

# Report of the Theft Incentive Scheme Development Group – Final Proposals

June 2007

## Summary

This report is the result of the work of the Theft Incentive Scheme Development Group established at the end of August 2006 under the auspices of the Energy Retail Association (ERA) and the Energy Networks Association (ENA). Both ENA and ERA have agreed the recommendations of the report and its submission to Ofgem.

The modelling work undertaken by the group confirms that the existing arrangements in gas and electricity do not provide economic incentives for optimal behaviour by industry participants.

The group has considered and recommends a package of measures that it believes will remove the present economic disincentives and encourage the investigation, detection and prevention of the theft of energy:

- Reasonable Endeavours Scheme – both electricity and gas. A scheme already exists for gas; the proposal is to extend that scheme and to introduce a similar scheme for electricity. This proposal will allow Suppliers to recover a proportion of their costs where they are unable to do so from the customer.
- Supplier Energy Theft Schemes (SETS) for both electricity and gas. The aim of the schemes is to compare Supplier revenue protection activity, based on their percentage market share of theft investigated, and to reward them according to performance. They will be phased in order to put in place a positive and robust framework for Suppliers to develop best practice processes for dealing with theft and a means of comparing and further refining those processes. Phase one, recommended to be a twelve month period, will involve gathering comprehensive data on companies' activities in dealing with theft and using that to design the second phase. It is anticipated that phase two would include a rolling twelve-month comparative measure of performance (cases found and investigated) based on market share, together with financial incentives.
- For electricity Suppliers and Distribution Network Operators (DNOs) only, a Losses Incentive Scheme. The working assumption is that the scheme would compare the number of stolen units entered into settlement by each Supplier with a threshold amount calculated using a Supplier's non-half hourly (NHH) market share percentage and the estimated level of detected theft inherent in the DNO's losses target. Payments would be made between Suppliers and DNOs depending on the number of found units going into settlement. The scheme could be introduced for all Suppliers and Distributors or based on bilateral agreements between Distributors and Suppliers. In view of the complexity and detail of such a scheme, it is recommended that it be subject to a twelve-month development period. Following consultation the most appropriate method for ensuring that units go through settlement would be developed.

The report describes a high-level implementation plan for the schemes. However, the first stage will be for the recommendations contained within the report to be consulted on by Ofgem in 2007.

The development of the schemes and their implementation and operation will be tied in with identifying and spreading best practice. The group will bring forward separate recommendations for establishing an industry expert group with defined terms of reference to deal with this activity. It recommends that following the initial phases the incentive schemes be reviewed periodically to assess the level of behavioural change they have brought about; and has suggested data items required both to support the administration of the proposed schemes, to monitor their impact and effectiveness and to fulfil Ofgem's data gathering requirements.

The group also believes that the measures described for the Reasonable Endeavours Scheme would provide a sensible approach for Independent Gas Transporters (IGTs) and Independent Network Operators (IDNOs) and therefore recommends that they should also be considered for development in these markets.

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## 1. Introduction

- 1.1 This report is the result of the work of the Theft Incentive Scheme Development Group set up on the 30<sup>th</sup> August 2006 under the auspices of the Energy Retail Association (ERA) and the Energy Networks Association (ENA). The group comprised representatives from Gas Transporters (GTs), Distribution Network Operators (DNOs) and Suppliers as well as Ofgem, xoserve, the ERA, ENA and the UK Revenue Protection Association (please see Appendix 8 for the names of representatives).
- 1.2 The terms of reference for the group are set out in Appendix 1 of this document. From the outset it was agreed that its discussions and recommendations would be in the context of the present market framework. This report continues on from previous work undertaken by the ERA/ENA Theft of Energy Working Groups.

### Previous work

- 1.3 The Theft of Energy Working Groups published their report in April 2006. The groups were established following Ofgem consultations about the theft of energy. Responses to the consultations had indicated some unease concerning the current revenue protection arrangements but no unanimity on the solutions that could be applied. The groups' purpose therefore was to understand the current arrangements and to identify shortcomings before considering whether changes were needed to the regulatory framework and to improve economic incentives.
- 1.4 The report agreed definitions of theft and three associated terms used in Supply Licences – 'detect', 'prevent' and 'investigate'. These are summarised below.
- **'Detect'** means to seek to identify suspected or actual instances of theft. This may be done primarily through:
    - field staff who attend consumers' premises recognising theft and reporting it;
    - receiving and recording reports from other sources; and
    - analysis highlighting unusual consumption patterns.Detection may be 'accidental' – arising from routine visits for other purposes - or it may also be 'proactive'.
  - **'Investigate'** means to follow up suspected or actual theft detected, taking such steps as necessary to remove any danger, secure any evidence, assess the extent of energy stolen and advise the customer of consequential action.
  - **'Prevent'** means to stop continuation of theft detected and confirmed by investigation. Effective detection and investigation can infer a level of prevention but generally it may involve reasonable measures to deter theft

from taking place in the first place, such as publicity as to the dangers of and penalties for interference.

- 1.5 One of the group's main conclusions was that whilst the obligation to report suspicions of theft and to ensure that they are followed up through appropriate investigation, detection and remedy rests primarily with Suppliers, it is also the registered Supplier, particularly, who has the most to lose if theft is discovered. In other words, the present arrangements for dealing with theft of electricity and gas do not provide economic reasons for optimal behaviour by industry participants. The report reviewed the present obligations on Suppliers, Distributors and Transporters and described potential schemes that could incentivise industry parties to more efficiently and effectively prevent, detect and investigate theft.

The full report may be accessed on

[www.energy-retail.org.uk/papers/ElectricityandGasReportFinalVersionpdf.pdf](http://www.energy-retail.org.uk/papers/ElectricityandGasReportFinalVersionpdf.pdf)  
and

<http://www.energynetworks.org/spring/regulation/pdfs/ElectricityandGasReportFinalVersionpdf.pdf>

#### **The new report**

- 1.6 This new report takes the work further forward by:
- highlighting the barriers to Industry participants being commercially incentivised to investigate, detect and prevent the theft of energy;
  - providing details of the proposals the group believes will incentivise industry to investigate, detect and prevent the theft of energy;
  - describing the modelling undertaken to quantify the current impacts on individual stakeholders and to illustrate the benefits of introducing the incentive scheme proposals; and
  - providing guidance as to the nature and content of future theft data gathering requirements.
- 1.7 The objective of the work has been to propose enduring arrangements that would efficiently and effectively ensure the prevention, detection and investigation of the theft of energy. If successful, the cost burden that falls on the honest customer would be reduced and unsafe practices (such as interference with meters, live cables and pipes) discouraged.
- 1.8 This document covers incentive scheme proposals for both the gas and electricity markets. Therefore, for ease, the common term 'theft' is used to replace the different terminology used in those markets. 'Theft' is a convenient term to cover interference with a gas or electricity meter and/or associated supply equipment to avoid or reduce the true payment due for energy supplied.
- 1.9 The recommendations contained within this report will be consulted on by Ofgem later in 2007.

## 2. Impact of theft

- 2.1 Theft of energy has critical safety implications; our work shows that it also has an adverse financial impact on a number of stakeholders. This has been demonstrated through the outputs of the modelling work and is also confirmed by additional analysis of the operation of the present arrangements. The group has developed further the simplified models produced by the Theft of Energy Working Groups (described in their report) to ensure they are flexible enough to test the effects of alternative proposals and variables.
- 2.2 Appendix 2 provides full details of the modelling work conducted on behalf of the group. In summary: there are two separate models, one each for gas and electricity. The basic principles and approach applied within the models are the same for both fuels but the market theft data and assumptions that are used in them will differ. Where possible industry agreed data have been used; where these were not available, the group used values it considered to be the most appropriate.
- 2.3 The models have identified the net present value of an individual case of theft going undetected for a period of nine years, for each of the impacted stakeholders in the electricity and gas markets. These impacts are summarised below and the colour coding system showing losers (red) and winners (green) clearly indicates where the impact of theft falls. The models further demonstrate how the incentive schemes proposed in this report allow stakeholders to be placed in a more favourable position than at present when they discover and investigate cases of theft.

### Gas Market

	Theft not found - impact of 1 case of theft being undetected for a period of 9 years
Thief (direct)	£ 3,251
Supplier	-£ 1,201
RBD Shippers	-£ 1,335
Other Society Members	£ -
Total Supplier/Society Impact	-£ 2,537
GDN	£ 677

### Electricity Market

	Theft not found - impact of 1 case of theft being undetected for a period of 9 years
Thief	£ 2,322
Supplier	-£ 668
NHH excluding Supplier	-£ 624
HH Electric Society	£ 346
Total Supplier/Society Impact	-£ 946
DNO	-£ 925

### **Issues contributing to the financial impact on participants**

- 2.4 The main barriers to participants being commercially incentivised to investigate, detect and prevent the theft of energy are explained in this section. The theft incentive schemes proposed in the report have been developed to help overcome these barriers.

### **Cost recovery**

- 2.5 Although arrangements are currently in place in the gas industry to mitigate the costs of investigating theft, it is considered that the current Reasonable Endeavours<sup>1</sup> Scheme process is too administratively burdensome and costly for the value shippers can claim in return for investigating theft of gas cases and inadequately reimburses them for the costs they have incurred. In some cases the payments are not sufficient to cover investigation costs or even the administrative costs associated with making the claim.
- 2.6 There is no equivalent scheme in electricity and therefore Suppliers will bear the full costs if they cannot be recovered from the party responsible for the theft.

### **Cost apportionment**

- 2.7 Current gas theft statistics<sup>2</sup> may indicate varying levels of Supplier activity in dealing with theft. The future analysis suggested by the group as part of the schemes will help to identify any reasons for the differences and develop best practice.
- 2.8 Shippers can submit claims under the Reasonable Endeavours Scheme to xoserve to recover some costs (excluding energy costs) if they cannot obtain payment from the responsible party. Gas Transporters are neutral to the impact of theft because they will recover their charges through Reconciliation by Difference (RbD).<sup>3</sup>
- 2.9 Electricity Suppliers are obliged by their licences to report suspicions of theft and to ensure that they are followed up through appropriate investigation, detection and remedy. This is usually delivered on behalf of the Supplier by revenue protection services (RPSs) – provided either by DNOs, Suppliers or specialist agencies. Electricity theft is not reported to a central body as in gas, so the level of activity by different Suppliers is not as visible.

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<sup>1</sup> Gas Transporters have licence obligations to administer the Reasonable Endeavours Scheme. The scheme allows for any un-recovered costs associated with the investigation of theft to be paid to the Shipper.

<sup>2</sup> On a monthly basis xoserve (central reporting agency) produces detailed statistics on cases of theft of gas, which are issued to all Shippers and Ofgem (those issued to Shippers are anonymised). The statistics record: the number of allegations received highlighting Shippers' performance in clearing them; the number cleared as valid and invalid; and the number of allegations closed automatically because no response has been received from the Supplier by xoserve.



- 2.10 Given that theft impacts on all Suppliers (via the settlement systems) the costs and benefits of theft investigation work may not be correctly apportioned or borne fairly amongst market players.

### **Settlement issues**

- 2.11 DNOs are able to bill for the extra delivered volumes when Suppliers enter previously unrecorded consumption into settlement. The identification of evidence of unrecorded consumption also triggers a reassessment of wholesale market balancing and settlement, putting costs back with the registered Supplier and removing the previous burden on other Suppliers. This leaves the registered Supplier worse off, since its direct costs have increased.
- 2.12 DNOs are also subject to a powerful incentive to reduce electrical losses. Theft is an important element of non-technical losses (along with, for example, settlement and registration errors). For the current 5-year price control period, each DNO has a fixed losses target and the current expectation is that the DNO will be able to keep the benefit of out-performance of this target for five years through the application of a rolling mechanism in the next price control period. The losses incentive rate, and hence the benefit from discovering one previously stolen unit, is 4.8p/kWh in 2004/05 prices.
- 2.13 In gas individual meter point reconciliation is not conducted for Small Supply Points and supply theft is dealt with under the RbD process<sup>3</sup>.

## **3. Group recommendations**

- 3.1 The Theft Incentive Scheme Development Group has evaluated a number of schemes designed to help overcome the issues described above. The economic models indicate that the schemes should ameliorate the financial impact on those participants adversely affected. We recommend that the following schemes be developed as a package:

- Reasonable Endeavours Scheme - both electricity and gas
- Supplier Energy Theft Scheme (SETS) - separate, phased schemes for both electricity and gas
- For electricity Suppliers and DNOs only: a Losses Incentive Scheme.

The schemes are explained in detail in section 4. The Reasonable Endeavours Scheme has been designed for all licensed network operators, including IGTs and IDNOs.

- 3.2 The group also recommends that in most cases the incentive schemes be subject to a phased approach to allow the gathering and evaluation of data

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<sup>3</sup> Reconciliation by Difference (RbD) is the method of apportioning transportation and energy costs within the Small Supply Point (SSP) sector following reconciliation of Large Supply Points' (LSPs') deemed consumption by a meter read. All non-daily metered consumption is in the first instance deemed (based on the AQ) but only that for LSP customers (above 73,200kWh threshold) is reconciled against a meter read. Since all the energy must be paid for, any adjustment in LSPs is balanced by an equal but opposite amount in SSPs.

prior to full implementation. They should also be reviewed regularly to assess the level of behavioural change they have brought about. For example, for the SETS scheme in particular, once there is convergence in the level of participation by market players in theft detection and investigation, the scheme may be seen to have met its objectives. Continuing with this type of scheme beyond that point may encourage perverse incentives and discourage market innovation to prevent theft, such as the implementation of tamperproof/smart metering. Therefore, it may be appropriate for any future incentive schemes to be focused on ‘prevention’.

#### 4. Incentive scheme proposals

4.1 This section covers the schemes recommended by the group. It includes details of how we envisage they will work and their possible pros and cons.

##### Reasonable Endeavours Scheme Scheme summary

4.2 The scheme seeks to remove from Suppliers the disincentives associated with dealing with theft of electricity and gas. It enables Suppliers to recover a proportion of their costs where they are unable to do so from the customer. A Reasonable Endeavours Scheme already exists for gas; the proposal is to enhance that scheme and to introduce a similar scheme for electricity. The working group suggests that schemes be administered by a national agent, with costs passed through by Licensed Network Operators<sup>4</sup> to reflect the activity within their GDN/LDZ and DNO areas.

##### Proposals

4.3 The table below provides further details of how at this stage it is anticipated such a scheme would operate.

	<b>Gas</b>	<b>Electricity</b>
Scheme	Already exists in gas. The proposal is to extend and enhance the existing scheme.	Replicate the gas scheme other than where specified below.
Coverage	<ul style="list-style-type: none"> <li>• National</li> <li>• Domestic</li> <li>• I&amp;C</li> </ul>	<ul style="list-style-type: none"> <li>• National</li> <li>• Non-half hourly</li> </ul>
Rewards	<ul style="list-style-type: none"> <li>• Specify the items of work against which the claims can be made.</li> <li>• Allow the cost of the work, but to a capped level.</li> <li>• Permit claims for the cost of a site visit including where theft is not discovered (but capped to a percentage of the total number of claims).</li> <li>• Claims for transportation charges are not currently included in the Reasonable Endeavours Scheme.</li> </ul>	<ul style="list-style-type: none"> <li>• Specify the items of work against which the claims can be made.</li> <li>• Allow the cost of the work, but to a capped level.</li> <li>• Permit claims for the cost of site visits including where theft is not discovered (but capped to a percentage of the total number of claims).</li> <li>• Allow claims for the cost of units not recoverable from the customer where those units have been entered into settlement. The value of the claim</li> </ul>

<sup>4</sup> Distribution Network Operators, Gas Transporters, Independent Distribution Network Operators and Independent Gas Transporters.

	Work is ongoing to clarify whether claims should be permitted under GTLC7.	could be a percentage of revenue (for example, 90 per cent). Alternatively it could be set by proxy or estimated (p/kWh).
Start	<ul style="list-style-type: none"> <li>• Implement six to nine months after the publication of Ofgem's decision document.</li> <li>• For electricity, a twelve-month trial (because unlike gas this will be a brand new scheme).</li> <li>• Reset payment amounts if necessary at the end of the trial.</li> </ul>	
Monitoring	<ul style="list-style-type: none"> <li>• Individual performance monitored by Agent.</li> <li>• Scheme/claims audited as appropriate (potential for gaming identified).</li> </ul>	
Reporting	<ul style="list-style-type: none"> <li>• Companies to aim to develop reporting systems in time to support the start of phase one - according to a data set agreed with Ofgem.</li> <li>• Monthly returns compiled into quarterly reports and made available to industry participants on an anonymised basis.</li> <li>• Periodic reporting to Ofgem.</li> </ul>	
Governance <sup>5</sup>	To consult on options.	To consult on options.
Operation	<ul style="list-style-type: none"> <li>• Nationally administered by an agency (possibly with an audit function to guard against gaming).</li> <li>• Bids from interested parties.</li> </ul>	

#### Detail - Reasonable Endeavours Scheme

4.4 It is anticipated that a revised Reasonable Endeavours Scheme should reduce or even remove the economic disincentive on Suppliers dealing with cases of theft. The current gas scheme has been reviewed to:

- assess ways to simplify the process – currently seen as too complex;
- indicate how it could be applied to both electricity and gas because similar issues occur in both markets; and
- ensure payments are cost reflective – the scheme should allow Suppliers to recover a proportion of the costs they are unable to recover from the party responsible for the theft.

4.5 See Appendix 3 for details of a draft new gas and electricity Reasonable Endeavours Scheme claim form. Key enhancements to the existing process are as follows:

**Format:** to make the existing process simpler (more manageable and easier to follow) the scheme has been amended to an itemised approach rather than a range of 'packages' as in the existing gas scheme.

#### New claim categories:

- It is proposed that the process should cover the cost of site visits even where there is no theft discovered, or where it is suspected but not possible to prove. These are likely to be low cost claims (up to £30) but the scheme will need to put in place rules to validate them and to set a cap on their number (perhaps set as a proportion of valid claims); this will ensure that claims are made only for visits connected with suspected cases of theft, and that appropriate checks are made prior to the visit to rule out any other reasons for the suspicion.

<sup>5</sup> For governance options please see Appendix 7.

- For electricity only, allow claims for the costs of units not recoverable from the customer. This is because, unlike in gas, identified units entered into settlement are paid for by the Supplier (at imbalance cost) and may not be capable of being recovered from the customer.

**Theft investigation cost data and caps:** it was an aspiration that any recommendation for Reasonable Endeavours Scheme claim levels would be based on actual investigation cost data provided by the Suppliers involved in the group. Most of this information is generally published for electricity, but not for gas. Information gathered to date has been limited (not available or not itemised as services are currently packaged) or costs are across a wide range. In the present gas scheme the amount that can be claimed for each scenario is capped. It would seem sensible to continue with the use of caps, set at such a level so as to encourage the Supplier to seek to recover the costs from the thief in the first instance but at a value worth claiming if they are unsuccessful. Information on existing costs should be gathered during the consultation period in an information request, together with a view on the level of caps in relation to existing costs, prior to setting the caps.

- 4.6 It is anticipated that for both electricity and gas the process will be undertaken by a national agency. The Group considered that the costs of such a scheme could be recovered by the network operators through the GDN/DNO price controls. There is already a precedent for this in the present gas Reasonable Endeavours Scheme, which has been running for some time. Given this, it would be sensible to follow the same model for an electricity scheme. The model also has the significant advantage of not requiring any upfront payments; further, it allows the recovery of costs when they have been crystallised; and shares those costs appropriately and equitably across the whole of the Supplier community. If this method of cost recovery were to be adopted in electricity, DNOs would require a direction from Ofgem that the costs of the scheme would be treated as a miscellaneous pass-through item under paragraph 5 of special condition B2. Statistics will be compiled on a similar basis to the existing gas statistics.

### **Supplier Energy Theft Scheme (SETS)**

#### **Scheme summary**

- 4.7 The aim of the scheme is to compare Supplier revenue protection activity, based on their percentage market share of cases investigated, and to reward them according to performance. The group envisages a financial component: for example, if the percentage of thefts investigated is greater than the market share the Supplier receives a credit; if the percentage is lower the Supplier incurs a debit. The greater the difference between the two figures the larger the debit or credit. It would be self-financing with poorer performers subsidising better performers.
- 4.8 It was agreed that a two-stage approach would be the most effective way to approach this scheme. The first stage (a data gathering stage) would incorporate reporting over a twelve-month period (using an agreed template)

on existing activities based around Suppliers' investigation of theft notifications from a range of sources. It would use these data to set appropriate, relative, rolling twelve-month targets going forward, based on the number of cases identified.

- 4.9 It was recommended that Suppliers continue to meet quarterly during the first twelve months, not only to consider the operating detail and appropriate targets for the following twelve months, but to examine the data and to discuss the activity identified; and to consider qualitative factors and how examples of effective behaviour could be transferred. The meetings would have agreed terms of reference and would consider which information could be shared more widely. There are already examples of similar industry working groups looking at other activities.

### Outline proposals

- 4.10 The table below provides further details of how at this stage it is anticipated such a scheme would operate.

	<b>Gas</b>	<b>Electricity</b>
Coverage	<ul style="list-style-type: none"> <li>National</li> <li>Domestic</li> <li>Non-daily metered I&amp;C</li> </ul>	<ul style="list-style-type: none"> <li>National</li> <li>Non-half hourly</li> </ul>
Start	<ul style="list-style-type: none"> <li>The scheme should be phased.</li> <li>Phase one should begin six months after the publication of the Ofgem decision document.</li> <li>It will gather data on a range of agreed items, including the number of notifications dealt with by Suppliers, and will last for 12 months.</li> <li>During this phase appropriate targets and the fund for phase 2 will be agreed based on data collected.</li> <li>Phase two will operate for 12 months at which point the scheme will be reviewed.</li> </ul>	
Calculation of Supplier performance	<ul style="list-style-type: none"> <li>Based on xoserve statistics.</li> <li>Could compare Supplier market share percentages with the percentage of thefts investigated (see Appendix 4 for a gas example). To be financially neutral to the scheme a Supplier's market share and its share of the number of thefts investigated would need to be equal.</li> </ul>	<ul style="list-style-type: none"> <li>Based on RPS statistics.</li> <li>Could compare Supplier market share percentages with the percentage of thefts investigated (see Appendix 5 for an electricity example). To be financially neutral to the scheme a Supplier's market share and its share of the number of thefts investigated would need to be equal.</li> </ul>
Rewards/ penalties	A Supplier would pay into a fund or receive payments from a fund, calculated according to how its market share compared with the share of the number of thefts it had investigated during the year.	
Fund	To be agreed at the end of year one.	
Monitoring	<ul style="list-style-type: none"> <li>Submissions monitored by an agency.</li> <li>Audit of scheme/submissions as appropriate (potential for gaming identified).</li> </ul>	
Reporting	<ul style="list-style-type: none"> <li>Companies to aim to develop reporting systems in time to support the</li> </ul>	

	start of phase one - according to a data set agreed with Ofgem. <ul style="list-style-type: none"> <li>• Monthly returns compiled into quarterly reports and made available to industry participants on an anonymised basis.</li> <li>• Periodic reporting to Ofgem.</li> </ul>	
Governance <sup>6</sup>	For consultation.	For consultation.
Operation	<ul style="list-style-type: none"> <li>• Nationally administered.</li> <li>• Bids from interested parties.</li> </ul>	

## Losses Incentive Scheme

### Scheme summary

- 4.11 This scheme would be applicable only to Suppliers and DNOs in the electricity industry. A similar scheme is not being proposed for gas, as the price control losses incentive provided to DNOs does not exist in the gas market. For the current 5-year price control period, each electricity DNO has a losses target and can keep the benefit of a losses reduction for five years through the application of a rolling mechanism. The losses incentive rate, and hence the benefit from discovering one previously stolen unit, is 4.8p/kWh in 2004/05 prices. Essentially, the scheme is designed to have the effect of rewarding Suppliers for their efforts in identifying theft by allowing them to take a portion of the benefit accruing to DNOs from that activity. Conversely, the scheme recognises the possible negative impact on DNOs where the level of theft identification diminishes. Our discussions were on the basis of the losses incentive forming part of the Distribution Price Control for 2005 – 10; any changes to its design for the next period will have an impact on our proposals.
- 4.12 The losses reductions counting towards the target include those resulting from the discovery of theft, but they are not separately identified within the target. The scheme therefore would need to set a threshold against which to compare the number of stolen units entered into settlement by each Supplier. The threshold amount would be calculated using a Supplier's NHH market share percentage and the estimated total amount of detected theft inherent in the DNO losses target. For each unit above its threshold, a DNO would share the payment it receives through the losses incentive scheme with the Supplier. For each unit below its threshold the Supplier would make an agreed payment to the DNO. Clearly, this scheme will be very sensitive to the level at which the threshold is set and the method of setting the threshold will need to be agreed. There are also decisions to be made concerning the sharing of the incentive payments.
- 4.13 This scheme would appear to be relevant for all Suppliers and DNOs and could be implemented through incorporation into the Distribution Connection and Use of System Agreement (DCUSA), operating by DNO area but administered nationally. In this context central administration would be preferable in order to more easily monitor and calculate the net position of each party nationally and to make payments accordingly. However, the Group recognised that voluntary arrangements in the form of bilateral commercial agreements between Suppliers and DNOs might be an alternative method of achieving

<sup>6</sup> For governance options please see Appendix 7.

similar aims; but until more data is collected it would be difficult to assess whether there would be a commercial incentive for all Suppliers and Distributors to participate. At this stage therefore the Group did not go so far as to recommend that the scheme be mandatory. Rather, in view of the complexity and detail of such a scheme, it is recommended it be subject to a twelve-month development period, which would include collecting sufficient data to enable us to test our working assumptions of how such a scheme could operate. We also recommend that during its consultation Ofgem should seek views from other sectors of the industry.

- 4.14 Following consultation, the most appropriate method for ensuring that units go through settlement would be developed. Ofgem should also consult on whether the rules for units going into settlement could be clarified and how such units should be identified or recorded. Elexon will have its own views to contribute as part of the consultation.

### Outline proposals

- 4.15 The table below provides further details of how at this stage it is anticipated such a scheme would operate.

	<b>Gas</b>	<b>Electricity</b>
Coverage	N/A	<ul style="list-style-type: none"> <li>National by DNO area</li> <li>Non-half hourly market</li> </ul>
Start	N/A	<ul style="list-style-type: none"> <li>The scheme should be phased.</li> <li>Phase one should begin six months after the publication of the Ofgem decision document and will last for 12 months.</li> <li>It will gather data on a range of agreed items, including the numbers of stolen units being identified.</li> <li>During this phase appropriate targets for the threshold and the associated payments for phase 2 will be agreed.</li> <li>Phase two will operate for 12 months at which point the scheme will be reviewed.</li> </ul>
Annual targets per Supplier	N/A	The volume of units entered into settlement above/below the Supplier's threshold.
Calculation of targets	N/A	<ul style="list-style-type: none"> <li>The estimated annual quantity of stolen units detected inherent in the current losses target (for example, identified by one DNO as being approximately 0.1% of total NHH volume in its area).</li> <li>Once the scheme is running the annual data collection will (after 5 years) provide a definitive annual amount of theft detected inherent in the DNO losses target (depending on regulatory regime).</li> <li>A Supplier's percentage share of the NHH market applied to the annual amount of theft detected inherent in the losses target to provide the Supplier's annual threshold target.</li> </ul>
Rewards/penalties	N/A	<ul style="list-style-type: none"> <li>Each Supplier's actual performance measured against its annual threshold at year end.</li> <li>If a Supplier's performance is greater than the</li> </ul>

		<p>threshold then the DNO will make a payment to that Supplier.</p> <ul style="list-style-type: none"> <li>If a Supplier's performance is lower than its threshold then the Supplier will make a payment to the DNO.</li> </ul>
Monitoring	N/A	Rigorous monitoring of the scheme to guard against gaming and to ensure the robustness of processes and accuracy of data.
Reporting	N/A	Companies / National Administrator to develop reporting systems as required to support the administration of the incentive scheme.
Governance	N/A	DCUSA or Individual commercial agreements (the latter option may only be viable if the scheme is not mandatory and not a nationally administered scheme).
Operation	N/A	<ul style="list-style-type: none"> <li>Nationally administered.</li> <li>Bids from interested parties.</li> <li>Individual customer data collected by Supplier/revenue protection agency sent to national administrator using revised/new market data flows. National administrator enters discovered units into settlement and reports those volumes to interested parties as agreed.</li> <li>Discovered units entering settlement should tie up with those used for other schemes (Reasonable Endeavours/SETS).</li> <li>National Administrator calculates the net position of each party nationally and produces one annual invoice for each applicable party and then distributes those funds to the parties requiring payments.</li> <li>Data and processes verified by rigorous monitoring.</li> </ul>

## 5. Scheme principles and evaluation criteria

5.1 The group reviewed the scheme principles set out in the previous theft report and, with some minor amendments, separated them into principles and criteria – the latter to be used to assess any scheme that met the initial overarching principles.

### Scheme principles

<ul style="list-style-type: none"> <li>Removes disincentives to prevent, detect and investigate theft</li> </ul>
<ul style="list-style-type: none"> <li>Helps to lead the industry as a whole to become more proactive in preventing, detecting and investigating theft</li> </ul>
<ul style="list-style-type: none"> <li>Shows benefits that outweigh net costs</li> </ul>
<ul style="list-style-type: none"> <li>Does not compromise safety</li> </ul>
<ul style="list-style-type: none"> <li>Apportions costs and benefits between industry parties</li> </ul>

### Scheme criteria:

<ul style="list-style-type: none"> <li>Should be clearly defined and documented and set out in a governance framework</li> </ul>
<ul style="list-style-type: none"> <li>Reasonable costs (start up, ongoing, administration)</li> </ul>
<ul style="list-style-type: none"> <li>Benefits to industry (high/medium/low)</li> </ul>
<ul style="list-style-type: none"> <li>Feasible (high/medium/low)</li> </ul>
<ul style="list-style-type: none"> <li>Auditable</li> </ul>



5.2 The group evaluated the proposed incentive schemes against the agreed set of principles and criteria and agreed that they were met.

## **6. Benefits of the incentive scheme proposals**

6.1 Appendix 2 shows full details of the modelling work. The models indicate that introducing the proposed incentive schemes should reduce the economic disincentive on Suppliers to detect and investigate theft. The cost to Suppliers (gas and electricity) of investigating a theft incident would be reduced as a result of the revised Reasonable Endeavours Scheme and the introduction of the Losses Incentive Scheme but the cost of these schemes is picked up by society (RbD and NHH), which includes Suppliers. This has the effect of apportioning more fairly the costs of investigating theft.

6.2 The introduction of these schemes and SETS would also be expected to reduce the overall levels of theft in the gas and electricity markets (a modest reduction of 5% is assumed in the model). The results estimate that in the gas market the total impact could reduce by £1.3m and in the electricity market the total impact could reduce by around £6m. Note: these results illustrate the benefits of the incentive schemes over a short period of time (snap shot) and the benefits could be much higher if the cost recovery period were longer and the effects of increased activity were seen over a prolonged period.

## **7. Data gathering**

7.1 The group has identified three objectives for gathering information relating to theft:

- to provide robust quantitative industry data on detected theft;
- to create a theft data library whose content can be utilised for trend analysis and assessing the impact of enhanced incentives and clearer obligations; and to support the administration of theft incentive schemes.

These data items have been reviewed against Ofgem's requirements in this area and a full list of data items we suggest should be collated can be found in Appendix 6.

The collection of data is an integral part of the overall package of measures being recommended. In the first instance, the data will help with the further development of the incentive schemes and the promotion of best practice. Following that initial period they will capture performance levels and help assess how successful we will have been as an Industry.

## **8. High level implementation plan**

8.1 The following high-level implementation plan is envisaged:

- Theft Incentive Scheme Development Group Proposals submitted to Ofgem.
- Industry to confirm, through Ofgem consultation, views on proposals and other items recommended for consultation.

- Work group re-assembled to assist Ofgem in amending/implementing incentive scheme proposals following on from the consultation process.
- The group will pass work packages into industry governance to support both the creation of the framework of the incentive schemes and the operational detail required to implement them. Industry governance groups will focus on the following core areas:
  - assist Ofgem in drafting: any modifications to distribution/transportation licences; and the schemes required by these licences that may be needed to cover the Reasonable Endeavours Schemes;
  - incorporate the SETS and Losses Incentive Scheme rules in the relevant governance arrangements;
  - implement any new theft reporting requirements;
  - work with chosen agency/ies to develop incentive scheme infrastructure and reporting; and
  - publicise new incentive schemes to ensure active participation.
- Incentive schemes start 6 months after the end of the publication of Ofgem's decision document.

## **Appendix 1 - Terms of reference for the Theft Incentives Scheme Development Group**

### **Aim**

For industry parties to work within common, agreed incentive arrangements designed to promote the detection, investigation and prevention of energy theft.

### **Purpose**

To produce a report setting out for Ofgem firm recommendations for an incentive mechanism(s), incorporating also recommendations for implementation and subsequent data gathering.

### **Background**

The starting point for considering issues around theft was an Ofgem consultation paper in 2004 and a further 'Next Steps' document in January 2005.

An ERA/ENA sponsored group, set up in response to the first consultation, delivered to Ofgem earlier this year an initial report containing concepts and building blocks for further developing incentive schemes. The new group will take these forward.

### **Scope**

Theft of gas and electricity, both domestic and non-domestic, including theft directly from distribution networks.

### **Deliverables**

The group aims to deliver a concise report to Ofgem by the end of the year, on which Ofgem intends to consult in early 2007.

### **Composition**

ERA Suppliers, ENA gas and electricity transmission and distribution licence holders, Association of Independent Gas Transporters, UK Revenue Protection Association, Ofgem, xoserve, ERA, ENA.

\*Other interested parties:  
energywatch, non-ERA Suppliers.

## **Appendix 2 – Theft of energy modelling work**

### **1. Introduction**

1.1 This appendix comprises the following sections:

- A summary of the model – a high level overview of the modelling objectives, principles and approach.
- A model user guide – that defines the theft data items and assumptions used in the model and how they drive costs that flow through to stakeholders.
- The outputs – that illustrate the current impact of theft within the gas and electricity markets and the benefits to the gas and electricity markets of the proposed incentive schemes.

### **2. Summary of the model**

#### **Modelling objectives**

2.1 The key objectives of the theft of energy models are:

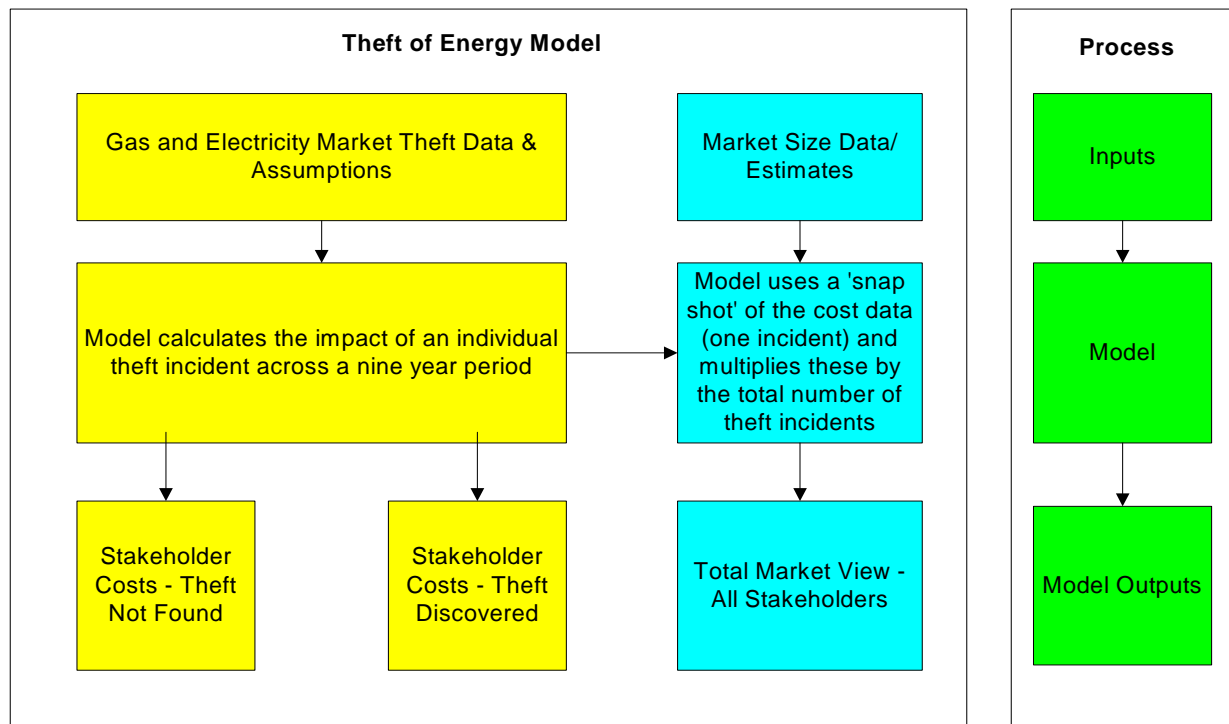
- to demonstrate the current impact of theft within the Gas and Electricity markets, as a means of illustrating the economic disincentives for Suppliers and shippers when dealing with theft;
- to identify the ‘winners and losers’ of theft, and any issues with the current incentive schemes, by calculating the cost of an individual case of theft for each of the impacted stakeholders. The economic model takes into consideration the current incentive schemes available within the markets;
- to identify the impact of theft in the gas and electricity markets as a whole by using the costs identified by the model and estimates on total market size; and
- to illustrate the benefits of the proposed new incentive schemes, which the group believes will help to encourage a greater level of theft investigation within the market by ensuring that the key stakeholders are in more equitable positions upon the discovery of theft. The three schemes proposed in the report are illustrated within the revised model; the Reasonable Endeavours Scheme, SETS and the Losses Incentive Scheme.

#### **Model principles and approach**

2.2 There are two separate models, one each for gas and electricity. The basic principles and approach applied within the models are the same for both fuels but the market theft data and assumptions used in them will differ.

#### **Baseline**

2.3 The model first provides a ‘baseline’ view of the current impact of theft within the gas and electricity markets. The diagram below shows the basic approach to the modelling work – where various inputs are used by the model to provide a set of outputs.



### Inputs

- 2.4 A number of gas and electricity market data items and assumptions are input into the model. These are on two levels:
- the theft data and assumptions required to calculate the cost of an individual case of theft; and
  - the market size data and estimates required to calculate a total market view.

### Model

- 2.5 The model calculates the costs of an individual theft incident across a fixed period (currently set at nine years). To illustrate the impact of theft, three cost calculations are performed:
- theft not found – used to illustrate the effect of doing nothing.
  - theft discovered (after 3 years). To illustrate the costs involved in investigating theft and the benefits of any incentive schemes, two scenarios are used:
    - after the theft is discovered the customer is retained for 6 years
    - after the theft is discovered the customer leaves immediately
  - Total market view – used to illustrate the total cost to the energy market/society as a whole (a snap shot of the above costs is used in this instance).

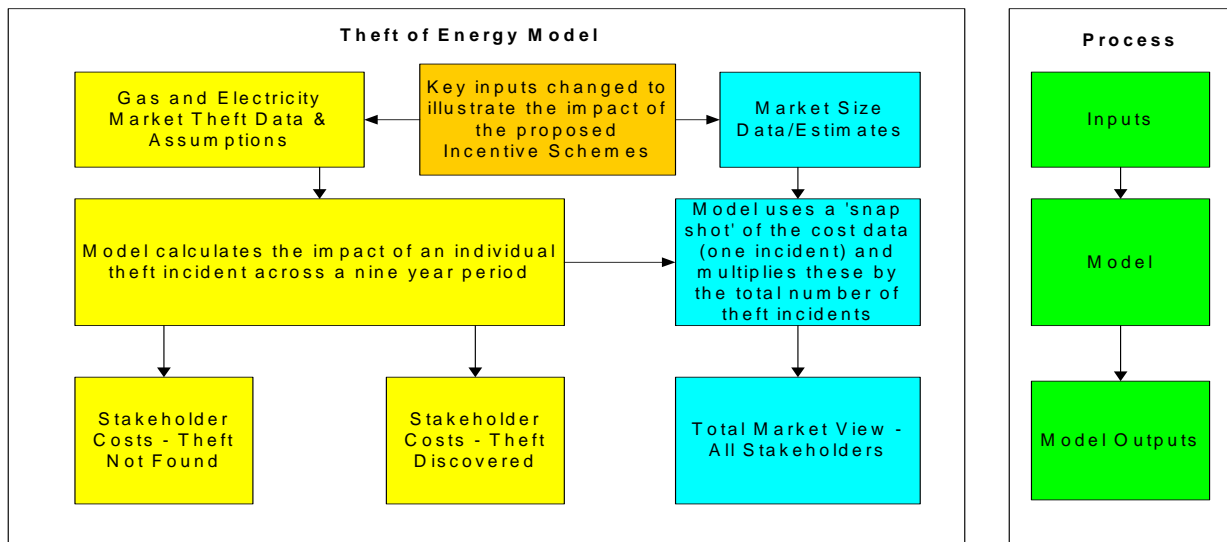
As part of the above calculations the model shows how the costs flow between the different market players.

## Outputs

- 2.6 Outputs are provided for each of the three aforementioned calculations and are shown for each stakeholder.

## Revised model

- 2.7 To illustrate the benefits of the proposed incentive schemes the inputs to the models are amended to reflect the changes likely to be brought about by the revised Reasonable Endeavours Scheme, SETS and the Losses Incentive Scheme. The diagram below shows how the theft data and assumptions are changed but the rest of the model remains the same.



## 3. Model user guide

### Data items and assumptions

- 3.1 This section provides details of all the main theft of energy data items and assumptions used in the models. Where possible industry agreed data have been used; where these were not available, the group used values it considered the most appropriate. A description of the data item is provided below and where assumptions have been used some justification for using the chosen value is given. It should be noted that these assumptions are believed to be representative of what takes place within the current markets. In reality there will be some variance in the theft period, the recovery period, the length of the Annual Quantity (AQ) process, etc. To allow a stakeholder to assess the specific impact of theft on it, a number of these variables can be amended within the models.

#### (i) Gas data items and assumptions

Data Ref.	Data item or assumption	Values used in model	Description/justification	Used in both models?
G1	Transmission and Commodity	Costs per kWh are listed in the table in the data	Financial figures were gained from historic charging data and include a mark up. These figures drive all subsequent figures in the	No

	Costs	values section	model. They can differ for each industry participant and the model allows for them to be adjusted by the user.	
G2	Gas Demand Levels	20,000 kWh	Some customers will take the full supply illegally; other cases will involve only partial theft. For simplicity, the model assumes an average figure for each case based upon historic data. It forms the basis of all subsequent demand-based calculations.	No
G3	Gas Theft Levels	63,000 cases	The overall level of theft in gas was based on the shrinkage theft of gas figure, which has been 0.2% of throughput since October 2005. Using this figure and the average consumption for 2005, the number of cases was calculated. This value is used to calculate the costs to the entire market.	No
G4	Number of Cases Investigated	4,000	These figures have been acquired from xoserve records of cases of theft identified to them in the gas market during 2005.	No
G5	Number of Cases of Found/Valid Theft	1,700	These figures have been acquired from xoserve records of cases of theft declared to them in the gas market during 2005.	No
G6	Original Reasonable Endeavours Scheme Value	£125 per case	Using historic data provided by xoserve a value of £125 was calculated. The justification for this amount is provided in the data values section. The original scheme only operates in the gas market.	No
G7	Cost of Investigation	£500	This figure was used by the previous theft group. The value can vary widely depending upon who is carrying out the investigation and the level of analysis needed. The value of £500 was agreed by the group but recent RP figures suggest it is lower.	Yes
G8	% of Theft Costs Billed to the Consumer	50%	This figure is currently set at 50%, as bills are not issued in all cases – customer leaves property, etc.	Yes
G9	Recovery Rate	30%	The % of billed costs actually paid by the consumer is currently set at 30%.	Yes
G10	Length of Theft Period	9 Years	<ul style="list-style-type: none"> <li>• Theft not found – 9 years</li> <li>• Theft discovered – 3 years of theft (analysis of historic xoserve data was carried out and an average period of 3 years was identified). To illustrate the costs involved in investigating theft and the benefits of any incentive schemes, two scenarios are used: <ul style="list-style-type: none"> <li>○ after the theft is discovered the customer is retained for 6 years</li> <li>○ after the theft is discovered the customer leaves immediately</li> </ul> </li> </ul> <p>The length of the theft period within the model can be amended from between 1 and 15 years. A nine-year period was agreed as this</p>	Yes

			<p>makes the gas model consistent with the electricity model. In reality customers may of course use/steal gas for longer or shorter periods of time. Furthermore data analysed may contain some inaccuracies depending on how honest the thief was in their admission. It is also assumed that meter readings continue to be taken during this period.</p>	
G11	Market Share of Supplier	Currently set at 15%	<p>The value can be altered to reflect a Supplier's actual market share. A Supplier's proportion of the costs from participating in the RbD market is dependent on this market share.</p>	Yes
G12	Discount Rates	<p>Thief: 3.5% Supplier: 10% GT: 6.25% Meter Operator: 10%</p>	<p>These figures are reflective of the current price control reviews and the Government's own statistics on the level of discount for a consumer.</p>	Yes/No
G13	AQ Period	<p>18 month time lag for the AQ to be changed to reflect lower consumption as a result of theft.</p>	<p>This assumption deals with the impact of the yearly AQ review. It is dependent on the Supplier getting actual meter reads and the Supplier continuing to be charged for their customer's gas based on the original AQ. Equally upon discovery the Supplier would avoid costs for a period. The time period may vary in reality but for simplicity the model assumes this period to be 18 months.</p>	No
G14	Theft in the DM Market is Unproven	<p>Only the domestic community is illustrated within the model.</p>	<p>It is an industry held view that there is likely to be little theft amongst DM customers. Theft does occur in the NDM I&amp;C sector but for simplicity the impact of theft is restricted to the domestic community. This assumption means that only the domestic community is illustrated within the model.</p>	Yes
G15	Costs Split Between RbD and Non-RbD Suppliers	<p>67% of costs are charged to the RbD Community.</p>	<p>The costs of the Reasonable Endeavours Scheme are spread across the industry. For this model it is assumed that 67% of these costs are paid for by the RbD community, with the remainder paid for by other market members.</p>	No



**Gas data values**  
**G1 – Transmission and commodity costs**

<b>Gas Costs (£):</b>	<b>KWh (Smaller Supply Points)</b>
Gas commodity costs	0.012
NTS Commodity	0.00025
LDZ Commodity	0.0013
Cust Commodity	0.0014
NTS Entry	0.00013
NTS Exit	0.0003
LDZ Capacity	0.0015
Cust Capacity	0.0000014
Total Metering Costs (per customer)	14.1
<b>Revenue</b>	0.021

**G4 - Original Reasonable Endeavours Scheme (REDS) value**

	Number of claims	Number of valid claims	Value of REDS	% of invalid claims	Average benefit per case
2003	19	14	£2,250	73.68	£160.71
2004	182	123	£15,375	67.58	£125.00
2005	344	274	£34,250	79.65	£125.00
Average		£126.22	Average used for model		£125

**(ii) Electricity data items and assumptions**

<b>Data Ref.</b>	<b>Data item or assumption</b>	<b>Values used in model</b>	<b>Description/justification</b>	<b>Used in both models?</b>
E1	Transmission and Commodity Costs	Costs per kWh are listed in the table in the data values section	Financial figures were gained from historic charging data. They drive all subsequent figures in the model. The figures can differ for each industry member and the model allows for them to be adjusted by the user.	No
E2	Electricity Demand Levels	4,000 kWh	Some customers will take the full supply illegally; other cases will involve only partial theft. For simplicity, the model assumes an average figure for each case based upon historic data. It forms the basis of all subsequent demand-based calculations.	No
E3	Electricity Theft Levels	165,000	See the data values section for information on how these figures are derived. The overall theft values are used to calculate the costs of	No

			theft in the entire market and the potential benefits of any incentive schemes.	
E4	Number of Cases Investigated	77,800	See above.	No
E5	Number of Cases of Found/Valid Theft	21,800	See above.	No
E6	Losses Incentive and Revenue Drivers Values	Losses Incentive: 4.96p p/kWh Revenue Drivers: 0.48p p/kWh	These values are laid down within the DNO price control review. The model has uplifted the 2004/05 prices (4.8p) to 2005/06 prices (4.96p) to be more consistent with the other costs in the model. 40% of the costs of the Losses Incentive Scheme are paid by the HH community. 60% of the costs of the Losses Incentive scheme are paid by the NHH community	No
E7	Cost of Investigation	£500	This figure was derived from the model developed by the previous theft group. The costs of investigation can vary widely depending upon who is carrying out the investigation and what level of analysis is needed. The value of £500 was agreed by the group but recent RP figures suggest it is lower.	Yes
E8	% of Theft Costs Billed to the Consumer	50%	This figure is currently set at 50%, as bills are not issued in all cases – customer leaves the property, etc.	Yes
E9	Recovery Rate	30%	The % of billed costs actually paid by the consumer is currently set at 30%.	Yes
E10	Length of Theft Period	9 Years	<ul style="list-style-type: none"> <li>• Theft not found – 9 years</li> <li>• Theft discovered – 3 years of theft (analysis of historic xoserve gas data was carried out and an average period of 3 years was identified). To illustrate the costs involved in investigating theft and the benefits of any incentive schemes, two scenarios are used: <ul style="list-style-type: none"> <li>○ after theft is discovered the customer is retained for 6 years</li> <li>○ after theft is discovered the customer leaves immediately</li> </ul> </li> </ul> <p>The length of the model can be amended from between 1 and 15 years. A nine year period was agreed as this fully illustrates the effect of the losses incentive scheme. In reality customers may of course use/steal electricity for longer or shorter periods of time. Furthermore data analysed may contain some inaccuracies depending on how honest the thief was in their admission. It is also assumed that meter readings continue to be taken in the period.</p>	Yes

E11	Market Share of Supplier	Currently set at 15%	The value can be altered to reflect a Supplier's actual market share. A Supplier's proportion of the costs from participating in the NHH market is dependent on this market share.	Yes
E12	Discount Rates	Thief: 3.5% Supplier: 10% DNO: 6.9% Meter Operator: 10%	These figures are reflective of the current price control reviews and the Government's own statistics on the level of discount for a consumer.	Yes/No
E13	Shift in Direct Distribution Costs of Electricity Model	DNOs recover the direct costs of theft but suffer through the effect of theft on their incentives	This assumption was developed during consultation with DNO representatives. It shows that DNOs do not suffer a financial loss directly from the thief since any unrecovered income in respect of that consumer will feed through and be collected in the following year. Rather, the DNO suffers the financial loss through the effect that the stolen units will have on their growth and losses incentives.	No
E14	Reconciliation of Costs within the Electricity Market	Costs not allocated to a Supplier are paid for by the other market members	This means that within the electricity model all costs of theft not paid for by the Supplier are paid for by the other market members. It is also assumed that only the NHH community is affected by theft, as theft is unproven in the HH market. Reconciled costs within the Electricity market are based upon the 14 months of previous consumption/theft levels.	No

## Electricity data values

### E1 – Transmission and commodity costs

<b>Electricity Costs:</b>	(£)
Electricity commodity costs (per kWh)	0.038
BSUoS (per kWh)	0.0009
TNUoS (per kWh)	0.003
DUoS (Fixed - per customer)	18.6
DUoS (Variable)	0.01
Metering (per customer)	4.3
<b>Revenue (per kWh)</b>	<b>0.075</b>

### E3, E4 & E5 - Electricity Theft Market Size

Number of cases investigated	50,000
Number of cases of found/valid theft	14,000

The figures above were derived from Ofgem’s consultation: “Theft of Electricity and Gas – Next Steps”, January 2005. This paper detailed the number of suspected and identified cases of theft in the electricity market. We have pro rated the figures to reflect fourteen networks and the overall levels of theft figures have been calculated as 0.2% of throughput (330TWh). This is the same methodology used to estimate the overall levels of theft in the gas market.

Overall theft levels	165,000
Investigated number of cases in market	77,800
Identified number of cases in market	21,800

**(iii) Incentive scheme data items and assumptions**

<b>Data Ref.</b>	<b>Data item or assumption</b>	<b>Values used in model</b>	<b>Description/justification</b>	<b>Model</b>
S1	Losses Incentive Scheme Value	2.48p per kWh entered into settlement.	The Losses Incentive Scheme will share some of the DNOs’ revenues from the losses incentive with Suppliers. The model uses a figure that is 50% of the Losses Incentive & Revenue Drivers Value (E6). The value and methodology of this was established by the development group as detailed within this report but is subject to consultation.	Electricity
S2	Reasonable Endeavours Scheme  Capped investigation costs	Capped investigation costs - the value that cannot be reclaimed from the thief.  For simplicity the revised model assumes that the Supplier is cost neutral (all investigation costs are recovered via the customer or the Reasonable Endeavours Scheme).	Currently on average only £125 is reclaimed per case. Under the new scheme claims would rise to a cost capped below actual cost, but at a more reflective level than at present. This will reduce the costs of investigating theft for Suppliers whilst making recovery from the customer the preferable option. For simplicity the model assumes that all costs are recovered. The Reasonable Endeavours Scheme will also allow the Supplier to reclaim investigation costs even when theft is not discovered (subject to certain criteria). Under the new Reasonable Endeavours Scheme for electricity it has been proposed that Suppliers will be able to reclaim a level of lost revenue, thus offsetting the costs of reconciliation within the electricity market.	Both Electricity and Gas
S3	Supplier Energy Theft Scheme (SETS)  Revised gas and	See table below.	Within the full market illustration the assumption is that due to the introduction of the SETS a greater level of theft investigation will be encouraged as Suppliers and shippers seek to match the optimal level. To reflect this activity, overall theft levels will be reduced by 5% and theft investigations increased by 5%.	Both Electricity and Gas

	electricity market theft levels		The group believes that a 5% reduction of overall theft levels is a conservative estimate.	
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### S3 – Revised theft levels

	Gas	Electricity
Number of cases of theft	59,850	156,750
Number of cases investigated	4,200	73,910
Number of valid/found theft cases	1,785	22,890

#### How the models work

- 3.2 The models demonstrate the movement of costs within the electricity and gas markets and incorporate the benefits of the proposed incentive schemes.

#### Model calculations and data flows

- 3.3 The models use the theft data and assumptions in section 3.1 to calculate the costs of an individual theft incident across a fixed period (currently set at nine years). To illustrate the impact of theft, three main cost calculations are performed:

- Theft not found – used to illustrate the effect of doing nothing.
- Theft discovered (after 3 years). To illustrate the costs involved in investigating theft and the benefits of any incentive schemes, two scenarios are used:
  - a) after theft is discovered the customer is retained for 6 years
  - b) after theft is discovered the customer leaves immediately
- Total market view – used to illustrate the total cost to the energy market/society as a whole (a snapshot of the above costs are used in this instance).

This section walks the user through these calculations and data flows by adding commentary to the view of the model. The illustrations cover the baseline position (current incentive schemes only) but additional illustrations are provided within the model to show the revised position (result of introducing the incentive scheme proposals).

### Theft not found - gas

<b>Impact of 1 Case of Theft Never Being Found</b>								
<b>Data Ref</b>	Cash flows (NPV)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
<b>Benefit to Thief</b>								
G1, G2, G12	Avoided Supply Charges	420.00					0.00	420.00
G1, G2, G7, G8, G9, G10	Profit Recovery							
<b>Cost to Supplier:</b>								
G1, G2, G8	Supplier's Revenue	-420.00	-420.00	-420.00	-420.00	-420.00	-420.00	-420.00
<b>Costs/Avoided Costs</b>								
G1,G2, G12, G13	Gas Commodity		-420.00	240.00	240.00	240.00	240.00	240.00
G1,G2, G12, G13	NTS Commodity		2.50	5.00	5.00	5.00	5.00	5.00
G1,G2, G12, G13	LDZ Commodity		13.00	26.00	26.00	26.00	26.00	26.00
G1,G2, G12, G13	Cust Commodity		14.00	28.00	28.00	28.00	28.00	28.00
G1,G2, G12, G13	NTS Entry		1.30	2.60	2.60	2.60	2.60	2.60
G1,G2, G12, G13	NTS Exit		3.00	6.00	6.00	6.00	6.00	6.00
G1,G2, G12, G13	LDZ Capacity							30.00
G1,G2, G12, G13	Cust Capacity							0.03
	<b>Total Costs/Avoided Costs</b>							337.63
<b>Total Metering Costs (per customer)</b>								
Customer Recovery								
Cost of Investigation								
Reasonable Endeavours Scheme - Investigation Costs								
G11	Supplier's Proportion of RbD Costs	0.00	-25.32	-50.64	-50.64	-50.64	-50.64	-50.64
	<b>Total Impact</b>	-420.00	-276.51	-133.02	-133.02	-133.02	-133.02	-133.02
<b>Cost to RbD Shipper</b>								
G1,G2, G12, G13	Gas Commodity		0.00	-240.00	-240.00	-240.00	-240.00	-240.00
G1,G2, G12, G13	NTS Commodity		0.00	-5.00	-5.00	-5.00	-5.00	-5.00
G1,G2, G12, G13	LDZ Commodity		0.00	-13.00	-26.00	-26.00	-26.00	-26.00
G1,G2, G12, G13	Cust Commodity		0.00	-14.00	-28.00	-28.00	-28.00	-28.00
G1,G2, G12, G13	NTS Entry		0.00	-1.30	-2.60	-2.60	-2.60	-2.60
G1,G2, G12, G13	NTS Exit		0.00	-3.00	-6.00	-6.00	-6.00	-6.00
G1,G2, G12, G13	LDZ Capacity							30.00
G1,G2, G12, G13	Cust Capacity							0.03
	<b>Proportion of Reasonable Endeavours Scheme Costs</b>							
G11	Supplier's Proportion of RbD Costs	0.00	25.32	50.64	50.64	50.64	50.64	50.64
	<b>Total</b>	0.00	-143.49	-286.98	-286.98	-286.98	-286.98	-286.98
<b>Costs to Total Gas Society</b>								
<b>Costs Relating to Reasonable Endeavours Scheme</b>								
<b>Meter Operator</b>								
	Total Metering Revenue (per customer)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Costs/Revenue to DNO</b>								
G1,G2, G12, G13	NTS Commodity	5.00	5.00	5.00	5.00	5.00	5.00	5.00
G1,G2, G12, G13	LDZ Commodity	26.00	26.00	26.00	26.00	26.00	26.00	26.00
G1,G2, G12, G13	Cust Commodity	28.00	28.00	28.00	28.00	28.00	28.00	28.00
G1,G2, G12, G13	NTS Entry	2.60	2.60	2.60	2.60	2.60	2.60	2.60
G1,G2, G12, G13	NTS Exit	6.00	6.00	6.00	6.00	6.00	6.00	6.00
G1,G2, G12, G13	LDZ Capacity	30.00	30.00	30.00	30.00	30.00	30.00	30.00
G1,G2, G12, G13	Cust Capacity	0.03	0.03	0.03	0.03	0.03	0.03	0.03
G1,G2, G12, G13	<b>Total</b>	97.63	97.63	97.63	97.63	97.63	97.63	97.63

Through theft the thief avoids the costs of gas consumption (based upon the average costs to a consumer).

The costs avoided by the thief result in a loss of revenue to the shipper.

The shipper will continue to be charged for the gas until the AQ is amended (the model assumes that this takes a period of 18 months).

As the shipper is a member of the RbD community they will incur a proportion of the costs dependent upon their market share.

Once the AQ has been adjusted then the shipper will begin to avoid the commodity costs; however the shipper's avoided costs become charges to the RbD community.

The supplier's proportion of the Rbd shippers' costs is then seen as a credit to the RbD community.

## Theft not found – electricity

Impact of 1 Case of Theft		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Data Ref	Cash flows (NPV)											
E1, E2, E	<b>Benefit to Thief</b> Avoided Supply Charge	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00
	Profit recovery											
	<b>Total</b>	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00
<b>Cost to Supplier:</b>												
E1, E2, E	Supplier Revenue	-300.00	-300.00	-300.00	-300.00	-300.00	-300.00	-300.00	-300.00	-300.00	-300.00	-300.00
Costs/Avoided costs												
E1, E2, E	Electricity commodity	152.00	152.00	152.00	152.00	152.00	152.00	152.00	152.00	152.00	152.00	152.00
E1, E2, E	BSUoS	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
E1, E2, E	TNUoS	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
E1, E2, E	DUoS (Variable)	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
	<b>Total</b>	207.60	207.60	207.60	207.60	207.60	207.60	207.60	207.60	207.60	207.60	207.60
<b>Lost Profit Margin</b>												
	Total Metering Costs (per customer)											
	DUoS (Fixed - per customer)											
	Reconciled Historic Costs											
	Energy											
	Other											
	Theft Losses Incentive Scheme											
	Customer Recovery											
	Cost of Investigation											
	Reasonable Endeavours Scheme											
E11	Supplier's Impact of NHH Costs	-5.56	-17.97	-11.56	-11.56	-11.56	-31.14	-31.14	-31.14	-31.14	-31.14	-31.14
	Supplier's Impact of HH Costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Total</b>	-97.96	-110.37	-103.96	-103.96	-103.96	-123.54	-123.54	-123.54	-123.54	-123.54	-123.54
<b>Cost to Society through NHH / (non half hourly)</b>												
	Revenue to NHH Suppliers											
E1, E2, E	Electricity Commodity Costs	-152.00	-152.00	-152.00	-152.00	-152.00	-152.00	-152.00	-152.00	-152.00	-152.00	-152.00
E1, E2, E	BSUoS	-3.60	-3.60	-3.60	-3.60	-3.60	-3.60	-3.60	-3.60	-3.60	-3.60	-3.60
E1, E2, E	TNUoS	-12.00	-12.00	-12.00	-12.00	-12.00	-12.00	-12.00	-12.00	-12.00	-12.00	-12.00
E1, E2, E	Benefit of lost revenue adjustment to costs	-82.76	-40.00	-40.00	-40.00	-40.00	-40.00	-40.00	-40.00	-40.00	-40.00	-40.00
	Benefit from Reconciled Historic Costs											
	Energy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Costs of Incentive Schemes											
E6, E14	DNO Losses Incentive Scheme	119.04	119.04	119.04	119.04	119.04	0.00	0.00	0.00	0.00	0.00	0.00
E6, E14	Units Revenue Driver	11.52	11.52	11.52	11.52	11.52	0.00	0.00	0.00	0.00	0.00	0.00
	Reasonable Endeavours Scheme	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Total</b>	-37.04	-119.80	-77.04	-77.04	-77.04	-207.60	-207.60	-207.60	-207.60	-207.60	-207.60
E11	Supplier's Impact of NHH Costs	5.56	17.97	11.56	11.56	11.56	31.14	31.14	31.14	31.14	31.14	31.14
	<b>Total</b>	31.48	101.83	65.48	65.48	65.48	176.46	176.46	176.46	176.46	176.46	176.46
<b>Cost to Society through HH / (half hourly)</b>												
E6, E14	DNO Losses Incentive Scheme	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E6, E14	Units Revenue Driver	87.04	87.04	87.04	87.04	87.04	0.00	0.00	0.00	0.00	0.00	0.00
	Supplier's Impact of HH Costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Total</b>	87.04	87.04	87.04	87.04	87.04	0.00	0.00	0.00	0.00	0.00	0.00
<b>Net Position of All Electric Members</b>		-42.40	-125.16	-82.40	-82.40	-82.40	-300.00	-300.00	-300.00	-300.00	-300.00	-300.00
	Total Metering revenue (per customer)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Costs/Revenue to DNO</b>												
	Theft Losses Incentive Scheme	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E6, E14	DNO Losses Incentive Scheme	-198.40	-198.40	-198.40	-198.40	-198.40	0.00	0.00	0.00	0.00	0.00	0.00
E6, E14	Units Revenue Driver	-19.20	-19.20	-19.20	-19.20	-19.20	0.00	0.00	0.00	0.00	0.00	0.00
	Fixed DUoS Charge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E13	Benefit of lost revenue adjustment to costs	-40.00	42.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Total</b>	-257.60	-174.84	-217.60	-217.60	-217.60	0.00	0.00	0.00	0.00	0.00	0.00

Through theft the thief avoids the costs of electricity consumption (based upon the average costs to a consumer).

The costs avoided by the thief result in a loss of revenue to the supplier.

Because of the theft taking place the number of units being entered into settlement is effectively zero. Therefore the supplier does not have to pay for any of the units consumed.

Instead the cost of the stolen energy along with the transportation costs are paid for by the wider NHH community.

As a member of the NHH community the supplier is responsible for a proportion of the costs dependent upon their market share.

The supplier's proportion of the NHH costs is then seen as a benefit to the NHH community costs.

The benefit to the DNOs of the losses incentive and revenue drivers schemes splits the costs between the NHH & HH community using Assumption E14.

Lost revenue in year 1 is then recovered in year two by spreading the lost revenue across society.

The costs of the revenue drivers and losses incentive schemes are split between the NHH and the HH market. This is calculated using Assumption E14.

### Theft discovered – gas (a) customer retained

<b>Impact of Theft Discovery</b>		Cash Flows								
Data Ref		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
<b>Benefit to Thief</b>										
G1, G2, G12	Avoided Supply Charges	420.00	420.00	420.00						
G1, G2, G7, G8, G9, G10	Profit Recovery	0.00	0.00	0.00	-339.00					
<b>Cost to Supplier:</b>										
G1, G2, G8	Supplier's Revenue	-420.00	-420.00	-420.00	0.00					
<b>Costs/Avoided Costs</b>										
G1,G2, G12, G13	Gas Commodity Costs	0.00	120.00	240.00	240.00					
G1,G2, G12, G13	NTS Commodity	0.00	2.50	5.00	5.00					
G1,G2, G12, G13	LDZ Commodity	0.00	13.00	26.00	26.00					
G1,G2, G12, G13	Cust Commodity	0.00	14.00	28.00	28.00	14.00				
G1,G2, G12, G13	NTS Entry	0.00	1.30	2.60	2.60	1.30				
G1,G2, G12, G13	NTS Exit	0.00	3.00	6.00	6.00	3.00				
G1,G2, G12, G13	LDZ Capacity	0.00	15.00	30.00	30.00	15.00				
G1,G2, G12, G13	Cust Capacity	0.00	0.01	0.03	0.03	0.01				
	<b>Total Costs/Avoided Costs</b>	0.00	168.81	337.63	337.63	168.81	0.00	0.00	0.00	0.00
	<b>Total Metering Costs (per customer)</b>									
G1, G2, G7, G8, G9, G10	Customer Recovery	0.00	0.00	0.00	339.00					
G7, G12	Cost of Investigation	0.00	0.00	0.00	-500.00					
G6	Reasonable Endeavours Scheme - Investigation Costs	0.00	0.00	0.00	125.00					
G11	Suppliers Proportion of RbD Costs	0.00	-25.32	-50.64	-63.14					
	<b>Total Impact</b>	-420.00	-276.51	-133.02	238.48					
<b>Cost to RbD Shippers / (domestic consumers)</b>										
G1,G2, G12, G13	Gas Commodity Costs	0.00	-120.00	-240.00	-240.00					
G1,G2, G12, G13	NTS Commodity	0.00	-2.50	-5.00	-5.00					
G1,G2, G12, G13	LDZ Commodity	0.00	-13.00	-26.00	-26.00	-13.00	0.00	0.00	0.00	0.00
G1,G2, G12, G13	Cust Commodity	0.00	-14.00	-28.00	-28.00	-14.00	0.00	0.00	0.00	0.00
G1,G2, G12, G13	NTS Entry	0.00	-1.30	-2.60	-2.60	-1.30	0.00	0.00	0.00	0.00
G1,G2, G12, G13	NTS Exit	0.00	-3.00	-6.00	-6.00	-3.00	0.00	0.00	0.00	0.00
G1,G2, G12, G13	LDZ Capacity	0.00	-15.00	-30.00	-30.00	-15.00	0.00	0.00	0.00	0.00
G1,G2, G12, G13	Cust Capacity	0.00	-0.01	-0.03	-0.03	-0.01	0.00	0.00	0.00	0.00
G15	Proportion of Reasonable Endeavours Scheme Costs	0.00	0.00	0.00	-83.33	0.00				
	<b>Total</b>	0.00	-168.81	-337.63	-420.96	-168.81				
G11	Supplier Proportion of RbD Costs	0.00	25.32	50.64	63.14	25.32				
	<b>Total</b>	0.00	-143.49	-286.98	-357.82	-143.49				
<b>Costs to Total Gas Society</b>										
G15	Costs Relating to Reasonable Endeavours Scheme				-41.67	0.00				
<b>Meter Operator</b>										
	Total Metering Revenue (per customer)				0.00	0.00	0.00	0.00	0.00	0.00
<b>Costs/Revenue to DNO</b>										
G1,G2, G12, G13	NTS Commodity									
G1,G2, G12, G13	LDZ Commodity									
G1,G2, G12, G13	Cust Commodity									
G1,G2, G12, G13	NTS Entry									
G1,G2, G12, G13	NTS Exit									
G1,G2, G12, G13	LDZ Capacity									
G1,G2, G12, G13	Cust Capacity									
	<b>Total</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Upon the discovery of theft the thief is charged for the stolen gas along with the cost of the investigation; however it was agreed that not all costs were likely to be paid and so this value is reduced based upon Assumptions G8 & G9

A value of £500 was decided upon for the costs of investigation but depending on its nature this can vary considerably.

The thief's incurred costs then become a benefit to the shipper.

Once theft has been identified the shipper can claim under the REDS scheme, on average this has a value of £125. However under the new proposals this could rise considerably.

The costs of the REDS scheme are apportioned between the RbD and the non-RbD community using Variable G15.

Upon the discovery of theft the shipper will be able to submit new and accurate meter reads; this will increase the AQ and reduce the costs to the RbD community.



## Theft discovered – gas (b) customer leaves

<b>Impact of Theft Discovery</b>										
Cash Flows		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Data Ref	Benefit to Thief									
G1, G2, G12	Avoided Supply Charges	420.00	420.00	420.00						
G1, G2, G7, G8, G9, G10	Profit Recovery	0.00	0.00	0.00	-339.00					
	<b>Cost to Supplier:</b>									
G1, G2, G8	Supplier's Revenue	-420.00	-420.00	-420.00	0.00					
	<b>Costs/Avoided Costs</b>									
G1, G2, G12, G13	Gas Commodity Costs	0.00	120.00	240.00	240.00					
G1, G2, G12, G13	NTS Commodity	0.00	2.50	5.00	5.00					
G1, G2, G12, G13	LDZ Commodity	0.00	13.00	26.00	26.00					
G1, G2, G12, G13	Cust Commodity	0.00	14.00	28.00	28.00	14.00				
G1, G2, G12, G13	NTS Entry	0.00	1.30	2.60	2.60	1.30				
G1, G2, G12, G13	NTS Exit	0.00	3.00	6.00	6.00	3.00				
G1, G2, G12, G13	LDZ Capacity	0.00	15.00	30.00	30.00	15.00				
G1, G2, G12, G13	Cust Capacity	0.00	0.01	0.03	0.03	0.01				
	Total Costs/Avoided Costs	0.00	168.81	337.63	337.63	168.81				0.00
	Total Metering Costs (per customer)									
G1, G2, G7, G8, G9, G10	Customer Recovery	0.00	0.00	0.00	339.00					
G7, G12	Cost of Investigation	0.00	0.00	0.00	500.00					
G6	Reasonable Endeavours Scheme - Investigation Costs	0.00	0.00	0.00	125.00					
G11	Suppliers Proportion of RbD Costs	0.00	-25.32	-50.64	-63.14					0.00
	<b>Total Impact</b>	-420.00	-276.51	-133.02	238.48					0.00
	<b>Cost to RbD Shippers / (domestic consumers)</b>									
G1, G2, G12, G13	Gas Commodity Costs	0.00	-120.00	-240.00	-240.00					0.00
G1, G2, G12, G13	NTS Commodity	0.00	-2.50	-5.00	-5.00					0.00
G1, G2, G12, G13	LDZ Commodity	0.00	-13.00	-26.00	-26.00	-13.00	0.00	0.00	0.00	0.00
G1, G2, G12, G13	Cust Commodity	0.00	-14.00	-28.00	-28.00	-14.00	0.00	0.00	0.00	0.00
G1, G2, G12, G13	NTS Entry	0.00	-1.30	-2.60	-2.60	-1.30	0.00	0.00	0.00	0.00
G1, G2, G12, G13	NTS Exit	0.00	-3.00	-6.00	-6.00	-3.00	0.00	0.00	0.00	0.00
G1, G2, G12, G13	LDZ Capacity	0.00	-15.00	-30.00	-30.00	-15.00	0.00	0.00	0.00	0.00
G1, G2, G12, G13	Cust Capacity	0.00	-0.01	-0.03	-0.03	-0.01	0.00	0.00	0.00	0.00
G15	Proportion of Reasonable Endeavours Scheme Costs	0.00	0.00	0.00	-83.33	0.00				0.00
	<b>Total</b>	0.00	-168.81	-337.63	-420.96	-168.81				0.00
G11	Supplier Proportion of RbD Costs	0.00	25.32	50.64	63.14	25.32				0.00
	<b>Total</b>	0.00	-143.49	-286.98	-357.82	-143.49				0.00
	<b>Costs to Total Gas Society</b>									
G15	Costs Relating to Reasonable Endeavours Scheme				-41.67	0.00				
	<b>Meter Operator</b>									
	Total Metering Revenue (per customer)				0.00	0.00	0.00	0.00	0.00	0.00
	<b>Costs/Revenue to DNO</b>									
G1, G2, G12, G13	NTS Commodity									
G1, G2, G12, G13	LDZ Commodity									
G1, G2, G12, G13	Cust Commodity									
G1, G2, G12, G13	NTS Entry									
G1, G2, G12, G13	NTS Exit									
G1, G2, G12, G13	LDZ Capacity									
G1, G2, G12, G13	Cust Capacity									
G1, G2, G12, G13	<b>Total</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Upon the discovery of theft the thief is charged for the stolen gas along with the cost of the investigation; however it was agreed that not all costs were likely to be paid and so this value is reduced based upon Assumptions G8 & G9

A value of £500 was decided upon for the costs of investigation but depending on its nature this can vary considerably.

The thief's incurred costs then become a benefit to the shipper.

Once theft has been identified the shipper can claim under the REDS scheme, on average this has a value of £125. However under the new proposals this could rise considerably.

Upon the discovery of theft the shipper will be able to submit new and accurate meter reads; this will increase the AQ and reduce the costs to the RbD community.

The costs of the REDS scheme are apportioned between the RbD and the non-RbD community using Variable G15.

### Theft discovered – electricity (a) customer retained

Impact of Theft Discovery		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Cash flows (NPV)													
<b>Benefit to Thief</b>													
E1, E2, E12	Avoided Supply Charges	300.00	300.00	300.00	0.00								0.00
E1, E2, E7, E8, E9, E10	Profit recovery	0.00	0.00	0.00	-385.00								0.00
	<b>Total</b>	300.00	300.00	300.00	-385.00								0.00
<b>Cost to Supplier:</b>													
E1, E2, E12	Supplier's Revenue	-300.00	-300.00	-300.00	0.00								0.00
Costs/Avoided costs													
E1, E2, E12	Electricity Commodity Costs	152.00	152.00	152.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E1, E2, E12	BSUoS	3.60	3.60	3.60	0.00								0.00
E1, E2, E12	TNUoS	12.00	12.00	12.00	0.00								0.00
E1, E2, E12	DUoS (Variable)	40.00	40.00	40.00	0.00								0.00
	<b>Total</b>	207.60	207.60	207.60	0.00								0.00
	Lost Profit Margin	-92.40	-92.40	-92.40	0.00								0.00
Total Metering Costs (per customer)													
DUoS (Fixed - per customer)													
Reconciled Historic Costs													
E14	Energy	0.00	0.00	0.00	-177.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E14	Other	0.00	0.00	0.00	-64.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Theft Losses Incentive Scheme													
E1, E2, E7, E8, E9, E10	Customer Recovery	0.00	0.00	0.00	385.00								0.00
E7	Cost of Investigation	0.00	0.00	0.00	-500.00								0.00
Reasonable Endeavours Scheme													
E11	Supplier's Impact of NHH Costs	-5.56	-17.97	-11.56	13.48	0.00	-19.58	-19.58	-19.58	22.85	0.00	0.00	0.00
	Supplier's Impact of HH Costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Total</b>	-97.96	-110.37	-103.96	-343.72	0.00	-19.58	-19.58	-19.58	22.85	0.00	0.00	0.00
<b>Cost to Society through NHH / (non half hourly)</b>													
Revenue to NHH Suppliers													
E1, E2, E12	Electricity Commodity Costs	-152.00	-152.00	-152.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E1, E2, E12	BSUoS	-3.60	-3.60	-3.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E1, E2, E12	TNUoS	-12.00	-12.00	-12.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E1, E2, E12	DUoS Variable	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benefit from Reconciled Historic Costs													
E14	Energy	0.00	0.00	0.00	177.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E14	Other	0.00	0.00	0.00	64.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Costs of Incentive Scheme													
E6, E15	DNO Losses Incentive	9.04	-138.88	0.00	-119.04	-119.04	-119.04	138.88	0.00	0.00	0.00	0.00	0.00
E6, E15	Units Revenue Driver	1.52	-13.44	0.00	-11.52	-11.52	-11.52	13.44	0.00	0.00	0.00	0.00	0.00
	Reasonable Endeavours	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E11	Supplier's Impact of NHH Costs	1.56	-13.48	0.00	19.58	19.58	19.58	-22.85	0.00	0.00	0.00	0.00	0.00
	<b>Total</b>	11.60	-165.80	0.00	-110.976	-110.976	-110.976	129.472	0	0	0	0	0
<b>Cost to Society through HH</b>													
E6, E15	DNO Losses Incentive	7.68	7.68	7.68	-8.96	0.00	-7.68	-7.68	-7.68	8.96	0.00	0.00	0.00
E6, E15	Units Revenue Driver	87.04	87.04	87.04	-101.55	0.00	-87.04	-87.04	-87.04	101.55	0.00	0.00	0.00
	Supplier's Impact of HH Costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Total</b>	87.04	87.04	87.04	-101.55	0.00	-87.04	-87.04	-87.04	101.55	0.00	0.00	0.00
<b>Net Position of All Electric Members</b>													
		-42.40	-125.16	-82.40	-368.87	0.00	-217.60	-217.60	-217.60	253.87	0.00	0.00	0.00
<b>Meter Operator</b>													
Total Metering Revenue													
		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Costs/Revenue to DNO													
E6, E15	Theft Losses Incentive	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E6, E15	DNO Losses Incentive	231.47	0.00	198.40	198.40	198.40	198.40	-231.47	0.00	0.00	0.00	0.00	0.00
E6, E15	Units Revenue Driver	22.40	0.00	19.20	19.20	19.20	19.20	-22.40	0.00	0.00	0.00	0.00	0.00
	DUoS (Fixed - per cust)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E13	DUoS (Variable)	-40.00	42.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Total</b>	-257.60	-174.84	-217.60	253.87	0.00	217.60	217.60	217.60	-253.87	0.00	0.00	0.00

Upon the discovery of theft the thief is charged for the stolen electricity along with the cost of the investigation; however it was agreed that not all costs were likely to be paid and so this value is reduced.

Within the electricity market reconciliation takes place. The result of this is that upon theft being entered into settlement the supplier will be charged for the units stolen. However they are only charged for those units consumed within the past 14 months.

As a member of the NHH market, the electricity supplier will be responsible for a proportion of the total costs to the NHH market. This will be dependent upon their market share. The same applies for the HH market (currently set at 0 %).

The NHH community sees the benefit of the supplier's reconciliation.

The operation of the electricity market is such that upon discovery of theft the electricity society pays the DNOs through the losses incentive and units revenue drivers schemes.

DNOs benefit from the losses incentive and revenue drivers schemes from units entered into settlement.

### Theft discovered – electricity (b) customer leaves

Marginal Impact of Theft Discovery and Customer Switching (Old Scheme)													
Cash flows (NPV)		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
<b>Benefit to Thief</b>													
E1, E2, E12	Avoided Supply Charges	0.00	0.00	0.00	-300.00	-300.00	-300.00	-300.00	-300.00	-300.00	-300.00	-300.00	-300.00
E1, E2, E7, E8, E9, E10	Profit recovery	0.00	0.00	0.00	-385.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Total</b>	0.00	0.00	0.00	-685.00	-300.00	-300.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Cost to Supplier:</b>													
E1, E2, E12	Supplier's Revenue	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Supplier Costs</b>													
E1, E2, E12	Electricity Commodity Costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E1, E2, E12	BSUoS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E1, E2, E12	TNUoS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E1, E2, E12	DUoS (Variable)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Profit Margin</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Metering Costs (per customer)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	DUoS (Fixed - per customer)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Reconciled Historic Costs</b>													
E14	Energy	0.00	0.00	0.00	-177.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E14	Other	0.00	0.00	0.00	-64.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Theft Losses Incentive Scheme	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E1, E2, E7, E8, E9, E10	Customer Profit Recovery	0.00	0.00	0.00	385.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E7	Cost of Investigation	0.00	0.00	0.00	-500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Reasonable Endeavours Scheme	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E11	Supplier's Impact of NHH Costs	0.00	0.00	0.00	25.04	11.56	11.56	11.56	11.56	53.99	31.14	31.14	31.14
	Supplier's Impact of HH Costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Total</b>	0.00	0.00	0.00	-332.16	11.56	11.56	11.56	11.56	53.99	31.14	31.14	31.14
<b>Cost to Society through NHH / (non half hourly)</b>													
	Revenue to NHH Suppliers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E1, E2, E12	Electricity Commodity Costs	0.00	0.00	0.00	152.00	152.00	152.00	152.00	152.00	152.00	152.00	152.00	152.00
E1, E2, E12	BSUoS	0.00	0.00	0.00	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
E1, E2, E12	TNUoS	0.00	0.00	0.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
E1, E2, E12	Redistributed Variable DUoS Costs	0.00	0.00	0.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
<b>Benefit from Reconciled Historic Costs</b>													
E14	Energy	0.00	0.00	0.00	177.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E14	Other	0.00	0.00	0.00	64.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Costs of Incentive Schemes</b>													
E6, E15	DNO Losses Incentive Scheme	0.00	0.00	0.00	-257.92	-119.04	-119.04	-119.04	-119.04	138.88	0.00	0.00	0.00
E6, E15	Units Revenue Driver	0.00	0.00	0.00	-24.96	-11.52	-11.52	-11.52	-11.52	13.44	0.00	0.00	0.00
	Reasonable Endeavours Scheme	0.00	0.00	0.00	166.92	77.04	77.04	77.04	77.04	359.92	207.60	207.60	207.60
E11	Supplier's Impact of NHH Costs	0.00	0.00	0.00	-25.04	-11.56	-11.56	-11.56	-11.56	-53.99	-31.14	-31.14	-31.14
	<b>Total</b>	0.00	0.00	0.00	141.88	65.48	65.48	65.48	65.48	305.93	176.46	176.46	176.46
<b>Cost to Society through HH / (half hourly)</b>													
E6, E15	DNO Losses Incentive Scheme	0.00	0.00	0.00	-171.95	-79.36	-79.36	-79.36	-79.36	92.59	0.00	0.00	0.00
E6, E15	Units Revenue Driver	0.00	0.00	0.00	-16.64	-7.68	-7.68	-7.68	-7.68	8.96	0.00	0.00	0.00
	Reasonable Endeavours Scheme	0.00	0.00	0.00	-188.59	-87.04	-87.04	-87.04	-87.04	101.55	0.00	0.00	0.00
	Supplier's Impact of HH Costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Total</b>	0.00	0.00	0.00	-188.59	-87.04	-87.04	-87.04	-87.04	101.55	0.00	0.00	0.00
<b>Net Position of All Electric Members</b>													
		0.00	0.00	0.00	-378.87	-10.00	-10.00	-10.00	-10.00	461.47	207.60	207.60	207.60
<b>Meter Operator</b>													
	Total Metering Revenue (per customer)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Costs/Revenue to DNO</b>													
	Theft Losses Incentive Scheme	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E6, E15	DNO Losses Incentive Scheme	0.00	0.00	0.00	429.87	198.40	198.40	198.40	198.40	-231.47	0.00	0.00	0.00
E6, E15	Units Revenue Driver	0.00	0.00	0.00	41.60	19.20	19.20	19.20	19.20	-22.40	0.00	0.00	0.00
	DUoS (Variable)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E13	DUoS (Fixed - per customer)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Total</b>	0.00	0.00	0.00	471.47	217.60	217.60	217.60	217.60	-253.87	0.00	0.00	0.00

The thief continues to pay for their supply of electricity, but this will be to an alternative supplier and so is not fully illustrated within this model.

The result of the thief switching suppliers is that the supplier will gain no benefit from future revenue.

Despite the thief switching suppliers after identifying a case of theft the supplier is still responsible for entering the units into settlement.

The supplier gains some benefit from their proportion of the reduced GCF costs.

All parties end up in the same situation as they would have been had the customer not switched (see previous models).

## Total market view – gas

Data Ref	Impact of Theft	
	Cash flows (NPV)	Base Case
	<b>Benefit to Thief</b>	
G1, G2, G12, G3, G4	Avoided Supply Charges	24,780,000
G1, G2, G7, G8, G9, G10, G5	Profit Recovery	-576,300
		24,203,700
	<b>Cost to Supplier:</b>	
G1, G2, G12, G3, G4	Supplier's Revenue	-24,780,000
	<b>Supplier Costs/Avoided Costs</b>	
G1, G2, G12, G13, G5	Gas Commodity Costs	-408,000
G1, G2, G12, G13, G5	NTS Commodity	-8,500
G1, G2, G12, G13, G5	LDZ Commodity	-44,200
G1, G2, G12, G13, G5	Cust Commodity	-47,600
G1, G2, G12, G13, G5	NTS Entry	-4,420
G1, G2, G12, G13, G5	NTS Exit	-10,200
G1, G2, G12, G13, G5	LDZ Capacity	-51,000
G1, G2, G12, G13, G5	Cust Capacity	-47
	Total Costs/Avoided Costs	-573,967
	<b>Supplier Costs/Avoided Costs</b>	
G1, G2, G12, G13, G5	Gas Commodity Costs	14,180,000
G1, G2, G12, G13, G5	NTS Commodity	295,000
G1, G2, G12, G13, G5	LDZ Commodity	1,534,000
G1, G2, G12, G13, G5	Cust Commodity	1,652,000
G1, G2, G12, G13, G5	NTS Entry	153,400
G1, G2, G12, G13, G5	NTS Exit	354,000
G1, G2, G12, G13, G5	LDZ Capacity	1,770,000
G1, G2, G12, G13, G5	Cust Capacity	1,618
	Total Costs/Avoided Costs	19,920,010
	Total Metering Costs (per customer)	
G1, G2, G7, G8, G9, G10, G5	Customer Profit Recovery	576,300
G7, G12, G4	Cost of Investigation	-2,000,000
G1, G2, G7, G8, G9, G10, S2, G1	Reasonable Endeavours Scheme - Ir	212,500
	<b>Total Impact</b>	-6,645,149
	<b>Cost to RbD Shippers / (domestic consumers)</b>	
	<b>Supplier Costs/Avoided Costs</b>	
G1, G2, G12, G13, G5	Gas commodity costs	408,000
G1, G2, G12, G13, G5	NTS Commodity	8,500
G1, G2, G12, G13, G5	LDZ Commodity	44,200
G1, G2, G12, G13, G5	Cust Commodity	47,600
G1, G2, G12, G13, G5	NTS Entry	4,420
G1, G2, G12, G13, G5	NTS Exit	10,200
G1, G2, G12, G13, G5	LDZ Capacity	51,000
G1, G2, G12, G13, G5	Cust Capacity	47
	Total Costs/Avoided Costs	573,967
	<b>Supplier Costs/Avoided Costs</b>	
G1, G2, G12, G13, G5	Gas Commodity Costs	-14,180,000
G1, G2, G12, G13, G5	NTS Commodity	-295,000
G1, G2, G12, G13, G5	LDZ Commodity	-1,534,000
G1, G2, G12, G13, G5	Cust Commodity	-1,652,000
G1, G2, G12, G13, G5	NTS Entry	-153,400
G1, G2, G12, G13, G5	NTS Exit	-354,000
G1, G2, G12, G13, G5	LDZ Capacity	-1,770,000
G1, G2, G12, G13, G5	Cust Capacity	-1,618
	Total Costs/Avoided Costs	-19,920,018
G1, G2, G7, G8, G9, G10, S2, G1	Reasonable Endeavours Scheme Imj	-212,500

Cost to Thief:  
Costs are calculated by multiplying the no of MPRNs by the value of the individual cases  
Number of Cases of Theft - No of cases investigated.  
The assumption is that all those cases investigated will result in reduced theft.

The costs to the supplier are calculated by the number of cases of theft multiplied by the cost of theft identified in the original models.

Avoided Supplier costs are calculated by multiplying the number of cases of theft that are not investigated by the costs of theft identified within the initial model.

Cost of Investigation & REDS scheme:  
The number of cases of theft investigated multiplied by the cost per case and the benefit per case.

The supplier's costs are the avoided costs of the RbD community.

The avoided costs of the suppliers are the total costs to the RbD community.

## Total market view – electricity

<b>Impact of Theft</b>	
Cash flows (NPV)	Current Scheme
<b>Benefit to Thief</b>	
Avoided Supply Charges	26,160,000
Profit recovery	-8,393,000
<b>Cost to Supplier:</b>	
Supplier's Lost Revenue	-26,160,000
<b>Supplier Avoided Costs</b>	
Electricity Commodity Costs	13,254,400
BSUoS	313,920
TNUoS	1,046,400
DUoS (Variable)	3,488,000
	18,102,720
<b>Supplier Costs</b>	
Electricity Commodity Costs	-3,313,600
BSUoS	-78,480
TNUoS	-261,600
DUoS (Variable)	-872,000
	-4,525,680
<b>Reconciled Historic Costs</b>	
Energy	-3,865,867
Other	-1,414,093
<b>Supplier/DNO Losses Incentive Scheme</b>	
Customer Profit Recovery	8,393,000
Cost of Investigation	-10,900,000
<b>Reasonable Endeavours Scheme</b>	
<b>Total</b>	-20,369,920
<b>Cost to Society through NHH / (non half hourly)</b>	
Electricity Commodity Costs	-13,254,400
BSUoS	-313,920
TNUoS	-1,046,400
Redistributed Variable DUoS Costs	-3,488,000
<b>Total</b>	-18,102,720
<b>Avoided Costs to Society through NHH</b>	
Electricity Commodity Costs	3,313,600
BSUoS	78,480
TNUoS	261,600
Redistributed Variable DUoS Costs	872,000
<b>Benefit from Reconciled Historic Costs</b>	
Energy	3,865,867
Other	1,414,093
<b>Costs of Incentive Schemes</b>	
Losses Incentive Scheme	-2,595,072
Units Revenue Driver	-251,136
Reasonable Endeavours Scheme	-11,143,288.00
<b>Cost to Society through HH / (half hourly)</b>	
Losses Incentive Scheme	-1,730,048
Units Revenue Driver	-167,424
<b>Total</b>	-1,897,472.00
<b>Net Position of All Electric Members</b>	-33,410,680
<b>Meter Operator</b>	
Total Metering Revenue (per customer)	0
<b>Costs/Revenue to DNO</b>	
<b>Losses Sharing Scheme</b>	
Losses Incentive Scheme	4,325,120
Units Revenue Driver	418,560
<b>Total</b>	4,743,680

**Cost to Thief:**  
Costs are calculated by multiplying the number of MPANs by the value of the individual cases  
Number of Cases of Theft - Number of cases investigated.  
The assumption is that all those cases investigated will result in reduced theft.

Avoided supplier costs are calculated by multiplying the number of cases of theft that are not investigated by the costs of theft identified within the initial model.

The costs to the supplier are calculated by the number of cases of theft multiplied by the cost of theft identified in the original models.

In the electricity market reconciliation takes place. The result of this is that the supplier is charged for each unit that is entered into settlement. This results in a benefit to the NHH society.

The supplier's avoided costs are society's costs.

The supplier's costs are avoided costs to society.

The operation of the electricity market is such that upon discovery of theft the electricity society pays the DNOs through the losses incentive and units revenue drivers schemes. This is to recoup the

#### 4. Model outputs

4.1 The financial outcomes for ‘theft not found’ and ‘theft discovered’ are based on an individual case of theft and the ‘total market view’ is based on estimates of the total levels of theft in the industry. Baseline outputs show the current impact of theft within the gas and electricity markets and revised outputs show the benefits to the gas and electricity markets of the proposed incentive schemes. It is important to understand who the ‘winners and losers’ of theft are, as an aim of the incentive schemes is to place stakeholders in a more favourable position once theft has been discovered than if theft had been left undetected; thus they should be seen as ‘winners’. For this reason a colour coding system has been adopted; the colour red will depict a ‘loser’, blue that they are neutral to the situation and then green will show that they benefit from the situation (a ‘winner’).

##### Theft not found

4.2 The results below illustrate the impact of theft where the case is never identified.

#### Gas market

Baseline outputs	Theft not found - impact of 1 case of theft being undetected for a period of 9 years	
Thief (direct)	£	3,251
Supplier	-£	1,201
RBD Shippers	-£	1,335
Other Society Members	£	-
Total Supplier/Society Impact	-£	2,537
GDN	£	677

#### Electricity market

Baseline outputs	Theft not found - impact of 1 case of theft being undetected for a period of 9 years	
Thief	£	2,322
Supplier	-£	668
NHH excluding Supplier	-£	624
HH Electric Society	£	346
Total Supplier/Society Impact	-£	946
DNO	-£	925

Generally only the ‘thief’ benefits in these instances. Revised outputs are not shown as the proposed incentive schemes will not alter the impact of theft not found.

##### Theft discovered

4.3 Theft discovered (after 3 years). To illustrate the costs involved in investigating theft and the benefits of any incentive schemes, two scenarios are used:

- a) after theft is discovered the customer is retained for 6 years

b) after theft is discovered the customer leaves immediately

The results below show the marginal impact (the difference from the theft not found results in section 4.2) of that case of theft being identified in year 4 and secondly the marginal impact of introducing the new incentive schemes.

**Theft discovered - customer is retained for 6 years**

4.4 The results below illustrate the impact of the customer staying with the Supplier for six years after a theft is discovered.

**Gas outputs**

Baseline outputs	Theft discovered - marginal impact of discovering 1 case of theft after 3 years with 6 years of recovery	Revised Outputs	Marginal impact of new incentive schemes on theft discovered model
Thief (direct)	-£2,354	Thief (direct)	£ -
Supplier	£721	Supplier	£145
RbD Shippers	£635	RbD Shippers	-£ 91
Other Society Members	-£30	Other Society Members	-£54
Total Supplier/ Society Impact	£1,326	Total Supplier/ Society Impact	£ -
GDN	£ -	GDN	£ -

**Electricity outputs**

	Theft discovered - marginal impact of discovering 1 case of theft after 3 years with 6 years of recovery	Marginal impact of introducing Reasonable Endeavours Scheme	Marginal impact of introducing the Supplier/DNO Losses Incentive Scheme	Combined impact of introducing both incentive schemes
Thief	-£1,808	£ -	£ -	£ -
Supplier	£129	£618	£83	£701
NHH excluding Supplier	£386	-£618	£ -	-£618
HH Electric Society	-£288	£ -	£ -	£ -
Total Supplier/Society Impact	£228	£ -	£83	£83
DNO	£814	£ -	-£92	-£92

4.5 In both gas and electricity, discovering theft puts stakeholders (apart from the thief) in a more favourable position and introducing the proposed incentive

schemes further reduces the impact on Suppliers. A Supplier's costs from investigating a theft incident will be reduced as a result of the revised Reasonable Endeavours Scheme and the introduction of the Losses Incentive Scheme but the cost of these schemes is picked up by society (RbD and NHH), which includes Suppliers. This has the effect of apportioning the costs of investigating theft more fairly.

### Theft discovered - customer leaves immediately

4.6 The results below illustrate the impact of the customer changing Supplier immediately after a theft is discovered.

#### Gas outputs

Baseline outputs	Theft discovered - marginal impact of discovering 1 case of theft after 3 years and customer leaves immediately	Revised Outputs	Marginal impact of new incentive schemes on theft discovered model
Thief (direct)	-£2,354	Thief (direct)	
Supplier	£86	Supplier	£145
RbD Shippers	£635	RbD Shippers	-£91
Other Society Members	-£30	Other Society Members	-£54
Total Supplier/Society Impact	£692	Total Supplier/Society Impact	
GDN		DNO	

#### Electricity outputs

	Theft discovered - marginal impact of discovering 1 case of theft after 3 years and customer leaves immediately	Marginal impact of introducing Reasonable Endeavours Scheme	Marginal impact of introducing the Supplier/DNO Losses Incentive Scheme	Combined impact of introducing both incentive schemes
Thief	-£1808			
Supplier	-£188	£618	£83	£701
NHH excluding Supplier	£386	£618		-£618
HH Electric Society	-£288			
Total Supplier/Society Impact	-£89		£83	£83
DNO	£814		-£92	-£92



### Total market position

- 4.7 The earlier results indicate that the present arrangements for gas and electricity do not provide economic reasons for optimal behaviour by industry participants. Work has also been undertaken to assess the impact on the energy market as a whole. This is a particularly important measure as although SETS will not alter the costs incurred in detecting and investigating theft, it is anticipated that it will (combined with the other incentive schemes), encourage greater theft investigation activity that will ultimately deter theft from taking place initially.
- 4.8 The previous results of the model are based on a 9-year view. This total market calculation incorporates the cost of both ongoing theft and the benefit of those cases identified (the expenditure of both Year 3 and Year 4 in the model) and uses the market size data covered in section 3.1. The current financial impacts, as identified by the model, are summarised by the indicative figures in the table below. These estimates on total market size are based on assumptions agreed by the group and although the figures are not precise, the trend of the impacts on Suppliers and society is clearly evident.

Category	Gas	Electricity
<b>Impact on individual stakeholders</b>		
Supplier/Shipper	-£6,645,149	-£19,487,020
Society (RbD/NHH)	-£19,487,718	-£11,143,288
Society (HH)	-£70,833	-£1,897,472
<b>Total Supplier/Society Impact</b>	-£26,203,700	-£32,527,780
Network Operator (DNO/GDN)		£4,743,680

### Total market view under new incentive schemes

- 4.9 The table below illustrates the position when the new incentive scheme proposals are included in the model. As with the earlier illustration, year 3 and year 4 cost values have been combined in order to create this snapshot.

Category	Gas	Electricity
<b>Impact on individual stakeholders</b>		
Suppliers/Shippers	-£6,056,834	£6,125,490
Society (RbD/NHH)	-£18,602,801	-£30,581,357
Society (HH)	-£208,250	-£1,992,346
<b>Total Supplier/Society Impact</b>	-£24,867,885	-£26,448,213
Network Operators (DNO/GDN)		£2,417,184

- 4.10 As explained earlier, the introduction of new incentive schemes will result in an increased expenditure for the RbD (gas) and NHH (electricity) communities (through increased payments). It should be noted that the Supplier will in fact be a member of the RbD or NHH community and will therefore pay a proportion of society's costs based upon their market share. However, the ability to reclaim a greater level of investigation costs should encourage a greater level of investigation. The long-term impact of this will be a reduction in the total level of theft - a modest reduction of 5% is assumed in the model.
- 4.11 In the gas market the total shipper impact is estimated to reduce by £1.3m and in the electricity market the total Supplier impact is estimated to reduce by £6m. It should also be noted that the results illustrate the benefits of the incentive schemes over a short period of time (snap shot) and the benefits could be much higher if the cost recovery period is longer and the effects of increased activity are seen over a prolonged period.

### Appendix 3 – Draft Reasonable Endeavours claim form

MPRN/MPAN:	<input type="text"/>	Duration of ToG/ Power:	From:	To:
Premise Number:	<input type="text"/>	Date Incident Reported:	<input type="text"/>	
Postcode:	<input type="text"/>	Agent Ref. (For gas from QMS or ConQuest):	<input type="text"/>	
Network Operator:	<input type="text"/>	Domestic or I&C/NHH	<input type="text"/>	

<b>Supplier to confirm that prior to any RP visit:</b>	
Consumption checks were undertaken; and/or	<input type="text"/>
Steps were taken to ensure property was not empty; and/or	<input type="text"/>
Evidence of possible theft provided by agency	<input type="text"/>

**Claims:**

Claim £	Gas Cap * (Dom/I&C)	Electricity * Cap	Total £ Claim
Cost of visit by RP staff (per visit)	£60.00		
Warrant charges	£76.00		
Locksmith charges	£76.00		
Supplier and RP admin for investigations	£180.00		
Obtaining police report	£50.00		
Calculation of estimated kWh & Period	£50.00		
Meter Exchange (CR to CR)	£53/£781		
Meter Exchange (CR to PP)	£65.00		
Meter Exchange (PP to PP)	£250.00		
Meter disconnection costs	£45/£277		
Forensic tests	£50.00		
Security devices	£51.00		
Court visits/costs (I&C only)	£250.00		
Timeswitch	n/a		
De-energise / Re-energise	n/a		
Miscellaneous work	n/a		
Total claim			
Subtract amount recovered from customer			
Net Claim			

**Evidence Required:**

Evidence Required:	Included
Report from RP agent (1 per claim required)	
Date & report	
Date & report	
n/a	
Copy of police report	
kWh value & period	
Date of meter exchange	
Date of meter exchange	
Date of meter exchange	
Date of disconnection	
Date & report of forensic test	
Date & report of devices fitted	
Detailed breakdown (please continue on separate sheet)	
Date & report	
Date & report	
Date & report	
Explain why full amount not recoverable	
<input type="text"/>	

Agent only

Claim checked by

Claim authorised by

Total value claim authorised

Date

Name of person completing REDS Forms

Name of Person Approving Claims

Signature of Person Approving Claims

Date

\* Figures will be consulted on.

## Appendix 4 – Gas SETS examples

Shipper	Number of Valid ToGs Closed												Total Theft	% Theft	% Portfolio	Difference	Payment	
	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05						
A													0	0.00%	0.30%	-0.30%	-£600.00	
B	139	32	97	60	89	26	75	159	52	104	120	152	1105	66.57%	50.00%	16.57%	£33,132.53	£200,000.00 Assumed Incentive fund
C	13					12		1		2	10	4	42	2.53%	3.75%	-1.22%	-£2,439.76	
D								11					11	0.66%	0.56%	0.10%	£205.30	£45,155.42 Total credits paid
E	4	4	5	11	6	5	1	2	11	12			61	3.67%	1.59%	2.08%	£4,169.40	
F													0	0.00%	0.14%	-0.14%	-£280.00	-£45,161.42 Total debits received
G	11	10	4	3	10	2	10	4		1		2	57	3.43%	2.63%	0.80%	£1,607.47	
H													0	0.00%	0.05%	-0.05%	-£100.00	£6.00 Rounding Difference
I													0	0.00%	0.01%	-0.01%	-£20.00	
J	9	2	19	11	3	4	6	3	6	7	10		80	4.82%	8.46%	-3.64%	-£7,281.45	
K	2					12			3	2			19	1.14%	6.54%	-5.40%	-£10,790.84	
L		10	1	12	1			10		4	2	10	50	3.01%	2.03%	0.98%	£1,964.10	7 Beneficiaries
M	2	2	5	2	13	2	12	1	1	18	2		60	3.61%	10.00%	-6.39%	-£12,771.08	
N	6	8	4	6	6	10	7	3	5	30	10	3	98	5.90%	6.35%	-0.45%	-£892.77	All other shippers would be neutral or would make a payment.
O						2		7	12	3		5	29	1.75%	1.45%	0.30%	£593.98	
P	7	1	13	2	2	4	1	1		5	1	10	47	2.83%	1.09%	1.74%	£3,482.65	
Q													0	0.00%	0.01%	-0.01%	-£20.00	
R													0	0.00%	0.00%	0.00%	-£6.00	
S													0	0.00%	0.07%	-0.07%	-£140.00	
T													0	0.00%	0.08%	-0.08%	-£160.00	
U													0	0.00%	0.50%	-0.50%	-£1,000.00	
V													0	0.00%	0.01%	-0.01%	-£20.00	
W													0	0.00%	0.96%	-0.96%	-£1,920.00	
X													0	0.00%	0.00%	0.00%	£0.00	
Y													0	0.00%	0.00%	0.00%	£0.00	
Z													0	0.00%	0.03%	-0.03%	-£60.00	
AA													0	0.00%	0.00%	0.00%	£0.00	
BB													0	0.00%	0.15%	-0.15%	-£300.00	
CC												1	1	0.06%	0.36%	-0.30%	-£599.52	
DD													0	0.00%	0.00%	0.00%	£0.00	
EE													0	0.00%	0.01%	-0.01%	-£20.00	
FF													0	0.00%	0.08%	-0.08%	-£160.00	
GG													0	0.00%	0.27%	-0.27%	-£540.00	
HH													0	0.00%	1.00%	-1.00%	-£2,000.00	
II													0	0.00%	0.50%	-0.50%	-£1,000.00	
JJ													0	0.00%	0.50%	-0.50%	-£1,000.00	
KK													0	0.00%	0.50%	-0.50%	-£1,000.00	
LL													0	0.00%	0.02%	-0.02%	-£40.00	
Totals	193	69	148	107	130	79	112	202	90	188	155	187	1,660	100.00%	100.00%	-£0.00	-£6.00	

## Appendix 5 – Electricity SETS examples

Number of Definite Interferences														Total Theft	% Theft	% Portfolio	Difference	Payment
Supplier	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05						
A	50	49	61	43	58	95	50	49	61	43	58	95	516	15.74%	16.00%	-0.26%	-£517.39	
B	0	1	0	0	0	1	0	1	0	0	0	1	4	0.12%	2.00%	-1.88%	-£3,755.95	£200,000.00 Assumed Incentive fund
C	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%	0.00%	0.00%	£0.00	
D	87	98	109	77	105	101	87	98	109	77	105	101	1154	35.20%	30.00%	5.20%	£10,408.79	£16,606.47 Total credits paid
E	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%	0.50%	-0.50%	-£1,000.00	
F	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%	0.00%	0.00%	£0.00	-£16,606.47 Total debits received
G	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%	0.00%	0.00%	£0.00	
H	1	0	0	0	0	0	1	0	0	0	0	0	2	0.06%	0.20%	-0.14%	-£277.97	
I	0	12	8	15	21	21	0	12	8	15	21	21	154	4.70%	6.00%	-1.30%	-£2,604.03	
J	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%	0.00%	0.00%	£0.00	
K	65	76	70	81	103	128	65	76	70	81	103	128	1046	31.91%	29.00%	2.91%	£5,819.40	
L	3	6	6	6	4	6	3	6	6	6	4	6	62	1.89%	2.00%	-0.11%	-£217.21	
M	25	30	29	28	29	26	25	30	29	28	29	26	334	10.19%	10.00%	0.19%	£378.28	
N	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%	0.10%	-0.10%	-£200.00	
O	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%	1.00%	-1.00%	-£2,000.00	
P	0	0	1	1	1	0	0	0	1	1	1	0	6	0.18%	1.00%	-0.82%	-£1,633.92	
Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%	1.00%	-1.00%	-£2,000.00	
R	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%	0.00%	0.00%	£0.00	
S	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%	1.00%	-1.00%	-£2,000.00	
T	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%	0.00%	0.00%	£0.00	
U	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%	0.10%	-0.10%	-£200.00	
V	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%	0.10%	-0.10%	-£200.00	
Totals	231	272	284	251	321	378	231	272	284	251	321	378	3,278	100.00%	100.00%	-£0.00	£0.00	

These figures do not represent the true market share of any Suppliers and are designed to show what happens when a company has a larger market share, and performs below, above or at expectations.

## Appendix 6 – Data gathering

Data will be required both to support the industry’s monitoring and review of the schemes, and to provide Ofgem with information concerning industry activity. It is anticipated that statistics will be collected monthly and shared on an anonymous basis with industry participants. Periodic reports to Ofgem will be delivered as required.

The combined data set below will fulfil the requirements of both sets of reporting.

	<b>Electricity cases suspected</b>	<b>Gas cases suspected</b>
1	Supplier ID	Shipper ID
2	MPAN	MPRN
3	MSN	MSN
4	Source of lead	Source of lead
5	Investigated (y/n)	Investigated (y/n)
6	Theft identified (y/n)	Theft identified (y/n)
7	Date supply started	Date supply started
8	Estimated unrecorded volume	Estimated unrecorded volume
9	Estimated timescale of interference	Estimated timescale of interference
10	Amount charged to customer’s account	Amount charged to customer’s account
11	Amount entered into settlement by data collector	Amount entered into shrinkage
12	Amount/value of energy recovered from customer	Amount/value of energy recovered from customer
13	DNO region	LDZ
14	Whether supply disconnected	Whether supply isolated
15	Cost of investigation	Cost of investigation
16	Theft related to other illegal activities: Drugs Other	Theft related to other illegal activities: Drugs Other
17	Criminal prosecution attempted	Criminal prosecution attempted
18	Criminal prosecution successful	Criminal prosecution successful

## Appendix 7 – Governance options

### Governance options for the incentive schemes

Scheme Title	Governance Home	Users
Reasonable Endeavours	<b>Gas:</b> Supply Licence; Uniform Network Code (UNC)/Independent Gas Transporter UNC <b>Electricity:</b> Supply Licence; Master Registration Agreement	Suppliers/Transporters  Suppliers/Distributors
Supplier Energy Theft Scheme	<b>Gas:</b> Supply Point Administration Agreement <b>Electricity:</b> Master Registration Agreement	Suppliers
Losses Incentive Scheme	<b>Electricity only:</b> Distribution Connection and Use of System Agreement; Master Registration Agreement	Suppliers/Distributors

**Appendix 8 - Members of the development group**  
(alphabetical order by organisation and then name)

Angela Mann, Central Networks  
George Moran, Central Networks  
Tahir Majid, Centrica  
James Rudolph, Centrica  
Richard Thompson, Centrica  
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Rosie McGlynn, E.ON  
Kate Potts, E.ON  
David Speake, ES Pipelines  
Chris Shanley, National Grid  
Gerald Jago, RWE npower  
Andrew Manning, RWE npower  
Andrew Wallace, Ofgem  
Richard Westoby, Scottish and Southern  
Steve Nunnington, xoserve