

Response Part 2 of 2 by Don Stickland, mobile 07973 110 010, re Ofgem Ref 145/04.

“Elexon, Sherlock Holmes, and the Theft of millions of pounds of Electricity each year from the Settlement System”

Preamble: *For the avoidance of doubt, all statements in this Response are either expressions of opinion or suggestions of opinion either by Box Ten Ltd (also known as BoxTen) or by Don Stickland or both, unless they can be shown to be statements of fact, and are made in response to the invitation in Document reference 145/04, titled “Electricity Distribution Price Control Review – Initial Proposals” issued in June 2004 by the Gas and Electricity Markets Authority, the office of which is known as Ofgem. This Document (which is part 2 of 2 of an invited Response to Ofgem) is Printed, Published and Promoted by or on behalf of Box Ten Ltd., P O Box 1010, Nottingham, NG5 8TF, UK, Telephone: 07973 110 010, as was the slideshow dated 06 August 2004 which formed part 1 of 2 of this Response, and which has already been released to Ofgem. All Rights Reserved. The moral right of Don Stickland to be identified as the author of this Response is asserted. This Response is not confidential, and is intended to be placed in Ofgem’s library and on their website. It follows on from, and contains some modifications to – with reasons – compared with our earlier June 2004 Response, to Ofgem “Theft of electricity ...” ref 85/04, which may be found on the Ofgem website, e.g. by entering the word “theft” in the search box. If you have any questions or need clarification on any of the issues, please contact us and we will find the answers for you as quickly as possible.*

Audience: This Response is intended (1) Formally for the Ofgem team represented by Cemil Altin, Head of Price Control Reviews, in Response to the invitation for responses to “Electricity Price Control Review Initial Proposals June 2004 145/04”, (2) Principally for the Elexon Team led by BSC Panel Chairman Nicholas Durlacher, from whom we’ve unfortunately not yet received any responses so far to any of our previous e-mails to him and his people on the topics of the (a) Qualified Elexon Audit, (b) £10m underspend of Budget, or (c) “Theft of Electricity from Settlement”, because there currently seems to be no alternative way to make public contact – unless we are URGENTLY advised to the contrary, please, [see these quotations e.g. Elexon Paper SVG/40/011, para 5.6 ‘A more general conclusion ELEXON has reached in respect of line losses is that the current industry processes and controls for setting and revising line losses may not be sufficiently transparent to allow for the validation of data ..’, para 5.7 ‘.. there is not in all cases precedence for ELEXON to actively engage with such industry organisations and the terms of reference for ELEXON to take a greater role in the losses process would need to be defined’ perhaps with the assistance of Ofgem, & Recommendation 11.1.1 ‘ELEXON should investigate the governance and controls surrounding the setting of Line Loss Factors.’] (3) As an updating assistance to the Ofgem team represented by Andrew Wallace, in order to keep them informed of recent developments, so that their Progress Summary Report [re Theft ref 85/04] – due out in September 2004 – may be able to take into account recent developments since their June due date, (4) the Member of Parliament for Don Stickland’s constituency, in order that the MP can raise some issues with the Home Secretary and / or the Secretary of State for Trade & Industry, especially in view of the DTI strapline of “We champion UK business at home and abroad. We invest heavily in world-class science and technology. We protect the rights of working people and consumers. And we stand up for fair and open markets.” and also (5) for the team at “Dragons’ Den” – a new programme for BBC2.

Welcome to the “Elexon, Sherlock Holmes, and the millions of pounds of Theft of Electricity from Settlement” Briefing Session [show slide 1]

Theft of Electricity from the Supplier Volume Allocation Market, via the Distribution System [show slide 2]

The rationale of the *Gas and Electricity Markets Authority* (Ofgem) is essentially that markets will serve the interests of consumers – in terms of both the charges they pay and the quality of service they receive – if there are appropriate market signals. Obviously, thieves will frustrate that rationale,

because they cheat on the charges they would otherwise pay if they were honest consumers, and as a result they face a diminished or zero price of energy.

Worse still, due to the way the current electricity trading and settlements system framework operates, the costs any theft of electricity appears to us to be subsidised either by Domestic Consumers, and by Small Businesses, even if the theft has been committed by the larger Industrial and Commercial customers! Surely this cross-subsidy is wrong?

We are surprised that the price control review Ofgem document in question (145/04) seems to us to disregard theft from Distribution Networks, especially in view of the concomitant work arising from the Ofgem 'Theft' document (85/04) which shows estimates for the current annual level of theft of electricity ranging from £44 million through £132 million, whilst some professional commentators (e.g. UKRPA) consider that 'electricity stolen range is between £220 million and £330 million each year', all of which indicates to us that the current annual level of theft of electricity is around at least £100 million each year.

For example, page 1 of the Summary para 3, 3rd sentence, refers to a "Consumer Expectations Survey" published in June 2004, but we do not see any reference in that survey to any Non Half Hourly (NHH) consumer being asked "Are you willing to pay for the costs of theft from the Distribution System, or mistakes by others on the Distribution System, in your Electricity Bills?"

If it is believed that the answer to this question is "obvious", then one has to ask, "Why is it the present practice?" Furthermore, as page 2 of the Summary indicates that the key theme involves maintaining pressure on distribution companies to be efficient, it has to be pointed out that they can only do this if the Suppliers – who are essentially guests on the Distribution Network Operators (DNOs) wires systems – also behave efficiently, or at least adhere to the energy trading settlement rules etc.

Unfortunately the BSC Auditor issued Elexon, the company in charge of operating the suppliers' etc settlements regime, with a Qualified Audit for the latest year, with an audit costing around £2 million. (And curiously, Elexon not only had a Qualified Audit, but also apparently underspent £10 million against its 2003/04 budget!) Whilst a "Qualified Audit Report coupled with an overspend against budget" would be worse, it is clear that a "Qualified Audit Report coupled with an underspend against budget" shows room for improvement.

And Elexon's Response – as reported in the BSC Panel Minutes – is encouraging: "**ELEXON ... to address the root causes of the errors in the SVA (Supplier Volume Allocation) Market ...**" but it's rather spoilt by the continuation of

Elexon's View of Qualified Audit Report [show slide 3]

"Whilst most of the responsibility to improve data quality lay with Suppliers, not all of whom appeared capable of, or interested in, taking remedial action, there were steps that ELEXON and PAB could initiate". We have to say that we find this remark surprising, given that Privatisation is supposed to give managerial ownership – as the result of incentives and/or penalties – to the solving of consumer problems, in a way that was not always possible under Nationalisation.

The reason why we believe that the Elexon Response is not quite as constructive as it could be, is that it has to be said that the Suppliers will inevitably be responding to the incentives and penalties of the regulatory framework as they currently perceive it to be, and that the alleged lack of capability or interest in taking remedial action is partly at least a reflection of the actual realisation of that framework. In addition, in the context of Ofgem 145/04, one has to ask if the Suppliers are not facing the correct incentives and penalties of the regulatory framework, are the Distributors?

Indeed, the "Elexon Link" publication issued 27 March 2004 indicates

Elxon's Key Issues [show slide 4] first 4 Issues

as:

- Inadequate Supplier Hub Management
- Ineffective techniques within the Performance Assurance framework (PAF)
- Inaccurate Energisation Status of Half Hourly (HH) and Non Half Hourly (NHH) Metering systems
- Erroneous values of EACs (Estimated Annual Consumptions) and AAs (Annualised Advances [of the consumers meter]).

Elxon's Key Issues [show slide 5] Issues continued

- Inadequate clearance of exceptions and backlogs in the NHH market
- Erroneous values of Unmetered Supply EACs (Estimated Annual Consumptions) in the NHH market
- Inadequate clearance of Exception Reports and other backlogs in the NHH market.

However, there is no clear reference to other issues, such as:

- Unrecorded connections to a distribution system, either 'unauthorised' or mistakes
- Other theft, e.g. shorting, or other abuse, of meter(s)
- Erroneous values of Line Loss Factors (LLFs) being provided by DNOs,

which, given the context of Ofgem 145/04 and its preceding documents, seems to be unfortunate, given that the DNOs are apparently parties to the BSC (Balancing and Settlement Code).

The point we are trying to make here is that it is essential that there is a need for a seamless framework that includes Distribution Price Control and Elxon Settlement, without a gap, but it is not clear to us that this has been achieved so far, as is manifested by the theft of electricity issue.

BoxTen's View [show slide 6]

And consequently this – Elxon's approach – seems to be a partly baked potential false security. The clear question to ask is: Can one really ignore theft? More importantly, can one ignore mistakes that lead to poor data quality? The sensible answer is no, not if these "exceptions" lead to results outside the tolerances of Audit Materiality.

Consequently, it would seem sensible to have a culture that encouraged the "self-healing" of poor quality data, i.e. encouraged by incentives and penalties, and perhaps stimulated by the certainty of detection of material anomalies. If one cannot ignore these matters, then ...

Theft CONTEXT [show slide 7]

Because a wide range of estimates is available, from the earlier Ofgem Paper (reference 85/04), all of which seem to be surprisingly large and of the order of £100 million, in the context of theft claims paid by the British Insurance industry, we should be looking out for ways to address the apparent lack of rigour. [Incidentally, our earlier June Response indicates some research re current attitudes to dishonesty, and explains the microeconomics of crime in this area, etc. Copy available on request.]

Another Cause of Poor Data Quality - 1 *[show slide 8]*

The real problem of missing data is that some of it occurs on the DNO's wires, in the form of theft of energy, or the form of energy lost to connections which have been legitimately made to the DNO's wires but which, through maladministration, have never been recorded as being connected to the distribution system, because they failed to be entered by the Meter Point Administration Service (MPAS).

Obviously, there is a wide spectrum of potential failure of "missing connections" here, ranging from mistakes by the Distributor (which probably should be penalised by the regulatory framework and hence the present price control review) through to fraud (which should be automatically catered for by the trading framework, as surely the trading arrangements should be as robust as possible to any form of cheating?).

Practitioners might tell you that – should there have been an electricity fault making the consumer be "off supply" – the DNO can remove an existing meter, and then replace it with another meter, which it then registers with the host PES (Public Electricity Supplier of "Last Resort"), in order to "keep the lights on". The inevitable confusion is obvious! Furthermore, if a Supplier is not registered for a consumer's MPAN (Meter Point Administration Number), or finds that it's not registered, then energy cost is free to that Supplier for that consumer's Meter Point, but the Supplier gets a revenue from that consumer – which is clearly a perverse incentive (to clean up "Dirty Data")!

However, the rationale of the legislation underpinning the Gas and Electricity Markets Authority (Ofgem) is essentially that only Suppliers, and not Distributors, will trade energy. Consequently, as there is a desire to have basically only one electricity meter for each consumers supply – distributors do not have direct responsibility for meters or for meter readings – only suppliers do. As individual Suppliers do not (quite rightly, in order to stimulate competitive pressures) have a monopoly in current market conditions, no individual supplier can detect "missing connections" with certainty.

Another Cause of Poor Data Quality - 2 *[show slide 9]*

The rationale of this Response is that "missing connections" can only be detected by looking at the electrical reality of the total situation on each separate Distribution feeder wire of each Distribution Network Operator (DNO). In the "old Nationalised world" this was done with some rigour, as one of the benefits of having a monopoly. In the "new Privatised world" this has largely gone but, of course, the underlying electrical reality remains that consumers have to be connected to system feeders, and that – as Ofgem Document 145/04, page 16, para 3.35, third diamond states - "losses will be measured as the difference between units [of electrical energy] and exiting the system in each DNO area", then the total system in each DNO area could also be broken down into finite elements made up of each system feeder wire, etc.

Please note that we believe that the next paragraph (Ofgem 3.36) does not seem to be quite correct, because the separate paper referred to does not seem to provide adequate details of the calculation of losses as such, merely the quantification of the effects of the apparently "hidden" calculation of losses "on the operation of the incentive mechanism"; for this reason, this Response goes to great lengths to make up for this apparent **MAJOR** deficiency, and to make constructive suggestions, especially as we have been informed earlier this year that "An Ofgem seminar is not the appropriate forum for recommending any specific technical innovations." This Response is written in order to provide necessary leadership to:

- Establish the new direction and/or goals for the players in the electricity market;
- Gain the support, co-operation and commitment of those who need to move in the new direction;
- Motivate the players to overcome the obstacles in the way of removing perverse incentives, etc, from the present trading framework.

In addition, we wish to do this with the effect of “minimal change” to the general proposals contained in Ofgem 145/04, in view of the tight timetable for DPCR4.

Consequently this Response modifies our previous suggestion (now that we are aware of the “legalistic stance of DNOs as helpfully pointed out by United Utilities in their Response to Ofgem ref 85/04), by suggesting that Elexon – rather than each DNO – analyses the metered and other data, against a list of connection points on each feeder wire, with the list to be provided by each DNO. This would then enable Elexon (a monopoly) to challenge the Suppliers that their data is complete, and also covers ALL the possible meter points, both recorded, and those previously un-recorded. The next slide explains how.

Another Cause of Poor Data Quality - 3 *[show slide 10]*

Line Loss Factors (LLFs) are required by DNOs, in order to properly charge for the conveyance of electricity. Basically, an LLF is a factor that the DNO uses to multiply the energy recorded on a consumer’s meter, in order to assess the impact that consumer would have made at the “entry point” to the Distributor’s system. This is because more has to go into the entry point, than is extracted at the exit point, due to part of the energy being lost in between, due to the laws of Physics. For example, some of the energy losses would be in the form of heat lost, due to the resistance effect of the wires. Obviously, these overall LLFs have to be published “in advance”, in order that the Supplier can make a firm price offer to each customer.

The rationale of this Response is that these LLFs can be broken down into values for each finite element of the DNO’s system. Furthermore, the rationale of this Response is that the values of these LLFs that are published “in advance” should be tested against “after the event” analyses – as part of NEW ‘Validation Processes’ in order to verify their robustness.

Whilst “Trust and verify” may be an old adage, it can all too easily be forgotten, as the Butler Report recently revealed. Indeed, given that electricity is an invisible product to many people, the parallels seem somewhat close!

Change the Rules - 1 *[show slide 11]*

The rationale of this Response also includes proposing that, should a previously unrecorded meter point be found, then it should be immediately allocated to a previously nominated Supplier, to deal with. It might be that the Supplier of Last Resort Licence rules could be modified to cater for this; however, it is suggested that it would be essential that the treatment rules of the handling of theft, or any other previous revenue shortfall, should be radically changed too.

This is because of the current perverse incentive on Suppliers, which apparently causes Suppliers to enter “FULL” consumption details into Settlement, and for the Supplier to incur the concomitant costs, even though the thief, etc, may not come up with the matching revenue stream! This would cause the Supplier to lose profit, which would become especially marked when compared with other competitive Suppliers!

The fallacy of the above approach is that honest customers would have already paid for the above shortfalls, due to the “smearing process” of the Settlements “Grid Supply Point Group Correction Factor” (GSPGCF). Later comments under Slide 24 give information about the “smearing process”.

So the honest consumers should be re-imbursed, shouldn’t they?

One way of doing this would be for the suppliers to obtain as much recompense for the energy theft as was reasonably justifiable, for the thieves, etc, net of any enforcement costs [for entry warrants, court costs, etc]. Then deduct VAT as appropriate for the energy etc. Then deduct a previously agreed [with Ofgem] profit margin, perhaps of 10%. And then to credit each of that Supplier's consumer's bills in that DNO's area, with an equal amount per MPAN. This credit could be called "Recorded Exception Reward", and be the last line of a bill sent out. This proposal would deal with the corrosive effect of the perverse incentives previously, by giving positive incentives on Suppliers and honest consumers to deal with theft, etc. And there would be no impact on the present DPCR4.

Change the Rules - 2 *[show slide 12]*

In addition, the rationale of this proposal would mean that there would be further certainty for DNOs, by allowing Ofgem to positively confirm that no DNO 'Section 6' schemes were needed.

Why Change the Rules Now *[show slide 13]*

So if the Rules were changed "now" there would be less uncertainty for DNOs, and also Elexon could then make even more progress in line with their expressed wishes *[see slides 2 and 3]*.

How DNOs could help Elexon - 1 *[show slide 14]*

The rationale of this Response is that DNOs should receive recognition of funding requirements for new ways of operating in order to be able to operate more efficiently in the detection and discouragement of theft.

Unfortunately, there does not appear to be direct recognition of these needs in Ofgem 145/04 currently.

Nevertheless, paragraph 5.18 does provide a hint of a possible way ahead because, if DNOs were able to apply for Innovation Funding Incentive (IFI), even though Patent GB2309086 had been missing from Ofgem's March 2004 Report "Innovation in Electricity distribution Networks" despite receipt in 2002, then work could be done to build a database with a list of known meter points on each 'finite element' feeder wire.

Whilst these words are easy to write, it has to be said that there may be considerable effort needed to do this task. A particular effort may be required to "unravel" the problem of UnMetered Supplies (UMS) who's MPANs may straddle several feeder wires. Nevertheless, balancing allowances could be made in the first instance; whilst in the longer term it would appear to be sensible to have a new policy for UMS. For instance, if the average After Diversity Maximum Demand (ADMD) of each separately metered house is less than 5 kW, how can it be justified not to have meters for streetlights on a unique feeder whose load is greater than that, in view of the inevitable estimation errors of UMS, and their changes with the age of the equipment? This is particularly so on stretches of motorways, and perhaps on large roundabouts, which might be supplied through one meter box! Surely any UMS feeder with a load greater than 20kW should be separately metered?

DNOs should also be able to apply for Innovation Funding Incentive (IFI) for any necessary costs for changing meters, in order to assist Elexon.

Incidentally, we would like to remind readers of this Response that the date mentioned "by 9 August 2004" apparently does not bear the weight of the term "deadline"; consequently it would appear that any intentions made after that date apparently may qualify for IFI funding!

How DNOs could help Elexon - 2 *[show slide 15]*

Once the above could be assured to be on a work programme, then Elexon could commence the necessary work of (1) identifying how to measure the energy entering into each required finite feeder element, and (2) developing the necessary Information Systems work to determine the annual electricity entering and leaving each feeder.

In addition, if the energy entering each feeder was determined on a Half-Hourly basis, further analytical work might be done to estimate “exceptional “times of day”.

Elexon would then be able to identify feeders with unduly high energy losses, and to challenge the DNO, who could in turn ...

How DNOs could help Elexon – 3 *[show slide 16]*

challenge the known Suppliers on that feeder) to explain some – or all – of the reason(s) for the unexpected variances.

This would take forward the ADRS [Annual Demand RatioS] work of SVG/38/480 and SVG/40/011 for Elexon, which lack history. For example Elexon said “ELEXON does not have any further metrics or research to substantiate the prevalence of this [theft] issue generally or in specific GSP Groups” on page 6 par 7.8, of SVG/38/480. Indeed, SVG/40/011 reports that “Theft” is a “Parked Issue” in Table 1. Here are some lessons from the past ...

Lessons from 25 years ago – 1 *[show slide 17]*

The Price Commission reported on the topic of system losses, and theft, in 1979 [ref HC 132].

They compared the variation of reported system losses for 12 Area Boards (ABs) and found wide variations between ABs, and over time.

Part of the system losses are due to a technical ‘pumping charge’, but ABs said it was “not possible to estimate proportion of losses” due to the pumping charge. The alert reader will note that, in an ideal world, the pumping charge should be “100% of the losses”, in accordance with the laws of Physics!

Lessons from 25 years ago – 2 *[show slide 18]*

The Price Commission also reported that “the other contributors to the losses are even more difficult to quantify, but one of increasing concern (particularly in metropolitan areas) is the theft of electricity.” Interestingly, it may be that it is cheaper to adopt feeder metering in metropolitan areas (such as London, Merseyside and Glasgow) compared with rural areas.

Lessons from 25 years ago – 3 *[show slide 19]*

The Price Commission also reported that “LEB has told us that its particular distribution system (which supplies a very high proportion of low voltage consumers) and its deliberate policy to operate equipment at high load levels” – *i.e. to sweat those assets* – “contribute to this, but it is also aware that it has a particular problem with theft of electricity, and is giving a high priority to combating it.”

Unfortunately, it is unclear whether the effects of this initiative [in 1979] were long lasting.

Lessons from 25 years ago – 4 *[show slide 20]*

It's also clear from the Price Commission work that SEB – *uniquely* – had the system loss figures that do not vary at all, unlike all the other Area Boards (ABs)!

However, the 1979 Price Commission Report did not address this feature.

One credible explanation is that the loss figures were *assumed* to be constant, in the same way as Line Loss Factors (LLFs) are *assumed* to be constant now! However, it would appear that any error in this losses assumption was “pushed” onto the calculation of the “unbilled units”, which was published in the Annual Reports. [Please note that the “unbilled units” in this instance would in fact be billed as part of “sales” in the following quarter, and are often known as “yet-to-be-billed units” for this reason; confusingly, some people use the term “unbilled units” to mean “never-to-be-billed units”, of which theft is an example!] Subsequently, it would seem that the error in the unbilled units caused this assumption to be re-reviewed, by the imposition of a “once for all” correction.

There is no such mechanism for correcting LLFs, with the present electricity trading settlement arrangements!

Hence this constructive Response, recommending a specific set of technical innovations, to clean up data quality, including theft, etc, in order to improve value for consumers.

Lessons from 25 years ago – 5 *[show slide 21]*

At the time, the rationale used by the Electricity Industry was that there were essentially two basic “unknowns” (a) system losses – *including theft of electricity* – and also (b) the “unbilled units” [UBU], which is the correction which should be applied to the Annual “Billed” Units, in order to derive the Annual “Sold” units. One technique was to use two simultaneous equations to solve for two unknowns. The Price Commission compared the Annual “Sold” units with the total Annual Purchased units, for System Losses.

Full figures for system losses were shown in slides 17 and 18. They seem to vary with time and location, in different ways in this sample, indicating a Risk Management issue.

Sherlock Holmes Elimination Approach *[show slide 22]*

The famous saying “*When you have eliminated the impossible, whatever remains, however improbable, must be the truth*” is one way of making progress, and was utilised by...

Patent GB2309086, Utility Metering Arrangement *[show slide 23]*

Patent GB2309086 ‘Utility Metering Arrangement’ which essentially allows a meter reading to be “frozen” at the end date of an Accounting Period, by transferring the recording of the energy used from one register to another, for cyclically read meters. This allows the ‘end’ reading to be held. This held reading would be objective.

Furthermore, if the “date switch” operated at the end of each financial year, it would represent an actual “Annual Advance”, regardless of the arrival time of the meter reader during the year.

It would also overcome the vagaries introduced by having a customer entering a meter reading (as a result of the customer being “out” when the meter reader called) on a card which, if the card is read by the meter reader on a subsequent visit might be unfortunately entered as a “true” meter reader meter reading, with the concomitant problem of a subsequently incorrectly assessed Annual Advance (AA) figure going into settlement!

Theft today and GSPGCF *[show slide 24]*

This diagram shows the current set up, with blocks representing the theoretical losses “announced in advance” implied by a DNO’s LLFs (Line Loss Factor figures).

The GCF (Group Correction Factor) boxes represent how discrepancies between “in advance” and “after the event” LLFs are accommodated, by what is known as a “smearing process” within the industry. “Smearing” essentially means that the ‘correction’ is equally forced across all customers in the ‘group’ affected, and is an arbitrary ‘tidy up’ process which can only be justified if the discrepancy were small. It is the thesis of this Response that the “£100 million pounds a year” or so losses due to theft – which are only a part of the current discrepancies in view Elexon’s qualified Audit – are NOT small.

The alert reader will note that NHH customers, who are mainly either domestic consumers, or are small businesses, are hit with ALL the correction. This is even if the larger HH consumers are doing the theft. Having such a cross-subsidy – which may be large – funded by voters seems to us to be unacceptable!

In addition, the “smearing process” means that individual Suppliers do not incur the whole cost of theft by any of their individual customers; surely this is contrary to the “Supplier Hub” principle?

Proposed Approach for Elexon to Challenge Participants *[show slide 25]*

The rationale of the Proposed Approach for Elexon to Challenge Participants is essentially to break each of the hypothetical LLF boxes – of the previous slide – into finite elements which match the reality of the DNO’s Distribution system.

Every year, etc, determine overall Losses for each element of each entire distribution voltage level, and not just for customers connected to that voltage level, for each separate GSP Group.

For extra precision, use the Utility Metering Arrangement of Patent GB2309086, in order to obtain precise end period meter readings, in order to produce a trust worthy figure for the overall losses on each element. We believe that this extra “date” precision is essential, due to the need to accurately measure differences between energy inputs and energy outputs. Obviously, the installation of these new meters and ‘date switches’ could either (1) be incorporated into the normal meter re-certification replacement cycle, or (2) could be focussed on to feeders with difficulties.

Refinements could be made to reflect switching between Interconnectors, because that energy, which should be subtracted from one finite element of the DNO’s system, should be added by a balancing amount to other parts of the DNO’s system.

As part of Risk Identification, Elexon should challenge the DNO to explain any significant variances that could be out with the agreed Audit materiality.

DNOs could in turn challenge Suppliers to contribute any appropriate explanation. Suppliers could, if they wished, instruct Revenue Protection teams to investigate “their” MPANs.

And then, as part of Risk Management, Elexon could initiate the work of Revenue Protection Teams onto those feeders that showed unexplained losses. Obviously, any Supplier which had not earlier sent out an appropriate Revenue Protection Team to investigate “their” MPANs, could suffer a slight penalty to reflect delay and extra costs, should “their” MPANs be at fault, as part of the Supplier Hub concept.

Proposed Elexon Oversight Example - 1 *[show slide 26]*

The rationale of this slide is to show how Revenue Protection Team work might be prioritised, by RED coding.

Ofgem, it is suggested, should arrange positive incentives so that Data Retrievers could be encouraged to **find “good leads” for Revenue Protection staff to positively determine an illegal situation, or for metering staff to determine other anomalies.** Currently there does not seem to be any such bounty, with inevitable poor performance, perhaps.

Proposed Elexon Oversight Example - 2 *[show slide 27]*

The rationale of this slide is to show how Revenue Protection Team work might attempt to screen out potential false allegations of theft, by GREEN coding.

Alternative Explanations, Including Mistakes, e.g. on UMS *[show slide 28]*

The rationale of this slide is to recapitulate the important lesson that not all “exceptions” are necessarily due to theft. It is believed that there are many mistakes resulting in poor data quality, which has resulted in a qualified audit for Elexon, and which may also undermine the performance – and reputation – of any new Distribution Price Controls produced by Ofgem.

Sherlock Holmes Alternatives Approach *[show slide 29]*

The famous saying “*One should always look for a possible alternative and provide against it. It is the first rule of criminal investigation*” is a very good summary of the attitude of this Response. It is hoped that it may be employed to change the sadly perceived stance of: “*Whilst most of the responsibility to improve data quality lay with Suppliers, not all of whom appeared capable of, or interested in, taking remedial action*”... which we saw at the start of this Response!

Initial Cost Benefit Analysis of adopting Patent GB2309086 *[show slide 30]*

The rationale of this slide is to show what a very good bargain it would be to serve the interests of consumers – in terms of both the charges they pay and the improved quality of service they would receive – if Elexon bought Patent GB2309086 for a one off cost of £2m, because this would amount to an expense of only 10p per NHH customer.

We believe that this extra “date” precision is essential, due to the need to accurately measure differences between energy inputs and energy outputs.

A 10p expense equates to 1p pa per NHH customer, as compared with the cost of theft currently suffered that amounts to perhaps £5 pa per NHH customer, or could be even £16 pa per NHH customer!

In order to get a better idea of potential benefits, it may be that the equipment cost to be Patent GB2309086 compliant might be around £10 extra, compared with “now”, i.e. equivalent to £1 pa; adding in the above cost of the Patent would make that £1.01 pa. Regarding the costs of analysis by the DNO for the “list” of MPANs each feeder, although one could argue that the DNOs could be doing this anyway as part of sound network management, these could be of a one off nature, with the costs of updating diminishing by going up “the learning curve”, and should not amount to more than £1 per customer pa, possibly a lot less. Equally, Elexon’s computing etc costs should again not amount to more than £1 per customer pa, and possibly a lot less too. Total Costs of £3.01 pa compare favourably against theft when estimated as £5 pa per NHH customer, and very favourably when compared with theft when estimated as £16 pa per NHH customer – the upper estimate of the United Kingdom Revenue Protection Association!

Obviously, once the possibility of certainty of detection is established, the threat of theft becoming more ingrained should be diminished, there would be improved market performance, and a result of better value for honest customers!

NB: The reason for proposing that Elexon “purchase” Patent GB2309086, titled “Utility Metering Arrangement”, is that we believe that this would be the overall cheapest way to implement this proposal, and to give better value for honest customers; for example, if a number of meter manufacturers were to “buy” this Patent separately, then it is believed that the eventual out-turn cost per customer would be higher, in order to recover the extra costs of the extra “purchasing” organisations.

Why do this NOW? *[show slide 31]*

The reason why Ofgem and Elexon must take action now is that a new energy feature is now being introduced into Distribution systems.

Distributed Generation – encouraged by the UK Government White Paper in order to reduce green house gas emissions – will radically alter the way local electricity distribution networks perform, including their overall losses (Ofgem 145/04, 3.35 refers).

Unless pro-active oversight accurate measurement is in place, focused analysis and management cannot happen, with increasing criticism of Elexon!

Finally, to quote Winston Churchill: “Action this day”.

Please.

Response to Ofgem 145/04, 3.35 & 5.18, etc, by:

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06 August 2004

**“Elexon, Sherlock Holmes, and
the millions of pounds of Theft
of Electricity from Settlement.”**

Theft of £ m's Electricity from Settlement SVA?

**Elexon's Response to its latest
Auditor's 'Qualified Audit' Report:**

***“ELEXON ... to address the root
causes of the errors in the SVA
(Supplier Volume Allocation)
Market ...”*** BSCP Minutes Jan 2004

Elexon's View of (SVA) Qualified Audit Report

“... Whilst most of the responsibility to improve data quality lay with Suppliers, not all of whom appeared capable of, or interested in, taking remedial action, there were steps that ELEXON and PAB could initiate.”

Elexon's Key Issues for data quality used for Settlement (1):

- Inadequate Supplier Hub Management.
- Ineffective Performance Assurance.
- Inaccurate recording of [HH and NHH] Metering Systems' Energisation Statuses.
- Erroneous energy consumption values [of EACs and AAs] both for metered ...

Elexon's Key Issues for data quality used for Settlement (2):

- ... and for Unmetered Supplies [NHH].
- Inadequate clearance of exceptions, Exception Reports, and other backlogs in the [NHH] market.

But are these “issues” tackling the unrecorded connections problem?

BoxTen's View of Elexon's Response to Qualified Audit Report

“No. ELEXON seems to address data quality only for currently registered Metering Points, so this work might turn out to be a false security. Mistakes (e.g. unrecorded Metering Points) & theft seem to be ignored.”

Ignore theft of electricity?

CONTEXT (Ofgem 85/04):

- Ofgem assumes “*Electricity stolen between £44m & £132m, with Gas stolen as £37m.*”
- UKRPA considers “*Electricity stolen range is between £220m and £330m*” each year.
 - In comparison: Total Insured Theft Claims paid in 2000 = £740m (ABI, ISSN 13540734).

Theft of electricity £ m's - INADEQUATE AUDIT?

Another cause of poor Data Quality (1 of 3)?

- *Some theft occurs from Distributors' wires.*
- *But only Suppliers, not Distributors, trade.*
- *So Suppliers are responsible for the meter data, including readings, for Distributors.*
 - *But if a "Meter Point" is missing, either through theft or mistake, how can we know?*

Theft of electricity £ m's - INADEQUATE AUDIT?

Another cause of poor Data Quality (2 of 3)?

- *Unless we look at the total situation on a local Distributor's feeder wire, we can't.*
- *Question: How could Elexon take this "total situation" approach to challenge the Suppliers that their data is complete, and also covers ALL the possible meter points?*

Theft of electricity £ m's - INADEQUATE AUDIT?

Another cause of poor Data Quality (3 of 3)?

- *Answer: By challenging the assumed LLFs provided 'in advance' by the local DNO,*
- *And by doing 'after the event' analyses to reveal any significant exceptions, as part of NEW 'Validation Processes' (VPs).*
- *NB Butler revealed that 'Group Think' led to key VPs missing from 'Intelligence' recently!*

Theft of electricity £ m's - INADEQUATE RULES?

How to make Progress (1 of 2)?

- *The “total situation” approach assumes that Ofgem etc new ‘rules’ would nominate a Supplier that would be responsible for each previously unrecorded “Meter Point” [due to theft or mistakes], e.g. the ‘Supplier of Last Resort’, as there was no ‘other Supplier’.*

Theft of electricity £ m's - INADEQUATE RULES?

How to make Progress (2 of 2)?

- *The “total situation” approach also assumes that Ofgem etc ‘rules’ would now be changed to support the ‘legalistic’ stance of Distributors, i.e that DNOs do NOT trade electricity. So Ofgem should confirm that there need be no DNO ‘Section 6’ schemes.*

Theft of electricity £ m's - INADEQUATE RULES?

Why clarify RULES now?

If Ofgem does not believe the 'rules' should now be changed as indicated, then there may be uncertainty in the development of revised price controls for the DNOs (para 1.10 of 145/04); for minimal change, Ofgem should clarify. Elexon could then progress.

Theft of electricity £ m's – PROGRESS BY ELEXON

What could DNOs do to help Elexon? (1)

- *If DNOs, in line with para 5.18 etc of Ofgem 145/04, had suitable IFl funding to provide Elexon with (1) a list of known meter points on each 'finite element' feeder wire, and (2) assistance to meter the electricity inputs onto each feeder wire, then Elexon could ...*

Theft of electricity £ m's – PROGRESS BY ELEXON

What could DNOs do to help Elexon? (2)

- *... with some development work, provide a computer analysis to determine the annual electricity entering and leaving each feeder.*
- *This would allow Elexon to identify feeders with unduly high energy losses, and to challenge the DNO (who could in turn ...*

Theft of electricity £ m's – PROGRESS BY ELEXON

What should DNOs do to help Elexon? (3)

- *... challenge the known Suppliers on that feeder) to explain some – or all – of the reason(s) for the unexpected variances.*
- *This would take forward the ADRS work of SVG /38/480 & /40/011, which lack history.*
 - *Here are some lessons from the past ...*

Theft 25 years ago: System Losses (1)

TABLE 3.6 Percentage of electricity purchased by the ABs which is not re-sold, 1976-77 to 1978-79

<i>Year ended</i> <i>31 March</i>	1977 %	1978 %	1979 %	Percentage Increase/(decrease) 1977 - 79
LEB	10.05	11.15	10.90	8.5
SEEB	6.58	6.56	6.37	(3.2)
SEB	6.40	6.40	6.40	-
SWEB	7.19	7.07	6.93	(3.6)
EEB	7.50	7.70	7.60	1.3
EMEB	5.79	5.86	5.70	(1.6)
MEB	6.50	6.04	5.79	(10.9)
SWaEB	5.95	7.20	6.43	8.1
MANWEB	6.89	7.65	8.00	16.1
YEB	4.47	4.43	4.65	4.0
NEEB	4.94	4.85	4.84	(2.0)
NORWEB	6.40	6.70	6.90	7.8

Source: Price Commission study.

Ref: HC 132, 4th July 1979, "Area Electricity Boards - Electricity Prices and Certain Allied Charges".

- “A large part of these losses arises from the energy – a ‘pumping charge’ – required to drive electricity through the the distribution system to the consumer.”
- ABs said “not possible to estimate proportion of losses” due to pumping charge.

Theft 25 years ago: System Losses (2)

TABLE 3.6 Percentage of electricity purchased by the ABs which is not re-sold, 1976-77 to 1978-79

<i>Year ended</i> <i>31 March</i>	<i>1977</i> <i>%</i>	<i>1978</i> <i>%</i>	<i>1979</i> <i>%</i>	<i>Percentage</i> <i>Increase/(decrease)</i> <i>1977 - 79</i>
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Source: Price Commission study.

Ref: HC 132, 4th July 1979, "Area Electricity Boards - Electricity Prices and Certain Allied Charges".

- “The other contributors to the losses are even more difficult to quantify, but one of increasing concern (particularly in metropoltn. areas) is the theft of electricity.”
- Some ABs indicated “such [theft] losses were unlikely to exceed 1% of sales”.

Theft 25 years ago: System Losses (3)

Part TABLE Percentage of electricity purchased by the ABs which is not re-sold, 1976-77 to 1978-79

<i>Year ended</i>	<i>1977</i>	<i>1978</i>	<i>1979</i>	<i>Percentage</i>
<i>31 March</i>	<i>%</i>	<i>%</i>	<i>%</i>	<i>Increase/(decrease)</i>
				<i>1977 - 79</i>
LEB (DNO = 12)	10.05	11.15	10.90	8.5
<u>MEMO ABs:</u>				
HIGH	10.05	11.15	10.90	16.1
LOW	4.47	4.43	4.65	(10.9)

- “From Table 3.6 it is clear that LEB has the highest loss of all the ABs.”
- “LEB has told us that its particular distribution system (which supplies a very high proportion of low voltage consumers) and its deliberate policy to operate equipment at high load levels” – *i.e. to sweat those assets* – “contribute to this, but it is also aware that it has a particular problem with theft of electricity, and is giving a high priority to combatting it.”

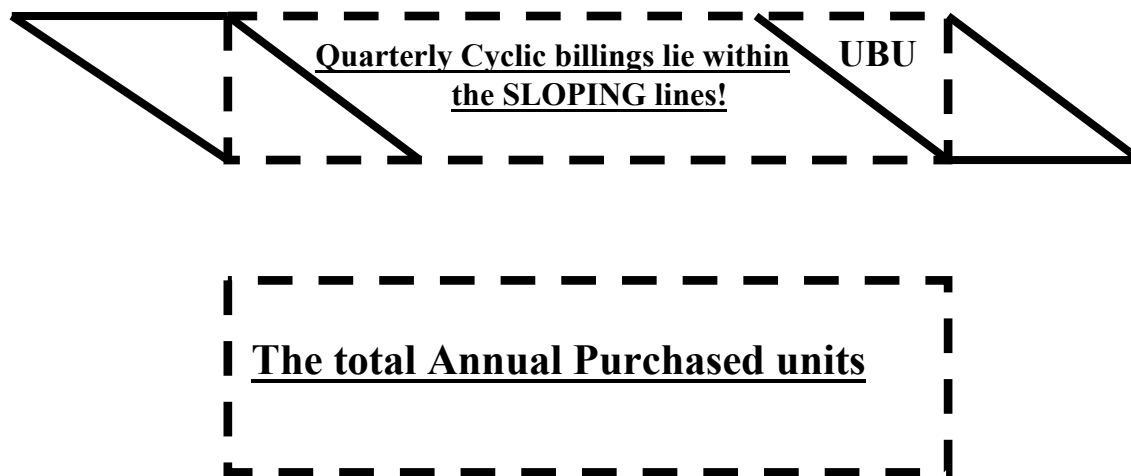
Theft 25 years ago: System Losses (4)

Part TABLE Percentage of electricity purchased by the ABs which is not re-sold, 1976-77 to 1978-79

<i>Year ended</i>	<i>1977</i>	<i>1978</i>	<i>1979</i>	<i>Percentage</i>
<i>31 March</i>	<i>%</i>	<i>%</i>	<i>%</i>	<i>Increase/(decrease)</i>
				<i>1977 - 79</i>
SEB	6.40	6.40	6.40	–
(DNO = 20)				
<u>MEMO ABs:</u>				
HIGH	10.05	11.15	10.90	<i>16.1</i>
LOW	4.47	4.43	4.65	<i>(10.9)</i>

- From Table 3.6 it's also clear that SEB – *uniquely* – has the system loss figures which do not vary at all, unlike all the other Area Boards (ABs)!
- This feature was not addressed by the 1979 Price Commission Report.
- One credible explanation is that the loss figures were **assumed** to be constant, in the same way as Line Loss Factors (LLFs) are **assumed** to be constant now!
- However, it would appear that any error in this losses assumption was “pushed” onto the calculation of the “unbilled units”, which was published in the Annual Reports. Subsequently, it would seem that the error in the unbilled units caused this assumption to be re-reviewed. **There is no such mechanism for LLFs!**

Theft 25 years ago: Unbilled Units (5)



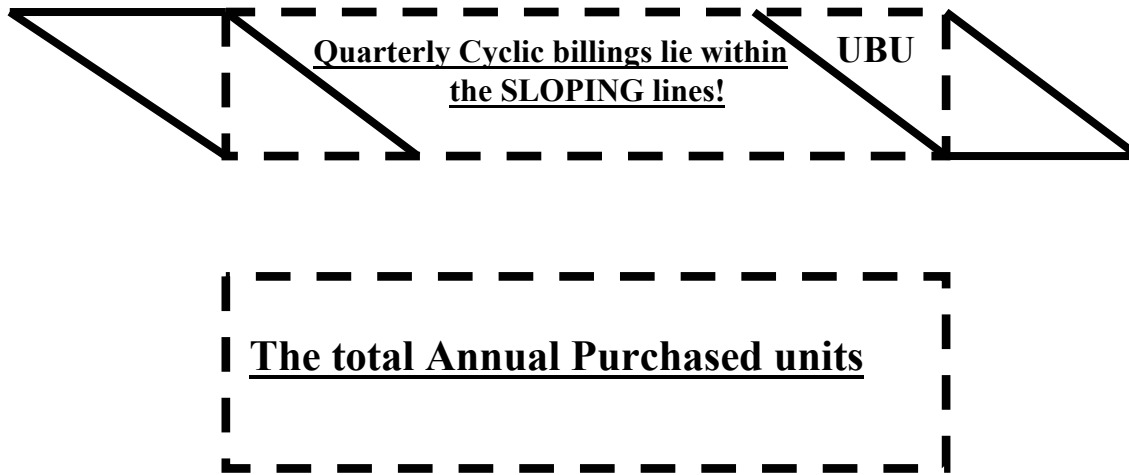
- SEB was faced with two basic “unknowns” (a) system losses – *including theft of electricity* – and also (b) the “unbilled units” [UBU], which is the correction which should be applied to the Annual “Billed” Units, in order to derive the Annual “Sold” units.
- The Annual “Sold” units were compared with the total Annual Purchased units by the Price Commission, for System Losses.
- The above diagrams show the Annual “Sold” units as the smaller rectangle with dashed lines, and the total Annual Purchased units as the larger rectangle with dashed lines. The difference = system losses.

Theft of £ m's Electricity from Settlement

Sherlock Holmes:

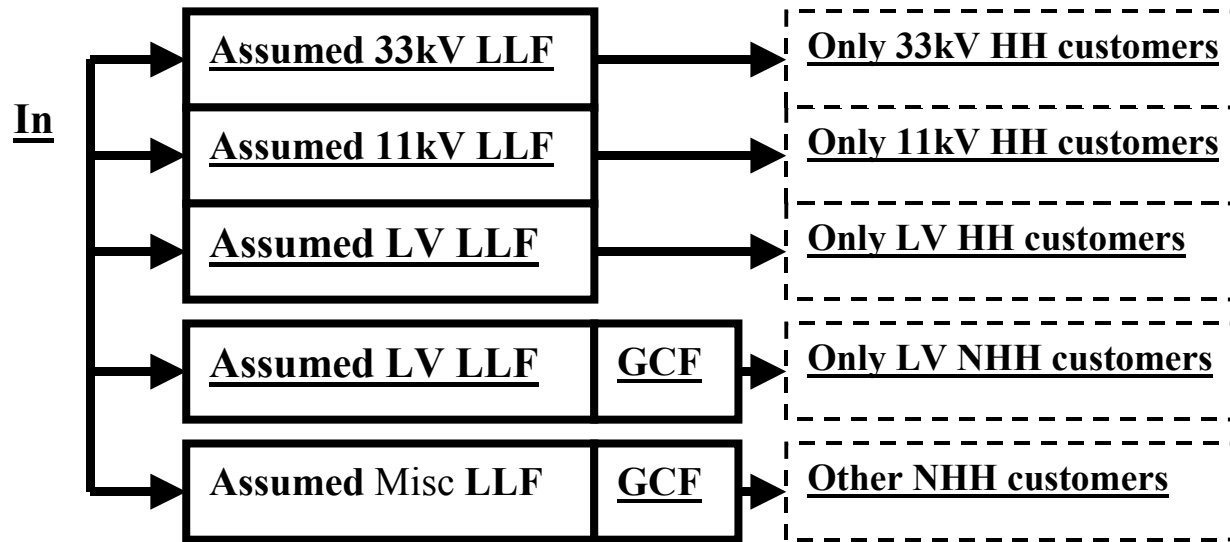
“When you have eliminated the impossible, whatever remains, however improbable, must be the truth.”

Patent GB2309086



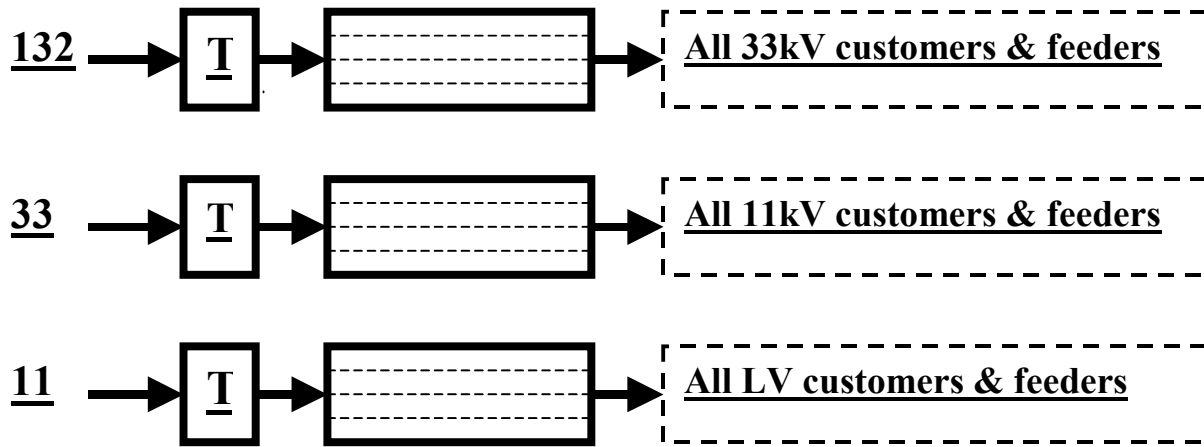
- Patent GB2309086 ‘Utility Metering Arrangement’ essentially allows a meter reading to be “frozen” at the end date of an Accounting Period, by transferring the recording of the energy used from one register to another, for cyclically read meters.
- This means that the area of the previously alleged “unbilled units” – the triangular area marked [UBU] – can be determined precisely.
- Consequently, the “other unknown”, the system losses – *including theft of electricity*, can be determined precisely. From Sherlock Holmes, if the pumping charge etc is eliminated, then the theft element is the rest!

Theft today: Customers' SPAM & GSPGCF



- The Customer based SPAM [Supplier Purchase Assumed Matrix] approach in BoxTen's opinion uses Assumed LLF figures.
- If the Assumed LLF figures include Theft, won't any discrepancy due to Theft be further forgotten due to the false security of the Grid Supply Point Group Correction Factor [GSP GCF]?
- How can one justify the asymmetry using a GSP GCF on LV NHH, but not LV HH, if there were no NHH "profiling" error?

Proposed Elexon Annual Finite Element Oversight approach



- Every year, etc, determine overall Losses for each element of each entire distribution voltage level, & not just for customers connected to that voltage level, for each separate GSP Group. For extra precision, use the Utility Metering Arrangement of Patent GB2309086.
- Make allowances for interconnectors, which would add and/or subtract equally, from each respective element. Challenge DNOs and Suppliers.
- Focus the work of Revenue Protection Teams onto those feeders which show unexplained high losses; avoid the hit/miss approach of just DRs.

Proposed Elexon Annual Finite Element Oversight example (1)

- Let us propose that a **Work Programme** is set up, and the annual Elexon analysis is done in a DNO, & that a League Table is drawn up, for each element of of a distribution voltage level, of the calculated overall Losses, with the following results for a comparable group of feeders:
 - 20 Feeders show 10% losses so code these GREEN
 - 20 Feeders show 15% losses so code these YELLOW
 - 20 Feeders show 25% losses so code these **RED** !!
- **ACTION: Ofgem should enable a framework to be set up so that there should be rewards on RED feeders for Data Retrievers, etc, for finding “good leads” for Revenue Protection staff to positively determine an illegal situation, or for metering staff to determine other anomalies.**

Proposed Elexon Annual Finite Element Oversight example (2)

- Another key aspect of this Work Programme, with the annual analysis is done for a DNO, and a League Table of the calculated overall Losses, is that the results for a comparable group of feeders could show:
 - 20 Feeders show 10% losses coded GREEN,
 - **Here the degree of comparable low overall losses - on a GREEN classified feeder - would indicate that the risk of theft is unlikely!**
 - ***This important prioritising feature could be used to screen out some of the inevitable false allegations of theft, against honest people!***
 - **NB: It's vital that Justice is seen to be balanced.**

Summary

- Not all the “exceptions” would necessarily be due to theft. There may be alternatives, and active Risk Management will:

L I M M I T

Losses/Interconnectors/Mistakes/Mis-
Information/Theft

- Elexon to examine each source of variance.

Theft of £ m's Electricity from Settlement

SUM-UP Sherlock Holmes:

“One should always look for a possible alternative and provide against it. It is the first rule of criminal investigation.”

Theft of £ m's Electricity – Initial Cost Benefit Analysis

- Estimated Elexon Audit Cost = £2m each year
- *Est. Annual Theft of Electricity = £100m (Ofgem Av) or £330 (UKRPA max), and probably rising.*
- *Est. NHH customers = 20 million*
- *Est. theft / customer = £5 to £16 pa, & probably rising.*
- If Elexon bought Patent GB2309086 for a one off cost of £2m, this would amount to only 10p per NHH customer.
- *A 10p expense equates to 1p pa per NHH customer, &*
- *Leaves a significant headroom for the other costs of metering and analysis. NB some of the enforcement costs should be recoverable from the thieves!*

As 'Validation Processes' are lacking:

Do this NOW, it's later than you think!

- ***The reason why Ofgem and Elexon must take action now is that a new energy feature is now being introduced into Distribution systems.***
- ***Distributed Generation – encouraged by UK Government in order to reduce green house gas emissions – will radically alter the way local electricity distribution networks perform, including their overall losses (Ofgem 145/04, 3.35 refers).***
- ***Unless pro-active oversight measurement is in place, focused analysis and management cannot happen, with increasing criticism of Elexon!***