

INFORMATION PROVISION IN  
ELECTRICITY MARKETS

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AN ECONOMIC ANALYSIS

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PROFESSOR NILS-HENRIK M. VON DER FEHR  
UNIVERSITY OF OSLO

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## FOREWORD

This report, which has been commissioned by Statkraft, contains an economic analysis of information provision in electricity markets in response to the draft advice on “Comitology Guidelines on Fundamental Electricity Data Transparency” that has recently been put forward by European Regulators’ Group for Electricity and Gas (ERGEG) for public consultation.

I have been working on these and similar issues for many years. As a professor of Economics at the University of Oslo, I have written extensively in the fields of Energy Economics, Industrial Economics, Regulation and Competition Policy. I have also acted as advisor and consultant to governments, private companies and organisations around the world, including the EU Commission, Inter-American Development Bank, OECD and The World Bank. Such engagements have provided insight into relevant issues but have not been leading for the conclusions of the present report.

During the work on this report, my contact at Statkraft has been Håkon Egeland. The report is based on information made available by Statkraft, as well as sources listed in References. I have not had opportunity to conduct a complete verification of this material, but have had to assume that it is accurate and complete. All views expressed here are mine and do not necessarily concur with those of Statkraft.

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Nils-Henrik M. von der Fehr

# CONTENT

INTRODUCTION .....	1
RELEVANT INFORMATION .....	3
Temporal Supply and Demand Decisions .....	4
Intertemporal Decisions.....	5
Imperfect or Missing Markets .....	6
Price formation and Information Aggregation .....	8
EXCESSIVE INFORMATION .....	9
Information Overload .....	9
Incentives to Gather Information.....	10
Information Distortion.....	11
Market Power .....	12
Tacit Collusion .....	13
CONCLUSION.....	16
REFERENCES .....	17

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## INTRODUCTION

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On September 8, 2010, European Regulators' Group for Electricity and Gas (ERGEG) presented its draft advice on "Comitology Guidelines on Fundamental Electricity Data Transparency" for public consultation (cf. ERGEG 2010a, b, c). The Guidelines aim at (ERGEG, 2010b, Section 1):

- *"establishing a minimum common level of fundamental data transparency that is a precondition for the efficient functioning of wholesale electricity markets;*
- *defining a minimum common level of publication of the defined data on a fair and non-discriminatory basis across all Member States; and*
- *developing a central information platform to enable all market participants to establish a coherent and consistent view of the European wholesale electricity market."*

The Guidelines set out a series of measures intended to increase transparency in electricity markets, including requiring individual market participants to reveal information about their activities on an on-going basis.

I have been asked by Statkraft to undertake an economic analysis of how the measures put forward in the Guidelines may affect the functioning and performance of the wholesale electricity market.

My analysis is concerned with information provided to individual market participants, by which I mean buyers and sellers of electricity, including consumers, generators and traders. I do not deal explicitly with information provided to other agents, such as network and system operators and regulators and other government authorities. While ERGEG does not always seem to make a clear distinction between market participants and other agents,<sup>1</sup> their information requirements tend to be rather different, and so are the issues involved in providing them with information; such a distinction therefore seems important for a meaningful analysis.

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<sup>1</sup> ERGEG (2010c) uses the term "market actors", by which it means "TSOs, generators, users and traders".

My analysis also concentrates on measures concerning generation, although parts of the analysis may be relevant for other measures as well. As far as generation is concerned, the Guidelines specify that information shall include at least the following (ERGEG, 2010b, Section 4.3.2):

- *“ex-ante information on the total sum of generation capacity (MW) installed for all existing generation units larger than 1 MW installed capacity, for each year per production type...;*
- *information about the installed capacity (MW) annually for the 3 following years for each generation unit (installed and planned) with an installed capacity larger than 100 MW...;*
- *ex-ante forecast of available capacity (MW) annually for the 3 following years for each generation unit (installed and planned) with an installed capacity larger than 100 MW....;*
- *ex-ante information on planned unavailability of generation units larger than 100 MW...;*
- *ex-post information on planned and unplanned unavailability of generation units with more than 100 MW of installed capacity per generation unit....;*
- *estimated aggregated information per market time unit on the scheduled generation of all generation units with more than 100 MW of installed capacity per bidding area for each hour of the following day...;*
- *ex-post information on the filling rate of the water reservoir and hydro storage plants in aggregated form (MWh) per bidding area on the third working day of the  $W+1$ ...;*
- *actual unit by unit generation output for generation units equal to or greater than 10 MW installed generation capacity, updated as changes occur, at least every 15 minutes;*
- *actual aggregated hourly generation output per generation type...;*
- *ex-ante forecast of day-ahead generation (MWh) of wind power and solar power in each bidding area for each quarter of an hour for the following day...;*

- *actual generation of wind and solar power (MWh) in each bidding area for each quarter of an hour...;*”

The Guidelines appear to be based on the premise that more information is always better.<sup>2</sup> This is wrong, for at least three reasons. Firstly, individual decision makers value information to the extent that it improves on the quality of their decisions; irrelevant information is of no value, and can indeed be detrimental to good decision making if it blurs or distorts relevant information. Secondly, requiring market participants to reveal private information may induce behaviour intended to conceal or distort this information. And thirdly, transparency may facility behaviour that undermines competition and leads to a market outcome characterised by monopoly or (tacit) collusion.<sup>3</sup>

The report is organised as follows. In the next section, I discuss what information is relevant to market participants, in the sense that it improves on their economic decisions and hence overall market performance. In the subsequent section, I discuss why requiring market participants to reveal private information may undermine market performance. The last section contains a short summary and conclusions.

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#### RELEVANT INFORMATION

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In this section, I discuss what sort of information is relevant for rational economic behaviour of individual market participants – in the sense that it may improve on their economic decisions – and I explain why more information is not necessarily beneficial for individual market participants and hence for overall market performance.

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<sup>2</sup> Cf. the statement on page 1 of ERGEG (2010c): “*The more information is disclosed about an economic activity the better.*”

<sup>3</sup> Overgaard and Møllgaard (2008) provide a general discussion of the pros and cons of information provision in a market context, as well as references to much of the relevant literature and discussions of case studies; see also Halliday and Seabright (2001), Kühn (2001) and Møllgaard and Overgaard (2001, 2006).

## TEMPORAL SUPPLY AND DEMAND DECISIONS

In many circumstances, information about other market participants, or market conditions more generally, are irrelevant for economic decisions of individual market participants.

Consider for example a generator who has to make supply offers to a day-ahead spot market for output from a wind park. Since variable costs of wind turbines are negligible, or at least substantially lower than typical spot-market prices, the generator will want to produce as much as possible, given prevailing wind conditions. The generator can achieve this by setting the offer price at nil.<sup>4</sup> The generator can gain nothing from information about (predicted) spot prices, nor about the behaviour of other market participants; the generator only needs to know that the offer will be accepted whenever price is positive, which is when the generator can operate the wind park at a profit.<sup>5</sup>

The same is true for an owner of a solar park or a run-of-river hydro facility. Indeed, also thermal generators only need information about their own production facilities in order to make economically rational short-run production decisions. Unlike wind, solar and hydro, thermal generation normally incurs substantial variable costs, in the form of fuel expenses. However, as long as generators are allowed to make bids that reflect the underlying costs structure, generators can ensure that units are despatched only when market prices are such that all costs are covered and hence operations are profitable.

Matters are slightly more complicated when generators cannot make bids that fully reflect the underlying cost structure, including quasi-fixed costs such as start-up costs and ramping costs. This would be the case in an energy-based spot market where block bids are not allowed. In such a case, a thermal generator has to base its offer for any given hour on expectation about its output pattern over the relevant period, which

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<sup>4</sup> If wind-based electricity generation is subject to output related subsidies, wind generators would in fact face negative variable costs and hence would be willing to produce also when market prices fall below zero, something that may occur in markets characterised by a combination of large amounts of wind and thermal capacity with considerable start-up costs. Again, the optimal pricing rule would be to bid at (negative) variable cost.

<sup>5</sup> I disregard considerations of market power here; below, I explain how a generator with market power may gain from information about market conditions, a potential argument for restricting access to such information.

will determine how it can recover quasi-fixed costs. In order to do so, the generator does not need to know actual demand and supply patterns, only market prices; knowing market prices over the relevant period allows the generator to tailor its bids so as to obtain an output pattern that ensures cost coverage. Since in most electricity markets day-ahead prices can be forecasted with a very high level of accuracy, generators are typically able to plan their operations rationally.

Access to price information is also all that is required for efficient behaviour on the demand side of the market, including for consumers with access to alternative energy sources. Consumers need to know prices in order to make economically rational decisions about how much electricity to consume at any given point in time, and as long as they know these, they do not need to know the underlying process of price formation.<sup>6</sup>

#### INTERTEMPORAL DECISIONS

Unlike run-of-river hydro generators – and wind, solar and thermal generators – hydro generators with storage capacity cannot base their decisions on current prices only; they need to know future prices also. The cost to a hydro generator of producing at any given point in time is the foregone future revenues that would obtain if the water were kept in storage instead. Therefore, for hydro generators with storage capacity costs depend on future electricity prices and hence short-run supply decisions cannot be based solely on knowledge about the characteristics of own production facilities.

A similar situation faces all generators when it comes to decisions about when to close down in order to do maintenance, repair and upgrading of existing plants. Ideally, a generator would want to stop production in periods when foregone earnings are the smallest, taking into consideration that such stoppages must occur at certain intervals (as well as restrictions resulting from systems operations or regulatory

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<sup>6</sup> The statement in ERGEG (2010c, p. 1) that “*Also in economic theory, one of the characteristics assigned to perfect competition assumes perfect information being available to buyers and sellers of a commodity*” is therefore wrong; perfect competition only requires that market participants are informed about prices (cf. Overgaard and Møllgaard, 2008, p. 4).



requirements). In order to make economically rational decisions about planned outages, generators need to know how prices develop over time.

Also decisions about investment (and disinvestment), whether on the demand or the supply side of the market, are based on how prices develop over time. Similarly, entry into, and exit from, the market will be based on (average) prices over the planning horizon.

More generally, decisions that concern timing – or has an intertemporal dimension – requires information about future, as well as current, prices. Medium-term decisions – such as decisions on planned outages – will to a large extent be based on observed pricing cycles, which in electricity markets tend to be quite pronounced, over the day, over the week and over seasons. Moreover, price information may be gathered from markets for futures or forwards, which allow trading of electricity at future dates. Longer-term decisions on investment and entry and exit will be based on information from long-term contractual markets.

Again, in order to make informed decisions market participants need to know prices, not the underlying process of price formation. At least, this is the case if markets exist and function well.

#### **IMPERFECT OR MISSING MARKETS**

Above, I have argued that what market participants need in order to make informed decisions is information about prices, not price formation. Clearly, this requires that information about prices exists at the time when decisions have to be made; if this is not the case, information about the underlying process of price formation may be required in order to forecast prices.

In the spot, or day-ahead, market, price formation follows a well-known pattern and depends, first and foremost, on time of day, day of week, season and external conditions such as the weather. In addition, certain idiosyncratic events, such as the unavailability of a large generation or consumption unit, may affect prices. Therefore, in addition to publicly available information, such as weather forecasts and current prices, market participants only need access to information about certain major events,

such as planned outages of large plants, in order to make precise forecasts of day-ahead prices.<sup>7</sup>

In the longer term, the most readily available – en presumably most reliable – information about future prices are prices in future or forward markets.<sup>8</sup> If such markets do not exist, prices forecasts will have to rely on information on market fundamentals, such as demand growth, new investment and the like.

Price forecasting generally involves processing forecasts of market fundamentals with the help of some, implicit or explicit, theory or model of how these fundamentals affect price. While the relationship between fundamentals and price is typically established by examining historical data – whether with econometric techniques or more impressionistic evaluations – forecasting of prices requires that market fundamentals can be forecasted also.

Access to more detailed information may improve the ability to explain or relate price to market fundamentals, but such information may not improve price forecasts, given the need to forecast market fundamentals as well. For example, having access to output data from individual generating units may allow for a better modelling of the relationship between generation and market price than if one had to rely on aggregate data only. However, to use a more disaggregated model for forecasting, one would need forecasts of generation at the plant level, and since such forecasting is typically much more difficult than forecasting aggregate entities, a more disaggregated model may offer little or no improvement over an aggregated model.

Making more detailed historical data available to market participants is therefore helpful for forecasting purposes only to the extent that market participants are able to forecast the underlying variables. It may be interesting to learn that the unplanned outage of a particular unit lead to a certain jump in price; however, to benefit from

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<sup>7</sup> Price forecasting is more difficult under certain market conditions, especially when the market is tight, since then relatively small changes in demand and/or supply may result in large changes in prices; in such events, more detailed information, especially about capacity availability, may be required in order to make precise price forecasts.

<sup>8</sup> Long-term contracts typically do not offer the same price resolution as short-term or spot contracts; in order to forecast spot prices, one must therefore combine information about means from long-term contract prices with information about short-run variations around the mean from hourly, weekly and seasonal price patterns.

this knowledge one would need to know if and when a similar outage is going to happen again. Therefore, making data available does not necessarily lead to more equal access to relevant information or “a level playing field”.

Of course, if one does have access to information about future values of variables at a more detailed level it will improve forecasting. Individual market participants do have access to such information about their own activities; for example, a generator will know – or can plan – the extent to which various parts of its generation park is available at some future date.

It follows that larger market players have an informational advantage relative to their smaller counterparts; for example, a large generator knows more about future capacity availability than a small generator, simply because the former controls a larger part of total capacity than the latter. To some extent, such information asymmetries can be levelled out by requiring market participants to make available forecasts or plans for their activities. However, since plans are always subject to change, and only the relevant market participant can know the extent to which any announced plan is realistic, requiring that such information be made public cannot overcome the inherent information asymmetry that results from asymmetries in size.

#### **PRICE FORMATION AND INFORMATION AGGREGATION**

The insight that providing more information about underlying market fundamentals does not necessarily improve the functioning of the market derives from the essential character of markets as mechanisms for collecting, processing and disseminating relevant information; price formation is information aggregation.

Through their bids and offers market participants reveal information, be it about underlying fundamentals such as costs and values or about their beliefs concerning such entities. The market, by ranking bids and offers, and by bringing them together, ensures that price is based on information of the best informed market participants; since the market is cleared at the intersection of demand and supply, price is determined by intermediate or average, as opposed to extreme, bids and offers; overly optimistic and pessimistic bids and offers fall outside of the range that determines market price.

Access to better information will improve the accuracy of market participants' bids and costs and hence price formation. However, since price formation, through aggregation of bids and offers, tends to correct for unsystematic variation at the level of individual market participants (caused, for example, by errors or misconceptions), the overall gain from providing more information to individual market participants may be limited or none at all. An efficiently functioning market does not rely on equal access to information by all market participants; on the contrary, an efficiently functioning market provides relevant information to market participants.<sup>9</sup>

This is important, especially since providing individual market participants with more detailed information may affect their behaviour in such a way as to undermine market performance; this is the topic of the next section.

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#### EXCESSIVE INFORMATION

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In the previous section, I discussed why more information is not necessarily to the benefit of either individual market participants or overall market performance. In this section, I discuss why making more information publically available can in fact undermine market performance.

#### INFORMATION OVERLOAD

A first and rather simple point follows from the observation that large amounts of information requires a correspondingly large processing capability in order to turn the various pieces of information into a coherent and meaningful picture. At best, providing more information may simply not be very useful if decision makers do not have the necessary processing capability; at worst, more detailed information may blur the overall picture and so undermine rational decision-making.

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<sup>9</sup> Fairness consideration, and maybe trust in market institutions, may lead to a different conclusion, but that is another matter; for efficiency, what is important is that market participants make bids and offers that reflect their own particular pieces of information, not that this information is the same across all participants. The statement in ERGEG (2010c, p. 8) that “*insufficient transparency has adverse effects on market competition and price formation as not all the market actors have access to the same information and an unlevel playing field is created*” is consequently misleading.

Consider the case of water reservoirs in the Nordic market. If one were to make use of information about storage levels in individual reservoirs for price forecasting one would, at the very least, need information about inflow into each reservoir over the relevant period. This not only requires very detailed hydrological knowledge, but also considerable processing capability, in order to determine how individual reservoirs contribute to overall supply conditions. It may be more useful to have information about water storage at a level that corresponds to areas of similar hydrological conditions and base forecasts on overall or average inflow to the different areas.

More generally, regulatory authorities may improve market participants' access to information by making it available in a form that facilitates its use, and this is not necessarily in its most detailed and basic form. Especially for smaller players, who may have limited ability to undertake sophisticated analyses themselves, providing information in a format that is suitable for simpler and more straightforward analyses may be particularly helpful.

#### INCENTIVES TO GATHER INFORMATION

Collecting information, validating it and subjecting it to systematic analysis is costly. Therefore, agents will only undertake such activities when the benefits from being better informed outweighs the costs.

If market participants are required to make their private information publicly available, their incentive to gather information may be reduced. The reason is that if information is no longer privileged, but available to others also, it may cease to be of value. For example, a generator benefits from scheduling its capacity in such a way as to ensure maximum output in periods of high prices, and hence has an incentive to undertake analyses that improves its ability to forecast prices and to develop operational procedures to further its responsiveness to prices. However, if the generator has to make information public (such as capacity availability, planned outages, water storage levels and production patterns) that effectively reveals its price forecasts and operational procedures, it may no longer have an incentive to undertake such analyses. Since, as explained above, improved decision-making at the individual

level may also improve overall market performance, undermining incentives to gather information may undermine the functioning of the market.

### **INFORMATION DISTORTION**

If information controlled by a particular agent is valuable to others, and especially if their access to such information reduces his or her own profitability, the agent has incentive not to make this information generally available; if forced to do so, the agent has incentive to distort the information so as to make it less useful to others.

Distortion may be achieved by delaying, under-reporting or misreporting information. Regulatory authorities may reduce the problem of distortion – by standardising the frequencies and formats with which information is to be made available, as well as with controls to ensure that agents adhere to regulations – but not eliminate it. It is in practice difficult to ensure complete compliance with any sort of regulation, and the challenge tends to become larger the more detailed, complicated and demanding the regulatory requirements are. For example, it may be difficult to ensure the realism of information concerning planned unavailability of generation units and forecasts of generation capacity long into the future.

Market participants may also distort information indirectly, by changing behaviour in such a way as to affect values of indicators that are to be reported. Suppose for example that generators are required to report output from individual generating units on an ongoing basis. Suppose also that such information may be used to infer generator strategies, their underlying costs or their assessment of future market conditions (eg. implied water values of a hydro generator). Then generators may have incentives to shift output between generating units in such a way as to conceal behavioural patterns; in other words, generators may want to deviate from cost-minimising or efficient despatch in order not to elicit information to competitors or other market participants.

Note that it is exactly when private information is valuable to other market participants – and hence the argument for requiring such information to be revealed may seem the most obvious – that the incentive to distort information tends to be the strongest. When information is of little or no value to other market participants, there

is little or no incentive to resist its publication; however, when information is valuable to other market participants, and especially when they may act upon this information in ways that are detrimental to the agent in question, the incentive to distort information is correspondingly strong.

#### **MARKET POWER**

The market power of an individual agent depends on market conditions, and hence more detailed information about these conditions may facilitate the exercise of market power, thereby undermining market performance.

Consider for example a generator situated in an area where transmission capacity in and out of the area is sometimes congested. In periods in which transmission capacity is not congested, the generator faces competition from generators in neighbouring areas; if the generator offers a high price to the wholesale spot market, it risks being undercut by lower offer prices of generators outside of the area. However, in periods in which transmission capacity is congested, especially when the load configuration is such that import to the area is constrained, the generator faces competition only from generators situated within the same area; its offer price is then more likely to be accepted, even when it is very high.

If such a generator knows beforehand whether or not transmission capacity will be congested, and hence the extent to which it faces competition from other generators, it may tailor its price to market conditions; it can offer a high price when transmission capacity is congested and a correspondingly lower price when capacity is not congested. If the generator does not know whether or not congestion will occur, it cannot tailor its price to the same extent; its price will then have to take into account that competition may or may not be strong, and, especially if the generator is cautious or risk-averse, it will have to price sufficiently low that it can meet potential competition from generators outside of the area.

It follows that more precise information about market conditions – including load configuration, availability of competing generators and transmission capacity – may facilitate the exercise of market power and thereby undermine market performance.<sup>10</sup>

It also follows that the fact that market participants may be willing to incur costs to obtain information is not necessarily a sign that such information is valuable from an overall perspective; information may be privately profitable because it furthers exploitation of market power, and socially unprofitable for exactly the same reason.<sup>11</sup>

### TACIT COLLUSION

Transparency may also affect the ability and incentive of market participants to coordinate their behaviour and hence the extent to which market outcomes are characterised by collusion rather than competition.

To see this, note that for a seller of electricity the benefit from cutting prices – which in itself involves a loss in the form of lower margins – comes from increased sales. Increased sales may result from attracting more buyers to the market, or from inducing larger sales from existing customers, but in electricity markets – where aggregate demand tends to be relatively inelastic – increased sales for any given seller must come at the expense of its competitors. A strategy to capture market share can therefore succeed only if the price-cutting supplier becomes cheaper than its competitors; that is, if competitors do not reduce their prices also.

In other words, an aggressive pricing strategy is more likely to succeed the longer it takes before competitors follow suit, which again depends on how fast they discover that the supplier in question has cut price, and how quickly they react on this information. If a price cut is discovered fast, and if competitors are able to adjust their prices quickly, then an aggressive pricing strategy is not going to be successful.

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<sup>10</sup> In ERGEG (2010c, p. 8), it is stated that “*This asymmetry of information that results from a lack of transparency also creates opportunities for market manipulation*”. However, while asymmetric information may provide individual market participants with profit opportunities – eg. by trading on perceived differences in price expectations – market manipulation requires the ability to move prices, i.e. on market power.

<sup>11</sup> ERGEG (2010c, p. 23) uses the fact that market participants are willing to pay for real-time information about generating units and their operations as an argument for why such information should be made publicly available. As explained below, this argument fails to account for collective, as well as unilateral, market dominance.



It follows that providing more timely and accurate information about the behaviour of individual market participants is likely to reduce incentives for competing on price. In other words, transparency may facilitate an outcome that resembles collusion or monopoly, rather than competition.<sup>12</sup>

The result that market transparency may facilitate (tacit) collusion is not a theoretical artefact but has been demonstrated in practice. A case of particular interest is the Danish market for concrete, since here market transparency was the result of government regulation. The case is analysed in detail in Albæk, Møllgaard and Overgaard (1998), but a short version of the story is given in Overgaard and Møllgaard (2008):

*“In the early 1990s, the Danish Competition Authority found evidence of a lack of competition in the ready-mixed concrete industry. In particular, it was concerned that some buyers were paying prices too high because it was rumored that other customers received significant confidential discounts. Because at that time the Danish Competition Act emphasized the role of price transparency in promoting competition, the authority decided to gather and publish firm-specific transactions prices for two grades of ready-mixed concrete in three regions of Denmark. The intention was to inform buyers of bargain deals in the hope that this would lead buyers to exert stronger downward pressure on prices. Following the initial publication, however, average prices went up by 15 to 20 percent in less than six months. This compares with inflation of 1 to 2 percent per year and stable or decreasing costs of inputs.*

*Tacit collusion is the most likely explanation for the price increase. The price increase cannot be explained by an increase in demand or increasing costs. Because ready-mixed concrete can only be transported a short distance (20 to*

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<sup>12</sup> For a textbook treatment of transparency and collusion, see Motta (2004, ch. 4.2.2), who writes: “Since observability of prices and quantities help firms to reach the most collusive outcomes..., competition policy should pay special attention to practices that can help firms monitor each other’s behaviour.” See also O’Donoghue and Padilla (2006, ch. 3.3.2) for a discussion framed within the context of European competition policy; they write: “Hence, formal and informal exchanges of commercially sensitive information among competitors, whether bilateral, multilateral or mediated through trade associations, must be viewed with suspicion. Information on individual prices and quantities is more helpful for firms to sustain collusion than aggregate information about demand from market studies. High frequency data and data disaggregated across markets helps detect deviations and draw inferences about demand and thus sustain collusion.”

*30 kilometers, depending on local infrastructure), competition is local. In the relevant market around the city of Aarhus only four firms were active and pricing was reported for each. These four firms thus constitute a tight oligopoly. That improved transparency led to improved coordination of their pricing policies appears a natural conclusion.... While prices were initially widely dispersed, after a year of publication the firms seemed to have found a mutually acceptable price level.*

*Evidence indicates that the firms stopped granting large individualized discounts because of the improved transparency, which was an implicit goal of the policy. But the authority also unwittingly assisted firms in reducing competition by providing the reliable detection of cheating that is a prerequisite for sustaining collusion. This case also illustrates that in an oligopolistic market setting if suppliers are able to react to improved information dissemination before buyers, buyers may be hurt rather than helped by transparency.”*

Another example of transparency requirements with unfortunate consequences is legislation passed by the US Congress concerning railroad freights mandating disclosure of firm-specific information, where increased freight rates were a direct result of the improved scope for tacit collusion (Fuller, Ruppel and Bessler, 1990; Schmitz and Fuller, 1995).

In both these cases, regulations required publication of prices. While such information is particularly conducive to coordinating behaviour among competitors and sustaining collusive outcomes, information about supply or output are likely to play much the same role. Specifically, since an increase in supply is a sign of reduction in price, monitoring output is likely to serve as a good substitute for monitoring price.<sup>13</sup>

Electricity markets are often seen as particularly conducive to tacit collusion, since participants meet very frequently – every day in the spot market – and hence have the opportunity to react quickly to changes in competitor behaviour. However, in most

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<sup>13</sup> See Porter (1983) for an example of a cartel that relied on monitoring supply or market shares.

electricity markets, neither bids/offers nor volumes of individual market participants are publicly observable. Therefore, even if other factors tend to facilitate coordinated or collusive behaviour, lack of transparency with respect to individual behaviour makes such coordination or collusion difficult. Requiring publication of detailed information on generator output may change this and make collusion even more likely.

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## CONCLUSION

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For market performance, more information is not always better. Indeed, more information may undermine market performance by facilitating behaviour that is either not cost efficient or aims at exercising market power or establishing and maintaining collusion. Moreover, ensuring rational economic behaviour and an efficient and competitive market outcome does not necessarily require general access to information at a very detailed level or with a high degree of immediacy.

It is therefore difficult to see why information at the level of individual market participants, or indeed generation units, should be made publicly available. Such information is obviously warranted for system operation and, possibly, market surveillance, but not for rational and competitive behaviour by market participants; indeed, information about individual market participants is exactly what may facilitate collusion and so undermine market performance.<sup>14</sup> For market participants, information at the market level (bidding area) would seem to suffice.<sup>15</sup>

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<sup>14</sup> Overgaard and Møllgaard (2008) discuss how the EU Commission, for antitrust reasons, has tended to restrict the exchange of information that allows the tracking of individual firms; in particular, in *“the EU Commission’s Cartonboard and Wastepaper cases...the Commission argued that to prevent identification of individualized information, aggregation of the data of at least three, respectively, four firms would be required.”* (see also Halliday and Seabright, 2001). They also write: *“examples in which the exchange of detailed, firm-specific information on prices and quantities is necessary for efficient planning and resource allocation seem rare.”* Kühn (2001) writes: *“Individualized information exchange about past prices and quantities should also be considered an anti-competitive agreement in the sense of Art. 81(1). I have shown that it is very difficult to justify information exchange of individualized data in theory and in individual cases. It is very hard to construct hypothetical situations in which very disaggregated data on past actions is really necessary to achieve substantial efficiency gains.”*

<sup>15</sup> Kühn (2001) writes: *“No prohibition of aggregated data should be contemplated. In contrast to disaggregated data the potential for efficiency enhancing exchange of aggregate data is much greater.”*

It is also difficult to see the necessity of making information about actual operations immediately available. Again, access to real-time information is of course vital for systems operations (although not for market surveillance), but not for rational decisions of market participants; on the contrary, more immediate access to actual operations may facilitate coordination and collusion.<sup>16</sup> For market participants, information about actual operations should be of interest to the extent that it improves their understanding of how the market functions and hence their ability to forecast market prices, but this does not require immediate access to such information.

Information about future supply and demand conditions is clearly valuable in order to allow market participants to forecast prices. However, again it would seem to suffice to provide such information in an aggregated form, both with respect to level and time period. Detailed information about available consumption, generation and transmission capacity may provide opportunities for coordination and exercise of unilateral market power, but is not warranted for competitive market behaviour.

To sum up: while the Comitology Guidelines on Fundamental Electricity Data Transparency appears to be heading in the right direction, the step they take seems overly long. To achieve the aims of an efficiently functioning of wholesale electricity markets, fair and non-discriminatory access to data and a coherent and consistent view of the European wholesale electricity market, it does not seem advisable to go quite so far with respect to immediacy and detail as suggested by ERGEG.

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<sup>16</sup> Halliday and Seabright (2001) writes, on EU competition policy on information exchange, that “...an influential factor as to the acceptability of an information exchange is the frequency with which the information is exchanged. The more frequently information is exchanged the easier it is to assess market development and, consequently, respond swiftly and appropriately to them. The slower the frequency of exchange of information, the more limited the scope for the useful commercial exploitation of the information.”

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