise time profile of volumes or flexibility as to the volume to be delivered in a particular period. These special arrangements in supply contracts need to be taken into account when calculating damage.

So, how does one go about estimating damage, assuming some breach of contract or expropriation has occurred?

2 As an example, during 2015, hourly prices in the day-ahead electricity market in Spain varied from €4/MWh to €85/MWh, and in France from €0/MWh to €123/MWh. Over a day, prices in both countries would often range by a factor of two or more.

The broad framework for estimating damage in the electricity and gas sectors is the same as for other sectors. Damage equals the difference in value for the factual and 'but for' cases. Within this framework, damage estimation typically entails five steps, which we use as the structure for the remainder of this section:

- establishing the factual case;
- establishing the 'but for' case or counterfactual;
- determining the correct perspective for the damage estimation;
- valuing the damages; and
- computing the present value of these damages to arrive at the amount to be compensated.

Please note, we do not cover the last step in this section as it is not specific to gas and electricity.

Factual

As in any damage estimation, the starting point is to establish the factual case. This is not always as simple as looking at actual developments following the breach because it is generally necessary to exclude from the damage calculation the effects that are unrelated to the breach and the effects that could have been avoided if the harmed party had taken the appropriate measures.

In the case of a long-term contract, the factual case may also need to be projected into the future. Furthermore, establishing the factual depends on the perspective for the damage estimation.

Counterfactual

The 'but for' or counterfactual is the situation the parties would have found themselves in if it were not for the breach of contract or expropriation.

Sometimes the counterfactual can be relatively straightforward to establish. In the case of non-delivery under a contract, the counterfactual may be that a pre-specified volume of deliveries took place over a pre-specified period at a pre-specified price. In the case of an unfair contractual term, such as an excessive price, the counterfactual may simply be the 'fair' price, with everything else being constant.

In other cases, establishing the counterfactual may be more complex. For instance, what would have been the volume and timing of deliveries in a contract if the buyer or seller had optionality over delivery volumes? How would the generation asset being available six months earlier have affected market prices and, therefore, the value of electricity sold on the market? How would those changes to market prices have affected the value of other assets in the harmed party's portfolio?

Suppose a gas trading and retail supply company purchased the bulk of its gas needs through a single long-term contract. The seller terminates the contract in breach of its obligations and the supplier markedly reduces the scale of its retail operations. Aside from the disputed contract, the counterfactual could be a larger company with, for example, higher staff and accommodation costs, greater credit requirements and more retail customers. In this case, complexity may be avoided if an upper or lower bound can be placed on the potential damage.

Similarly, if a competition infringement hindered a player from entering a market, the counterfactual would need to establish, inter alia, the specific role that player could have played in the market, its effect on market prices and its profits.

Some of these complexities are more likely to arise in less competitive markets or if the asset in question is sufficiently large to affect market prices. With a competitive market, notwithstanding the difficulty in excluding a player from the market, the player's entry (or lack of entry) would have an immaterial effect on price. Similarly, the delayed delivery of a small generation asset (relative to the size of the market) is likely to have an immaterial effect on the market price.

Ex post versus ex ante perspective

There are two conceptual approaches to estimating the loss of value caused by an infringement or breach: the use of *ex ante* information and the use of *ex post* information.

Ex ante means using the information available at or prior to the breach to estimate the value destroyed by the breach.

Ex post means using the information available after the breach – the latest available information – to estimate the value destroyed by the breach. This approach can only be applied with respect to past damage.

A combination of the two conceptual approaches may also be used; for example, *ex post* information could be used to estimate damage from the time of breach until the award, and *ex ante* information could be used to value the damage that is expected to arise post-award. The legal framework will dictate which approach should be used or whether there is any option to use either.

Given the nature of electricity and gas markets, with prices that vary over time, taking an *ex ante* view or an *ex post* view can result in materially different damage estimates. The option to choose between the two views, so as to arrive at the highest valuation of damage, is a valuable option that neither party to a dispute would have had at the time of the breach.

Ex ante view

With an *ex ante* perspective, the basic principle is that the damage should be the change in value caused by the breach or infringement measured at the time of the breach or infringement. When an asset is expropriated, the measure of damage is the fair market value of the asset at that time (or, strictly, before knowledge of the breach).

This principle is most easily applied if the breach or infringement can be traced back to a specific point in time. In this case, the *ex ante* view may be more appropriate. However, even in this case, it may in some circumstances be more appropriate to use *ex post* information; for example, if the legal principle is that the party at fault should not benefit from *ex post* developments.

Electricity and gas is traded and in some markets the majority of electricity and gas is contracted for well in advance of its delivery. If companies can value electricity and gas well enough to buy and sell it in forward contracts, it would normally be possible to value it for the purposes of a damage calculation.

In some cases, there may be no option but to use *ex ante* information. Future damage cannot be analysed *ex post* without waiting until it is no longer in the future, and so in some circumstances, the *ex ante* view revealing the lost value at the time of the breach (or award) may be the only practical approach.

We know of some electricity and gas contracts with termination clauses that work in a similar way to an *ex ante* damage calculation. They have provisions for compensating the parties based on the (future) value lost as resulting from termination on the day of termination. In these circumstances, it would be impractical to wait until the contract would have reached its full term (which could potentially be many years later) to calculate the termination payments *ex post*.

Ex post perspective

Depending on the case and legal framework, some damage may be more amenable to *ex post* calculation. This may be the case when the breach or infringement itself cannot be pinpointed to a single point in time, or is not clear at that point in time and only materialises later.

For example, a continuous infringement, such as excessive prices, may only be detected retrospectively, so damage may be best estimated *ex post* as the difference between the actual excessive price and the counterfactual of what would have been a fair price. Assuming the abusive behaviour, once detected, does not extend into the future, an *ex ante* approach may not be required.

Similarly, non-performance under a contract may continue for a lengthy period, but the duration of non-performance may not be known at the time it first occurs. In this case, it may be more practical to compare *ex post* the counterfactual of what should have happened with what actually did happen.

We note a number of characteristics of using *ex post* information in damage calculations where it is legally appropriate.

Use of *ex post* information does not always provide an unambiguous answer that removes all uncertainty associated with the damage calculation. For example, when there is a traded market for gas and electricity, should 'actual' prices be derived from prices for contracts for delivery in the next day, delivery in the next month or delivery in the next year? What time profile of deliveries should be applied following the breach if the contract provided for optionality over delivery volumes?

One final point on *ex post* information: the *ex post* price simply differing from the *ex ante* expectations at the time of breach about the future price is not a rationale per se for relying on *ex post* information.

Calculating the damage

In simple terms, the damage incurred as a consequence of a breach of contract, expropriation or competition infringement is the difference in value between the factual and the counterfactual situation. Depending on the legal framework, an *ex ante* or *ex post* (or a combination of *ex ante* and *ex post*) approach could be used to estimate the difference in value between the factual and the 'but for' or counterfactual situation.

Broadly, there are two approaches to estimating the damage:

- directly estimating the change in value at the time of breach; or
- estimating the change in value over time and summing this stream of values, taking into account the time value of money, so as to arrive at the change in value at the time of breach.

In practice, we have seen both approaches applied in the same case to help build the body of evidence as to the quantum of damage.

With a direct estimate, it may be possible to observe the effect of the breach in the change in market value of the harmed firm. However, this is not straightforward, since the value of the firm may have begun to change prior to the breach if expectations of the breach emerged in the preceding days, weeks or months. In addition, spurious events may have affected the market value of the company contemporaneously with the information about the breach becoming known. Further, adjusting the change in market value of the firm for wider changes to a market index or utilities index may help.

In some sectors, it is possible to observe around the time of a breach the value of transactions for similar assets and to use those values to estimate the effect of the breach on value. In electricity and gas, assets tend to be unique in the sense that there is no precise replica of a gas field or power station, and a trading or retail supply company has its own set of contracts and customers. This may make it difficult to find sufficiently comparable transactions.

To calculate damage, one would most likely need to revert to the second approach: estimating the change in value over time because of the breach. To simplify the discussion, we describe this approach in terms of the early termination of a long-run contract to deliver gas or electricity to the wholesale market. However, many of the same principles can be applied to delayed power station commissioning, expropriation or excessive pricing.

The value of the contract at termination is the difference between the future market value of the electricity or gas that would have been delivered under the contract (the factual, if the contract was actually terminated) and the amounts payable under the contract (in the case of termination, the counterfactual). As discussed, the future market value of the commodity value could be estimated *ex ante* termination or *ex post* termination, depending on the legal framework. To the extent that termination caused a material change to other costs (e.g., additional procurement costs to replace the power or avoided fuel costs in not generating), these should be taken into account.

First, consider the counterfactual. Since the value of gas and electricity can vary substantially over time, it is necessary to understand the time profile of when the electricity or gas under the contract would have been delivered. It is then necessary to establish the price that would have been paid to receive those deliveries, the payments for the deliveries and when the payments would have been made. This information can normally be derived and, if necessary, projected into the future using the contractual terms.

Next, consider the factual setting. It is necessary to estimate the market price for buying replacement gas or electricity that was not delivered (using the same profile of deliveries as for the counterfactual),[3] what the market value of the deliveries would have been and when payments for the replacement gas or electricity would be made. Other terms in the contract, such as delivery options and delivery location, should also be valued relative to standard market products.

The appropriate 'factual' case may not be what is observed to have actually happened for two reasons. First, the wronged party would typically have an obligation to mitigate damage and the response to the breach that was expected to minimise damage may not have been to replace the lost deliveries with purchases elsewhere. For simplicity, here we assume that buying replacement electricity or gas would have been the best option for mitigating damage. Second, in the case of a long-term contract, the factual case must be projected into the future, meaning that it cannot be observed.

Estimating the market price for replacement gas or electricity is more complex. A comparator analysis draws on the market prices of similar traded products, if available. If not available, the way in which the market works may be sufficiently well understood that the market can be simulated to estimate market prices, and hence estimate damage. We focus on the comparator approach first and later return briefly to the modelling approach.

Comparator approach

The more common approach used when estimating damage in the electricity and gas sectors is some form of comparator approach.

In other sectors, one could rely on temporal comparators (i.e., the same product traded before the breach). However, this is typically not appropriate for valuing electricity and gas contracts because of the possible significant changes to value over time. Normally, values contemporaneous with the breach are to be preferred.

Often, 'perfect' comparators, which could be used directly to provide a market price for replacement gas or electricity, do not exist because contracts with the precise specifications of the long-term contract in question are not traded regularly. Sometimes, even when traded, the price at which they are traded is not observable by the parties to the dispute. Therefore, the closest possible but still imperfect comparators are normally used, adjusting for differences between the terms of the contract in question and the comparator products.

3 In some cases, e.g., in the context of an abuse that manifests itself as an excessive price, establishing the market price may be needed when considering the counterfactual.

To make those adjustments, it helps to consider electricity or gas contracts as bundled products, that is, consisting of the delivery of electricity or gas and of other services. For valuation purposes, the bundled product can be disaggregated and each individual component valued separately.[4] A contract for the delivery of electricity or gas to the wholesale market would typically entail the following components:

- Delivery of the commodity – This is just the delivery of electricity or gas, usually the essence of a supply agreement, and can be thought of as the delivery of a uniform volume during each hour or day of a given period (e.g., a calendar year) of a standard traded product.
- Shape – Typically, a commodity contract provides for a volume that, although fixed in advance, does vary by delivery period; for example, more gas is delivered in winter than in summer and more electricity is delivered during the day than at night. A contract that provides for greater volumes to be delivered when the market-wide demand for the commodity is higher is typically more valuable than a contract with a uniform delivery profile. The reverse is also generally true.
- Flexibility – Until some point in time prior to delivery, the contract may provide the buyer or seller with the option to nominate the delivery volume within certain limits. For example, the buyer in a gas supply contract may be able to take gas within a year, opting for any volume between minimum and maximum annual contract quantities. The seller in an electricity contract may have rights to reduce deliveries because of a physical event, such as reduced power plant availability or poor hydrological conditions. This type of flexibility is valuable to the party with the option and may reduce value for the other party.
- Location – Delivery of electricity or gas under the contract may take place at a specific network location. This would need to be compared to the delivery location of the comparator product and, if they differed, an adjustment made for the cost of transportation.
- Payment terms – The terms of payment under the contract and under the comparator product may constitute a value to one or other of the parties. For example, if payment for delivery in one month is due in the middle of the next, the seller is providing the invoice amount as working capital to the buyer for an average period of one month.
- Other terms – The contract and comparator products may include other terms that need to be valued, such as the quality of gas delivered (if not accounted for in the price of the comparator product), credit support and exposure to *force majeure*.

Valuing many components of a contract can be complex. However, the task can be made easier in two ways. First, since we are using a comparator approach, we are only interested in the differences between the terms of the contract and the terms of the comparator product. However, a term that differs may require consideration of terms in common if it is to be valued. Second, the vast bulk of the value is likely to sit with only a few of the components. If the less critical components cannot be valued, it may not have a material effect on the overall damage estimate.

4 It is also possible that two or more of the individual components interact in such a way that their combined value differs from the sum of their individual values.

We discuss potential methods of valuing each of the components below. The approaches used to value each component in electricity and gas markets are, in principle, similar to those used when determining the value or price of a contract in the first place, or during price reviews of long-term energy contracts.

Commodity

The value of commodity electricity or gas at the wholesale level may best be reflected by the price at which it is traded. Exchanges, brokers and price reporting firms make available market prices for standard contract products; for example, a calendar year product for gas or electricity that entails the delivery of a fixed volume of gas or electricity for every hour or day of a specified year, a quarterly product that entails the delivery of a fixed volume for every hour or day of a specified quarter. With the *ex ante* approach, the market price available at or before the breach is relevant, for contracts for delivery in the period contemporaneous with delivery under the disputed contract. If the market price is not available in the relevant jurisdiction, one could potentially use market prices for other jurisdictions or at other points in the value chain within the same jurisdiction.

Gas and electricity are regionally traded commodities (and in the case of gas, globally traded to some extent). This means market prices for other jurisdictions could provide useful information about the price in the relevant jurisdiction. An adjustment for transportation cost differentials may be required (see below).

If the market price in the relevant jurisdiction is not available for products for delivery sufficiently far into the future, it may be necessary to look to the market price in alternative jurisdictions only for products for delivery further into the future.

Within the relevant jurisdiction, alternative value indicators to the traded market price might include regulated wholesale prices, published import prices or even final retail prices, with appropriate adjustments to reflect the expected difference between retail and wholesale prices.

Electricity has inputs to production that are other commodities. Market prices for these other commodities that are underlying drivers of the price of electricity in the relevant jurisdiction may also provide useful information. For example, market prices for gas, coal and carbon dioxide permits (in jurisdictions where these apply) may provide useful information in estimating future electricity prices.

Shape

Delivering gas or electricity according to a specific profile, as opposed to a standardised product, may mean the gas or electricity delivered by the contract under dispute has greater or lesser value than the market price for a standard traded product.

For gas and electricity, shape could be valued by temporal differences in the market price for shorter duration products; for example, the price of gas in winter versus the price of gas in summer, or the price of electricity during the day versus the price of electricity during the night. These shorter-duration traded products are normally traded only a relatively short period into the future. For this reason, information about temporal prices for historic delivery periods, or delivery periods only a short time into the future, may be

required to overlay onto the price for future delivery of the commodity electricity or gas (with any adjustments for how inter-temporal price shape may change from one year to the next).

In addition, for gas, shape can be provided by gas storage facilities. If relevant to a given case, the cost of gas storage (e.g., as obtained from published storage tariffs) could be used to value shape or set limits on the value of shape.

Flexibility

An option for a buyer or seller to vary the shape of deliveries can be valued in several ways. In the case of gas, some of the option value may be reflected in tariffs for using storage facilities, since storage facilities would usually offer optionality over the timing and quantity of injections and withdrawals. Otherwise, flexibility in the case of gas may be valued approximately, using standard option valuation techniques when markets are sufficiently liquid. Options in both gas and electricity can be valued through market simulation.

If applying an approach using *ex post* information on market prices, it is still important to consider how, in practice, the option could have been used, given the time constraints on its exercise. It is necessary to avoid the trap of assuming the perfect exercise of an option based on *ex post* information when that information would not have been available when the option had to be exercised.

Transport costs

The value of transport services included in a contract could potentially be based on published transport tariffs, taking into account the effect of, for example, network congestion, and import and export levies. Transport costs might be incurred or avoided relative to the delivery point of the product to which the observed market price relates. For gas, this could be between the source of gas and the observed market price, and between the source of gas and the point of delivery of interest. For electricity or gas, it could be the transportation cost incurred or avoided in moving from one jurisdiction to another.

Payment terms

Payment terms in the contract under dispute can be valued relative to the payment terms of the product to which the observed market price relates. This may mean a saving or an increase in costs. The timing and quantum of advance and 'wash-up' payments may need to be taken into account.

Simulation

In the absence of appropriate comparator market prices with which to value the gas or electricity delivered under the contract in dispute, a market simulation model could be used. There are many approaches to simulating market outcomes. Without market prices, the most common approach would be to develop what is often called a fundamental model of the market and then simulate the interaction of supply and demand and the price-setting process.

We give a very brief and simplified overview of this approach for the power sector, noting that a similar approach could be used for gas.

In electricity, power stations can be thought of as being stacked from the lowest to the highest short-run marginal cost. Power stations with lower marginal costs run in preference to those with higher marginal costs. The available generation is compared to demand in the hour. In the hour, the point at which the demand curve intersects with the supply curve, made up of the sorted capacity of available generation in the hour, determines the market price for the hour, and which power stations produce electricity in the hour and which do not. The (hourly) market price is set by the power station that is the most expensive still required to meet demand – the market price may be set equal to the marginal cost of the marginal power station or some function of the marginal cost.

This simulation can be repeated for every hour of the year, or for a sample of representative hours, with varying demand, varying generation availability and varying short-run marginal costs (which vary, for example, with gas and coal prices).

In the long run, power stations will close and, particularly if demand is increasing, new power stations will be built. Simulation models can integrate new entry and exit decision-making, such that as prices rise and it becomes profitable to enter, new entry occurs.

Needless to say, these types of models – although conceptually simple – are complex and require many inputs. The complexity will increase with the presence of interconnected markets, imperfect markets with large players, and markets whereby policy decisions have an important influence on outcomes.

Conclusion

Estimating damage relating to supply in the electricity and gas sectors has many similarities to estimating damage elsewhere. However, the characteristics of electricity and gas mean the estimation may be more challenging because of the often long duration of contracts and the potentially large changes in value over time.

A number of techniques are available that would typically allow damage to be estimated using an *ex ante*, *ex post* or hybrid approach, as legally appropriate. Although the estimation is often complex, approaches can be applied to simplify the task, including using comparator analysis and focusing on those aspects that are most material to the overall damage estimate.

Appendix 1

About the Authors

Wynne Jones
Frontier Economics Ltd

Wynne Jones is a director in the energy practice at Frontier. Wynne has more than 30 years of economics consultancy experience, working predominantly in the energy sector. He focuses on competition, commercial and regulation issues. He has wide international experience, having worked in more than 30 countries worldwide. Wynne has been involved in the development of European energy policy from the first studies on reform in the United Kingdom in the early 1980s and has recently led several studies for the European Commission on the development of the internal energy market.

Wynne frequently advises clients with dispute and arbitration case support across Europe. He is an experienced expert witness and has appeared before arbitration tribunals (including the International Court of Justice, UNCITRAL, ICC, ICSID and Vienna International Arbitration Centre), courts and regulatory bodies.

Christoph Riechmann
Frontier Economics Ltd

Dr Christoph Riechmann directs Frontier Economics' Berlin and Cologne offices. He acts as expert in dispute, regulatory and competition proceedings in the electricity and gas industries, and occasionally also in other infrastructure sectors. His geographical focus is on the European Union and he regularly works in both English and German. He holds a doctorate degree from Cologne University, an MSc in economics from Glasgow University and a degree in business economics (Dipl.-Ökonom) from Justus-Liebig-University, Giessen.

Stefan Lochner
Frontier Economics Ltd

Dr Stefan Lochner is a manager in Frontier's competition and energy practices. He advises a wide range of international clients on various aspects of competition and industrial

economics, often in a litigation or arbitration context. Most recently, he has worked on estimating damages from contractual infringements in the power and gas sector in different European jurisdictions. Before joining Frontier Economics, Stefan worked as a researcher and consultant with EWI, the Institute of Energy Economics at the University of Cologne, for five years. Stefan holds a PhD in economics from the University of Cologne (Germany).

Frontier Economics Ltd
Satellite Office
Unter den Linden 10
10117 Berlin
Germany
Tel: +49 30 767 598 440
christoph.riechmann@frontier-economics.com

Kranhaus Süd
Im Zollhafen 24
Cologne 50678
Germany
Tel: +49 221 337 130
stefan.lochner@frontier-economics.com

71 High Holborn
London, WC1V 6DA
United Kingdom
Tel: +44 20 7031 7000
wynne.jones@frontier-economics.com

www.frontier-economics.com

Visit globalarbitrationreview.com
Follow @garalerts on Twitter
Find us on LinkedIn

an LBR business

ISBN 978-1-83862-212-1