INTERGEN Fined £37.3M for market abuse.

This briefing looks at Ofgem's prosecution of the InterGen for the manipulation of GB electricity markets in Oct/Nov 2016[1]. It explores how the digital footprints left behind in reported data, electricity system balancing actions, and the technical aspect of gas plant operation interact with market regulation. As the largest fine under REMIT[2] (to date) it shows the increased confidence in the application of REMIT by regulators to more complex manipulative strategies.

EXECUTIVE SUMMARY

This is a key prosecution under REMIT. Not just because of the size of the fine, but because it shows how near real time operational data is integral to market price formation, and how important it is to align (and record) technical and commercial decision making.

1. Wholesale energy markets and energy balancing markets are intra-dependant (ref Elexon)[3]. And technical information (including plant availability and its dynamic characteristics) can be price sensitive "information". Like the dinosaur tracks these records can be uncovered a long time later.
2. Energy regulators have capability to investigate complex cases and to prosecute where appropriate. These investigations can take several years to conclude and are no doubt very disruptive.

Figure 1 Dinosaur track in Arizona, USA. © U.S. Geological Survey (CC0 1.0)

3. Given the lack of off-the-shelf internal monitoring solutions participants in balancing markets need to ensure i) front line staff and management are provided with appropriate training, ii) there accurate contemporary records are maintained (of the economic & technical rationale for actions), and iii) there is a robust, independent surveillance and compliance monitoring capability.

Summary of Ofgem's Findings & Regulatory Context

Ofgem's investigation concluded that over four days in Q4-2016 InterGen sent misleading signals to GB electricity transmission system operator, National Grid ESO, about how much energy it would supply during peak winter hours. In giving these signals InterGen sought to profit by securing contracts from the system operator to generate up to, and including, these peak hours. Ofgem, found that InterGen's management of REMIT and Grid Code compliance was weak, and had inadequate procedures, management systems and internal controls. Ofgem fined InterGen £37.3M (£12.8M redress plus £35.0M, penalty reduced to £24.5M for early settlement) for breaching REMIT

[1] www.ofgem.gov.uk/publications-and-updates/ofgem-requires-intergen-pay-37m-over-energy-market-abuse
[2] REMIT is EU Regulation 1227/2011 on wholesale energy market integrity and transparency.
[3] BMRA – is the GB Balancing Mechanism Reporting Agent, www.elexon.co.uk

E: enquiries@ainstyrisk.co.uk
O: +44 1904 466482
A: York Eco Business Centre, Amy Johnson Way
Clifton Moor, York YO30 4AG UK

Article 5 (market manipulation) with the clear intent of sending a message that market manipulation will not be tolerated.

The largest REMIT fine previously had been levied by the Spanish competition and markets authority. CNMC fined Iberdrola Generación €25M in Nov 2015 (still subject to appeal @ Apr-2020) for alleged market manipulation, linked to withholding hydro generation capacity. The authority identified that Iberdrola's conduct led to market prices that did not correspond to available production capacity or to fundamental market data, and that this constituted market manipulation prohibited by REMIT, Article 5. (Bird&Bird).[4] A criminal investigation has also subsequently been launched.

A similar pattern of market abuse[5] had occurred in the California, USA between Sept. 2010 and Nov 2012. In this case JP Morgan executed a series of strategies that *"anticipated and intended that its bids would trigger make-whole payments, exceptional dispatch payments, and Residual Imbalance Energy payments to [them] at prices above market rates"*. In 2013 JP Morgan agreed to pay a civil penalty of $285M, disgorgements (i.e. redress) of $125M, and to implement additional compliance procedures. Interestingly, most System Operators in the US monitor for these types of behaviour, including changes in ramp rate and capacity.

This case, concerning abuse in the balancing market for GB electricity, demonstrates the added value of EU Regulation, REMIT, in preventing gaming in a time sensitive and crucial market for the growth of low carbon electricity generation. It provides important sector specific regulation that can address the detailed physical and technical characteristic that underpin wholesale energy markets.

INTERGEN's POWER PLANT

InterGen is an important part of the GB power and gas market. They manage five percent of the UK's overall daily generating capacity (ref InterGen)[6], operating and trading gas fired power stations on behalf of Rocksavage Power Ltd., Spalding Energy Company Ltd., and Coryton Energy Company Ltd. Each of these Generation Licence holders use InterGen as their administrative agent, providing access to the wholesale energy markets via Coryton Energy, and employing the traders who sell and dispatch the plants' power. The power plants are:

i) **Rocksavage** (810MW_e, two Alstom GT26 gas turbines and HRSG's[7], & Steam Turbine ("ST") with wet cooling tower. First commercial operations in 1998) built to provide electricity for the nearby Ineos chemical complex, located near Runcorn, Cheshire, N-W England. BMU id[8]: ROCK-1.

[4] Bird&Bird, www.twobirds.com/en/news/articles/2016/spain/spanish-authority-fines-iberdrola-25m-in-first-remit-infringement-decision
[5] For details of the JP Morgan case see www.ferc.gov/CalendarFiles/20130730080931-IN11-8-000.pdf
[6] InterGen, www.intergen.com/where-we-are/project-portfolio
[7] HRSG – "Heat Recovery Steam Generator" - An energy recovery heat exchanger that recovers heat from Gas Turbine exhaust, producing steam to be used to drive a steam turbine (i.e. "combined cycle").
[8] BMU id is the Balancing Market Unit identifier, used to identify notifications sent to the system operator.

ii) **Coryton** (800MW$_e$, two Alstom GT26 gas turbines and HRSG's, Steam turbine with air cooled condenser, 2002) built on the now closed Coryton oil refinery site on the North bank of the River Thames, Essex, S-E England. BMU id COSO-1.

iii) **Spalding** (880MW$_e$, two GE frame 9FA gas turbines, two HRSG's, & Hitachi ST with air cooled condenser, 2004) built on the former British Sugar sugar beet site, in Lincolnshire, E. England. BMU id: SPLN-1

All three have the same "2+1" block configuration - two Gas Turbines, two Heat Recovery Steam Generator (HRSG) and a single Steam Turbine. This governs the economic operating modes available to the plant operator. These generation units were designed and built to run baseload with some (limited) flexibility. However, by 2016 these had been operating for between 12 and 18 years and will have been modified to enable more flexible running during their routine major overhauls. CCGT plant can generate at part load quickly from grid synchronisation. Initially this is from the gas turbine but in the event of cold starts there is a prolonged hold point while HRSG and steam turbine operating conditions are met. This was a key consideration of the system operator when accepting the InterGen Bid Offers in this case. The time can be reduced if the plant is held in a "hot" or "warm" condition. The InterGen sites do not have bypass stacks so the gas turbines would not have been designed to operate in "open cycle" (i.e. without the steam turbine).

WHOLESALE ENERGY MARKETS Q4-2016

The energy markets in Q4-2016 were dealing with several "live" issues. Gas demand was 12.6% higher than the previous year, driven by increased use of gas (instead of coal) in electricity generation, whilst electricity consumption was broadly unchanged (BEIS, 2017)[9] October temperatures were in line with the long term average, but November 2016 was 1.2 degrees colder than average (5.4°C vs 6.6°C). And in mid-October the French nuclear safety authority (ASN) instructed EDF to take a further five reactors offline within the next three months (ICIS, 2016)[10]. Compared to Oct & Nov 2015 there was a net swing of 1,250MW, now exporting electricity to France, not importing. Tues 8th Nov (one of the four days Ofgem found InterGen had been involved in the alleged market manipulation) saw the two highest imbalance system prices (>£1,500/MWh) since 2002, not to be exceeded until March 2020.

[9] BEIS, 2017 Statistical press release, UK Energy Statistics, 2016 & Q4 2016

[10] www.ICIS.com, "The French nuclear outages of 2016: the backstory", Joachim Moxon, 29 Dec 2016

ENERGY BALANCING & WHOLESALE ENERGY MARKETS

With the loss of French nuclear power, and increased demand for gas the role of gas plant in the GB balancing market will have played the most significant role. Key to understanding the nature of the InterGen case is understanding the GB "Balancing Mechanism" (BM). The Balancing and Settlement Code ("BSC"), a legal document, defines the rules and governance for the balancing mechanism and imbalance settlement processes. The BM ensures electricity supply and demand is balanced in real time, and accounts for between 5 and 15% of contracted electricity volumes over a year. It covers the period between one hour prior to real time until the end of each settlement period (a 30-minute window). During this time, the System Operator (National Grid) instructs parties to increase or decrease their generation, based on "Bids and Offers". For a generator these set out how much they are willing to pay or be paid to change output. The System Operator accepts Bids and Offers as required to balance the electricity on the Transmission System, informed by other Physical and Dynamic data notifications from market participants. Changes from FPN ("Final Physical Notification") are paid based upon the Bids or Offers accepted. The provision of data, physical, dynamic and contracted volumes, is obligatory for licenced generators, and forms part of meeting REMIT Article 8.

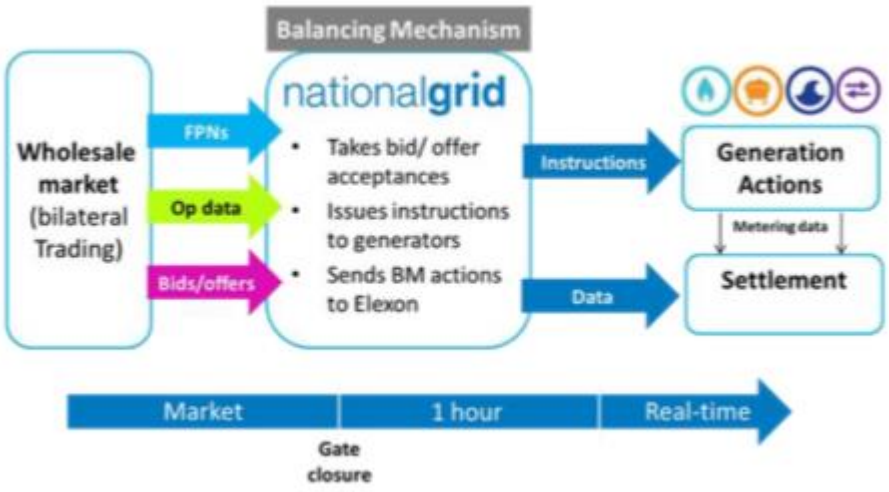

Figure 2 GB Electricity Balancing Mechanism

- Physical notifications. Final Physical Notifications (FPNs) (as series of point MW values) are the last Physical Notifications submitted to the System Operator before by Gate Closure. (Ref BSC Section Q-3)
- Dynamic notifications. For generators these include (ref OC2.A)[11]
    - Run-Up and Run-Down Rates,
    - Minimum non-Zero Time - the minimum time that a Generating Unit must remain synchronised following a shutdown period,
    - Minimum Zero Time - the minimum period for which a Generating Unit must remain de-synchronised if it is taken off-load, and

[11] Grid Code, Operating Code No. 2 (OC2) Operational Planning & Data Provision, Appendix 2 - Generation Planning Parameters.

  - Stable Export Limit (SEL), the minimum value at which the BM Unit, under stable conditions, may export to grid (ref BSC[12] Section Q-2). SEL is when a unit is operating within its design range, with stable combustion and operational NOx levels within permitted levels.
- Bid - Offer data notifications. A generator may submit several "Bid-Offer Pairs" to the System Operator for each settlement period. "Offers" are to increase generation and "Bids" are to decrease generation from FPN (BSC Section Q-4). These are bilateral balancing services contracts and are reportable "upon the reasoned request of the Agency …" (i.e. ACER) Implementing Regulation 1348/2014 Article 4(1). Bid Offer Acceptance ("BOA") is the instruction issued by the System Operator when accepting a Bid Offer submitted by a BSC Party, e.g. a generator.
- Contract notifications. Most energy - supply and demand - is traded ahead of delivery on exchange or bilaterally. For GB electricity these contracts are notified Energy Contract Volume notification (EVNAA), a rolling 7-day report covering contracted electricity buys and sells. It would be reasonable to expect that the ECVNA report and the FPN align as any gap show a potential exposure to energy imbalance mechanism. Generators (and suppliers) are required to notify the BSC systems of their contract positions to enable Energy Imbalance Volumes to be calculated] (Ref BSC Section P-2)

OFGEM'S INVESTIGATION & PROSECUTION

Ofgem's investigation was launched in May 2017 following an alert from a market participant who was suspicious of activity it had observed in the market in October and November 2016[13]. Typically triggers for a potential investigation could come from: market monitoring (either Ofgem, ACER or perhaps the FCA), whistle-blowers / complaints, or STR's (suspicious transaction reports). Their criteria to determine whether an investigation should proceed (or continue) addresses whether they have the power to act and the resources to investigate. They then prioritise based on the potential harm to consumers, whether a "person" has, or is, deriving "benefits", and the strength of the evidence likely to be available.

[12] The Balancing and Settlement Code (BSC) Section P relates to "Energy Contract Volumes…" and Section Q to "Balancing Services Activities".

[13] Around 2 years previously InterGen, Drax and four other energy companies had been investigated for failure to comply with their CESP (Community Energy Saving Programme) obligations. Opened in May 2013, the case was closed in March 2015. InterGen was fined £11M and Drax £28M.

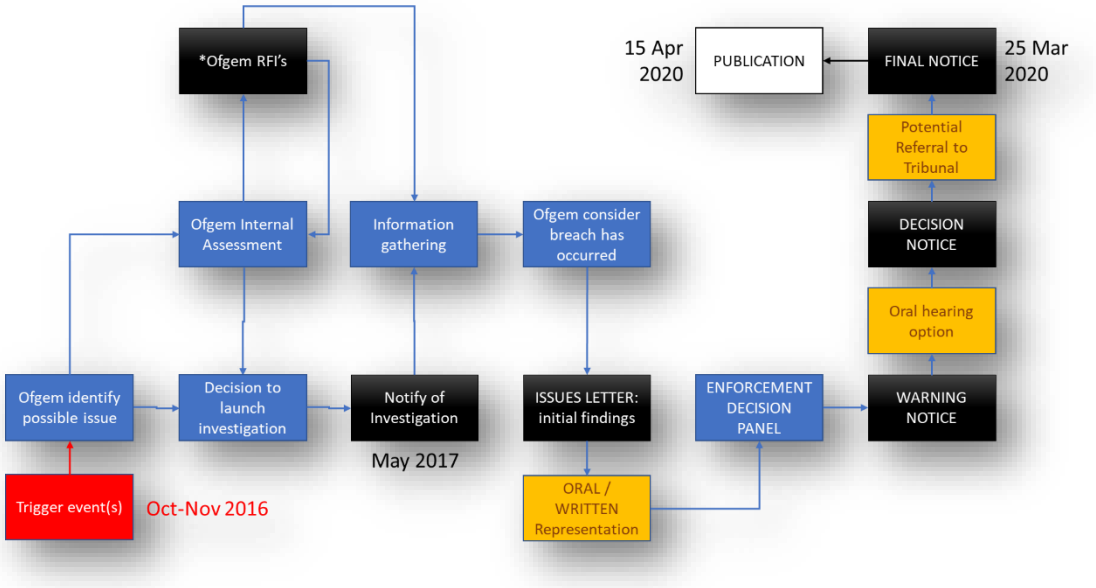

Figure 3 Ofgem Investigation Process & Timeline

Once a decision to proceed has been made Ofgem follow a pre-defined procedure[14] for carrying out a REMIT investigation. Typically, the first indication of an investigation would some form of a "request for information" (RFI) from Ofgem. This could be issued under the Electricity Act 1989 "Power to require information etc for the purpose of monitoring", but if it was clear that a REMIT violation may have occurred, this would have been under The Electricity and Gas (Market Integrity and Transparency) (Enforcement etc.) Regulations 2013. It is worthwhile noting that any information provided may be used for any purposes relating to Ofgem's functions and that destroying/changing information may result in a fine.

If an investigation is to be launched, then formal notification (normally) follows. Whilst it may not be possible to notify in all cases Ofgem will endeavour to notify the person under investigation, giving as full details as possible of the focus of the investigation, and providing a main point of contact at Ofgem. In the InterGen case notice of the investigation was provided in May 2017.

Following the investigation Ofgem determined that InterGen's actions on the relevant days could be summarised as follows:

1) Physical Notifications were submitted in the morning of delivery day, in some cases as "Final", indicating that one or more plant would not be running up to and potentially including the darkness peak.
2) After the FPN had been submitted InterGen did not enter the wholesale market to fill the gap indicated by a final physical notification falling to zero.
3) Dynamic data was submitted that was not reflective of the plant fundamental's,

[14] Ofgem, REMIT Procedural Guidelines - www.ofgem.gov.uk/system/files/docs/2016/09/remit_procedural_guidelines.pdf

4) InterGen submitted "Bid-Offer Pairs" knowing that the System Operator would feel obliged to contract with the InterGen irrespective of price level.
5) System Operator contracted with InterGen by accepting Bid-Offer pairs[15] submitted to generate at the previously notified Stable Export Limit (i.e. minimum safe level operating level)
6) Once the Bid-Offer acceptance had been received InterGen would resubmit their FPN's indicating the plant would be generating at the darkness peak.

Ofgem's Final Notice concluded that InterGen, on behalf of Coryton, Rocksavage and Spalding submitted for one or more of these power stations on 4 days, i) Physical Notifications that did not represent the best estimate of the level of generation, and ii) Dynamic Parameters (specifically "Stable Export Limit") that did not reflect their true operating characteristics.

INTERPRETATION & ANALYSIS

This section interprets InterGen's activities for trading day Tues 31st Oct 2016. We review the final physical notifications (FPN) and Stable Export Limits submitted for each of the three plant and then review against the BOA's (i.e. changes from the FPN notified) accepted for each of the three plant.

1. Spalding CCGT FPN's & BOA's 31st Oct

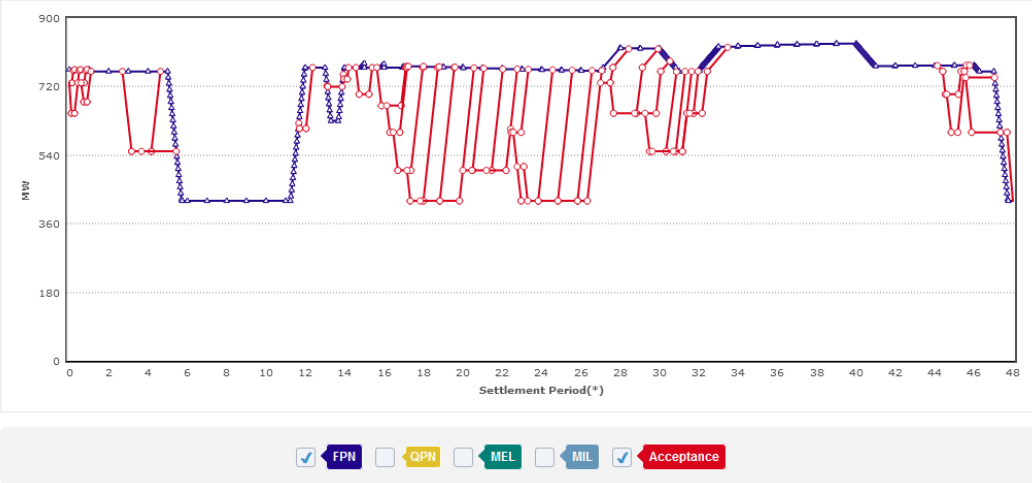

Figure 4 Spalding FPNs 31 Oct 16

		Spalding
Max Generation capacity	MW	880
Max FPN	MW	760
Max#2 FPN	MW	820
Min FPN	MW	420
Notified SEL @ 31 Oct 2016	MW	420

By gate closure InterGen had physically notified that Spalding will be "on", generating between 48% and 93% of capacity for the day. SEL submitted at 48% of capacity, and indicated peak running was between 86% and 93% through to and including the darkness peak. During the balancing mechanism Spalding had

[15] BOD – "Bid-Offer" Data submitted by generator prior to gate closure

its offers accepted within the Balancing mechanism to reduce its output down towards plant SEL. No indication of any unreasonable or unexplained behaviour and the plant appears to be playing an active (and valuable role) in supporting the System Operator.

2. Coryton CCGT FPN's & BOA's 31st Oct

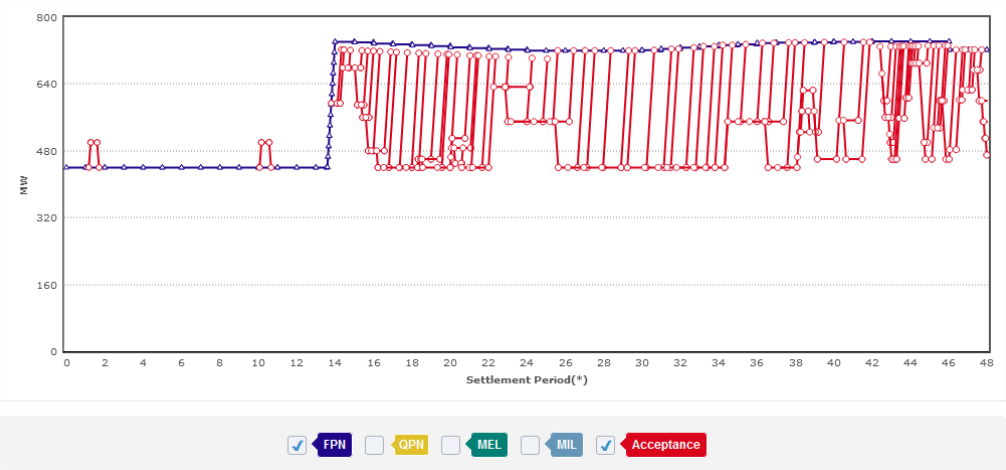

Figure 5 Coryton FPNs 31 Oct 16

		Coryton
Max Generation capacity	MW	800
Max FPN	MW	720-740
Min FPN	MW	440
Notified SEL @ 31 Oct 2016	MW	440

InterGen notified FPN for Coryton at 55% of capacity overnight increasing to 92% for daytime peak 07:00- 23:00hrs. Bid and offer pairs submitted with the plant being routinely Bid down to its SEL. Like Spalding, Coryton was very actively utilised by the System Operator on the 31st Oct, responding to System Operator requests though out the day and evening period to reduce load. As for Spalding, there was no indication of any unreasonable or unexplained behaviour and the plant appears to be playing its expected role in supporting the System Operator.

3. Rocksavage CCGT FPN's & BOA's 31st Oct

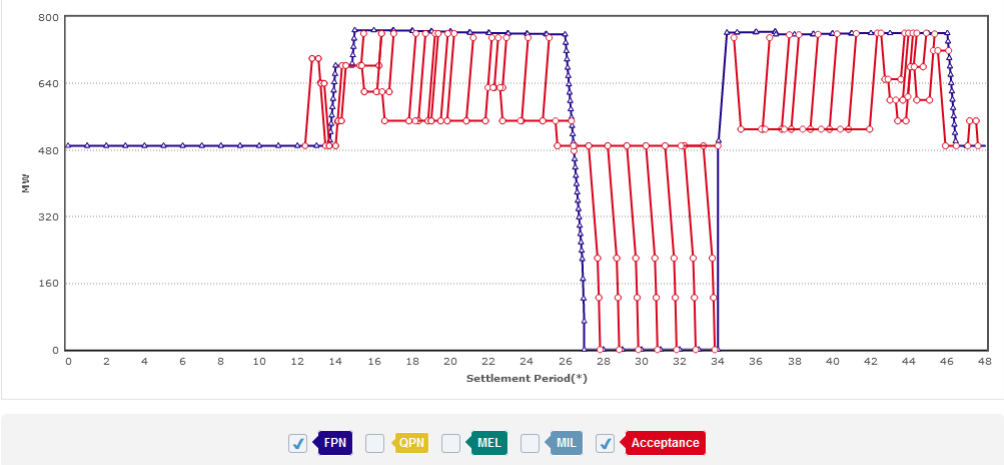

Figure 6 Rocksavage FPNs 31 Oct 16

		Rocksavage
Max Generation capacity	MW	810
Max FPN	MW	760-765
Min FPN	MW	490 / 0*
Notified SEL @ 31 Oct 2016	MW	490

InterGen's Rocksavage Final Physical Notification for the 31st, taking it to zero for 4 hours, seems, at best, unusual. Why was the plant not due to run* in the late afternoon period? No planned (or unplanned) outage had been notified via UMM's. Whilst Rocksavage is the oldest (and likely the least efficient) of the three InterGen plant given the market context and it would take a compelling and urgent operational reason for it not to be "warm" in the run up to peak period. In Ofgem's Final Notice they also highlight that InterGen were contracted to be supplying electricity in this period but had not acted to fully close out this exposure in the market[16].

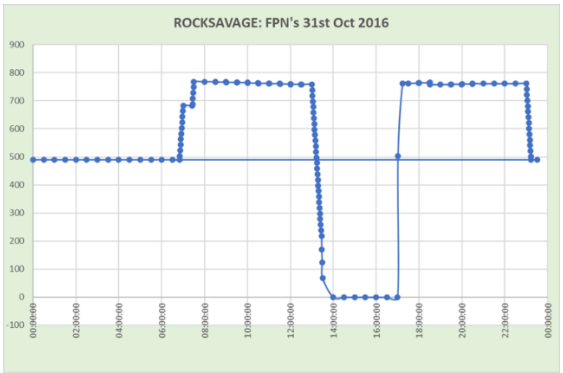

Figure 7 Rocksavage Final Physical Notifications

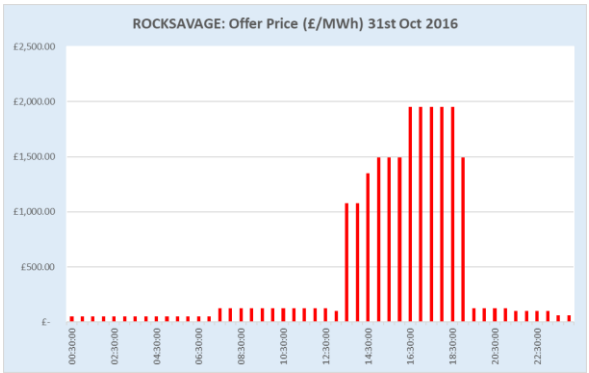

Figure 8 Rocksavage Offer Prices

The bid-offer pairs that were submitted, when combined with the Stable Export Limit (in Rocksavage's case 490MW on 31 Oct 2016) resulted in for periods 27-34 Rocksavage having its offers

[16] Market participants contract position (ECVNA reports) are not available publicly this could not be reviewed.

accepted and being contracted to deliver 480MW at prices ranging from £1,080/MWh to £1,950/MWh.

Our analysis of FPNs and BOAL[17]s for the three other days would suggest that in addition to Rocksavage on 31st, the Ofgem penalty is likely to be related too:

- 7th Nov 2016 – Rocksavage and Coryton.
- 8th Nov 2016 – Spalding (and attempted at Coryton).
- 15th Nov 2016 – Rocksavage.

However, it is unclear how the £12,791,000 restitution payment was calculated on a day-by-day, plant-by-plant basis, or whether it includes a secondary impact. Might there be other market participants who missed opportunities, or overpaid because of InterGen actions?

At the time these breaches it is possible that there was an organisational gap between the market regulatory compliance requirements of REMIT and MAR and operational code requirements of plant "optimisation" and dispatch in InterGen. This may have been reinforced by bilateral balancing services contracts not being reported in the same way as forward contracts. They are only to be reported "upon the reasoned request of the Agency …" (i.e. ACER). However, this was not the view of the energy regulator.

DISCUSSION & CONCLUSION

There are several issues that are worth further consideration that arise from this analysis:

- Was the "market participant who was suspicious of activity" a competitor who thought InterGen had gone too far? It would be interesting to see whether other balancing market parties change their physical or dynamic notifications to increase balancing mechanism revenues.
- Why was an investigation not triggered by the system operator following the unusual FPN's submitted on behalf of Rocksavage for the 31st Oct? This allowed a further 3 sets of manipulative behaviour to occur in the following two weeks.
- Electricity cannot be stored so prices become more volatile the closer you get to delivery. It will not always be clear whether extreme prices are because of scarcity or manipulation. And on a winter weekday darkness peak with no French interconnector running flexible electricity supply will be more limited. So, what differentiates between scarcity pricing and market manipulation? What constitutes artificially / intentionally "inflating" prices in these situations?
- InterGen was only able to submit one 'set' of dynamic data that anticipated which combination would be most likely to get their Bid / Offers accepted. Would being able to offer the system operator alternative combinations enable greater innovation and better outcomes?

[17] BOAL = Bid-Offer Acceptance Level

- Given the changing balance of electricity generation does Ofgem, or do ACER, have any reason to remain concerned about behaviour or the effectiveness of the controls in the balancing market?

In conclusion:

- This case demonstrates that REMIT encompasses activities in the energy balancing markets, with the potential for very large penalties for market manipulation (and by inference trading on inside information).
- InterGen actions on the four days left an enduring digital footprint behind. This enabled the "cont(r)act tracing" (my one Covid-19 reference!) to establish a consistent and coherent narrative, that demonstrated the alleged market manipulation, despite years passing and a change of personnel.
- Internal monitoring systems (off the shelf or developed in house) that uses market transaction and orders data (i.e. REMIT data) would not have picked this up. Therefore, preventative controls alongside detective controls under the current circumstances would make more sense for most firms.
- The role and responsibility of the system operator in preventing, identifying and calling out this type of abuse – which they are uniquely positioned to see, should be made explicit.
- Potential adverse impact on competition. To ensure competition can thrive in the balancing market it is critical that the cost of balancing energy does and can increase as balancing services providers adjust their prices to match the scarcity. Ambiguous rule with respect dynamic data may deter existing participants and new entrants.

RECOMMENDATIONS

1) Electricity balancing market participants should:
    a. Undertake an independent review of their current actions,
    b. Introduce the capability for self-reporting capability, and
    c. Ensure staff dispatching plants and transacting with the system operator do so in compliance with
        - System Operators rules (e.g. balancing code) and
        - Market Regulations (REMIT and MAR).
2) ACER (Ofgem in the UK) should provide a guidance note on the application of REMIT in the balancing markets, including submission of plant technical data, and addressing the role of the system operator.
3) Energy regulators (including Ofgem) should provide more detail of cases. For the InterGen case (for example) it would be reasonable to include:
    - Redress calculation by licence holder and date, and
    - Guidance on what constitutes a "misleading stable export limit" and other permissible tolerances on dynamic data notifications.

E: enquiries@ainstyrisk.co.uk
O: +44 1904 466482
A: York Eco Business Centre, Amy Johnson Way
Clifton Moor, York YO30 4AG UK