

# Tackling Electricity Theft - The way forward

## Final Impact Assessment

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### Overview:

The theft of electricity has a material impact on customers in terms of both cost and safety. We consider that the existing regulatory framework does not adequately encourage suppliers to be proactive in detecting and deterring theft.

This document presents the updated Impact Assessment of the proposed policy measures to increased theft detection. They include the Theft Risk Assessment Service (TRAS) and an incentive scheme.

We also provide a summary of the response to the July consultation on tackling electricity theft.

## Context

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This document reflects our commitment, set out our Forward Work Programme 2013-14, to support industry initiatives to revise anti-theft arrangements and to consider whether further action is required.

Here we focus on the electricity market. We intend to build on arrangements for tackling gas theft developed in 2012.

Our proposals also support several key themes outlined in our Corporate Strategy and Plan 2011-16. These include promoting value for customers and protecting the interests of vulnerable customers, helping to maintain security of supply and achieving a low-carbon economy.

## Associated documents

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- Tackling electricity theft: consultation and Impact Assessment  
<https://www.ofgem.gov.uk/publications-and-updates/tackling-electricity-theft-consultation>
- Tackling gas theft: the way forward and Final Impact Assessment, March 2012, Ofgem (Ref: 35/12)  
<http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=100&refer=Markets/RetMkts/Compl/Theft>
- TRAS Direction, January 2013, Ofgem  
<http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=149&refer=Markets/RetMkts/Compl/Theft>
- Standing Issue 39 Final Report, February 2011, Elexon  
<http://www.elexon.co.uk/Pages/Issue39.aspx>
- Strategy consultation for the RIIO-ED1 electricity distribution price control - Outputs, incentives and innovation, September 2012, Ofgem (Ref 122/12)  
<http://www.ofgem.gov.uk/Networks/ElecDist/PriceCtrls/riio-ed1/consultations/Documents1/RIIOED1SConOutputsIncentives.pdf>
- Theft of Gas and Electricity - Discussion Document, April 2004, Ofgem (Ref: 85/04)  
<http://www.ofgem.gov.uk/Markets/RetMkts/Compl/Theft/Documents1/6839-8504Energytheft.pdf>
- Theft of Energy Incentive Group – Final Proposals, June 2007, ENA and ERA  
<http://www.energy-retail.org.uk/documents/ReportoftheTheftIncentiveSchemeDevelopmentGroup-FinalProposalsJune2007.pdf>
- DCP080/80A – Theft in conveyance, September 2011, Ofgem  
<http://www.ofgem.gov.uk/Licensing/ElecCodes/DCUSA/Changes/Documents1/DCP080%20080A%20D.pdf>

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# 1. Final Impact Assessment

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## **Chapter Summary**

This chapter presents an update of our impact assessment in light of further input received from stakeholders.

- 1.1. This chapter sets out our final impact assessment on the proposed policy measures to support the investigation, detection and prevention of theft in the electricity market. They include the TRAS and the incentive schemes.
- 1.2. We published a draft impact assessment alongside our July 2013 consultation. This draft focused on the incentive schemes and policy measures that could be implemented under industry code governance arrangements to encourage suppliers to take steps to investigate, detect and prevent electricity theft, and where theft is detected, to report accurate estimates of unrecorded units into settlement following detection.
- 1.3. Our draft impact assessment covered these candidate schemes:
  - A detection-based incentive scheme that would offer suppliers a payment for each confirmed theft detected.
  - A volume-based incentive that would offer suppliers a payment for each unrecorded stolen unit of electricity they enter into settlement following a confirmed theft.
  - A settlement cost-sharing mechanism that would allow suppliers to share, with all other suppliers, part of the settlement charges they incur when entering previously unrecorded stolen units into settlement following detection of theft. This may be combined with a detection-based incentive scheme.
  - Enhanced audit and performance assurance of settlement arrangements with the aim of ensuring that suppliers produce reasonable estimates of unrecorded units and enter these units into the settlement system.
- 1.4. We also discussed the potential financial costs and benefits of setting up the TRAS.
- 1.5. We use the impact assessment to demonstrate, through both quantitative and qualitative analysis, that consumers could benefit from industry-led incentive and cost-sharing measures. Our impact assessment looks at the costs and benefits of these measures.

## **Respondents' views**

- 1.6. This section summarises the views expressed by stakeholders on our draft impact assessment. A detailed summary of responses can be found in Chapter 2.



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1.7. Most respondents agreed with our approach to the draft impact assessment and considered that it accounted for all relevant impacts. No respondent disagreed with our approach or suggested an alternative approach to the impact assessment.

1.8. They did, however, make these additional points:

- Three respondents expressed a view that our assumptions on the set up and operating costs of the TRAS and the incentive schemes were low.
- One respondent said the costs of operating an incentive and cost-sharing scheme in parallel would be higher than those in our draft impact assessment. The respondent said the “likely costs would be closer to, and probably exceed those for Option 2 in the Issue 39 documentation”.
- One respondent suggested that the quality of available data on theft-related activities is poor, and therefore insufficient to support our quantitative assessment of supplier incentives.
- One respondent suggested that the total value of energy theft is around £500m per year.

### Updating our analysis

1.9. Following our consultation, we have decided to drop the volume-based incentive from our analysis. Our reasons for doing this are:

- Our draft impact assessment identified the risk that a volume-based incentive scheme might encourage suppliers to delay detection of theft as this would lead to higher incentive payments.
- Estimation of the volume of electricity stolen at a site where theft has been detected is not a precise science. A degree of subjectivity is involved in arriving at such estimates. A volume-based incentive scheme might encourage these estimates to be artificially inflated for the purposes of generating higher incentive payments. A volume-based incentive scheme would also be difficult to audit.

1.10. There were two main strands to our draft impact assessment:

- A quantitative assessment of the impact on customers. This analysis illustrated the nature of financial incentives that suppliers face in carrying out theft detection. It also demonstrated that such incentives are not necessarily aligned with the interests of the industry as a whole, and ultimately consumers. Our analysis then looked at how the proposed incentive and cost-sharing arrangements could, subject to various assumptions, deliver benefits to customers by better aligning supplier incentives with the interests of both the industry as a whole, and also consumers.
- A qualitative assessment of the likely effects on aspects of supplier behaviour that would be likely to reduce the incidence and the cost of theft. It also set out some risks associated with unintended consequences or perverse incentives that could arise.

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1.11. In light of the views expressed by respondents to our consultation, we have not seen the need to depart from the broad approach that we used in our draft impact assessment. However, we have adjusted some of the assumptions underpinning our analysis to take account of feedback received. The changes relate to five areas:

- *Set up and operating costs of the TRAS and incentive schemes.* Several respondents to our consultation expressed the view that our assumptions on these costs were too low. We have taken these comments on board and have revised our assumptions on these costs. Our draft quantitative assessment of benefits did not consider one-off set up costs. Rather, it only considered ongoing operating costs in arriving at the annual net benefit figure. We have now updated our analysis to show the set up costs separately in the summary table. We have also revised upwards our ongoing cost assumptions. These are described in the table below.
- *Treatment of cannabis farm detections for incentive purposes.* We have amended our model in order to merge cannabis farm detections with commercial theft for the purposes of estimating the impact of the detection-based incentive scheme. Our updated quantitative analysis assumes that cannabis farm detections would be eligible for the incentive payment at the same rate as a commercial theft.
- *Cap on the incentive "pot".* We have updated our quantitative analysis by introducing a cap on the total size of the incentive pot. This is in response to concerns that an incentive scheme without a cap would expose suppliers to the risk of very high contributions. For our analysis, we now assume a cap of £12.8 million in aggregate. This would include incentive payments for all kinds of theft. The precise split between the different types of theft is for consideration by the industry, but for now we have assumed a split of £11.2 million for domestic theft and £1.6 million for commercial theft. This implies that up to 28,000 domestic and 4,000 commercial theft detections would qualify for incentive payments at the rate of £400 per detection.
- *Industry aggregate occurrence of theft.* An important feature of our quantitative assessment model is that the detection rate per investigation carried out by suppliers falls as the number of investigations carried out increases. The detection rate for a given level of investigations also depends on the total prevailing incidence of theft at that time (detected and undetected). We have revised upwards our assumption on the total number of theft cases occurring at any time so that these are consistent with the view expressed by stakeholders that the total value of energy stolen is approximately £500m a year. We assumed that half of this value is related to electricity theft (£250m a year).

Based on current estimates of average consumption by domestic and commercial customers, we estimate that there are 275,000 cases of domestic theft, 5,000 cases of commercial theft and 4,500 cases of cannabis farm theft taking place at any time.

- *Quantitative impact of the TRAS.* We have updated our quantitative analysis by modelling the impact of the new electricity TRAS. Our approach to quantifying the benefits of the TRAS is to assume that it would improve detection rates for a given number of investigations, ie the

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likelihood that each investigation would result in a successful detection would be boosted by the information gathered and shared by the TRAS. We assume that the TRAS would improve detection rates at low levels of activity by a relatively modest 2 percentage points (from 60 per cent to 62 per cent).

1.12. Table 1 presents an overview of the changes we have made to our assumptions in our final impact assessment. The full set of assumptions used in our analysis is set out in Chapter 3. We also aim to publish the model and the accompanying user manual shortly after publication of the decision document.

**Table 1 - Updated assumptions**

Assumption details	Original assumption	Updated assumption	Basis for new assumptions
Set up costs of the TRAS, incentive and cost sharing schemes	Not shown separately in the quantitative analysis	£1 million (TRAS) £2 million (incentive and cost sharing schemes)	We have extrapolated from the highest reported estimate, instead of the average, of cost submitted by suppliers in response to the BSC Issue 39 questionnaire. This should be a reasonable upper bound for the actual cost. The total figure is also consistent with the upper end of the set up cost assumed in the gas theft IA.
Total annual operating cost of the TRAS, incentive and cost sharing schemes (£)	£1.2 million	£4.5 million	Revised assumption based on feedback to our consultation. The new figure is still a very rough estimate and is higher than the upper end of the assumed costs for the gas theft IA. This should be a reasonable upper bound for the actual cost.
Total numbers of thefts occurring at any time	Domestic: 80,000 Commercial: 2,000 Cannabis farm: 4,000	Domestic: 275,000 Commercial: 5,000 Cannabis farm: 4,500	Numbers updated to make consistent with the feedback that total value of electricity stolen is approximately £250 million a year
Cap on the total incentive “pot” under the detection-based incentive scheme	No cap	Overall cap of £12.8 million. This translates to an annual cap of 28,000 domestic and 4,000 commercial detections at an incentive rate of £400 per detection.	Cap introduced to limit the overall size of the incentive “pot” following concerns expressed by several respondents.
Impact of the TRAS on detection rates	No quantitative impact modelled. The impact of the TRAS only assessed qualitatively.	Assumed improvement of 2 percentage points in detection rates compared to a counterfactual of no TRAS	To reflect some of the potential benefits of the TRAS in our quantitative analysis

### Updated quantitative assessment

1.13. This section summarises the results of our quantitative analysis of the impact of the proposed measures on consumers. The results are based on a simple theoretical model of the financial impacts of theft detection activity both on an electricity supplier and on the wider industry as described in our draft impact assessment.

1.14. The model draws on assumptions in relation to a wide range of factors that may affect the costs and benefits of theft investigation and detection activities. We have updated some of these assumptions following our consultation. Although we have tried to make our assumptions on input data as representative as possible, we recognise that they may not completely reflect the circumstances that individual suppliers face.

1.15. The results of our quantitative analysis are based on the assumption that each supplier will carry out an additional theft investigation only if they can benefit from theft detection. Suppliers could benefit from detecting theft in two ways. First, they may recover a proportion of lost revenue. Second, they may increase the amount of billed consumption by reducing the volume of stolen units going forward.

1.16. [Table 2](#) below summarises the results of our quantitative analysis. These are based on a single set of input data using the central assumption for each variable. Our estimate of the financial impact in each case is based on a counterfactual of no theft investigations and detections by suppliers.

1.17. The financial impacts reported in [Table 2](#) are to be interpreted as follows:

- The base case is based on the latest available levels of theft investigations and detections reported by suppliers (in 2010/2011). The financial impact in this scenario is the estimated benefit to the industry of carrying out this level of activity, compared to a counterfactual of no activity.
- For each scenario, the expected levels of activity are estimated within our model. The financial benefit in each case is the estimated benefit to the industry of carrying out this level of activity, compared to a counterfactual of no activity.
- The incremental financial impact of any scenario is the difference between the estimated financial benefit for that scenario and the financial benefit in the base case.

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**Table 2 - Financial impact**

	Market aggregate number of detections	Absolute financial impact	Incremental financial impact compared to the base case
“Base case”	15,956 (Domestic)	No set up costs	N.A
Current reported levels of activity	750 (Commercial)	Annual benefit: £20.1m	
	1,683 (Cannabis farm)		
<b>Alternative scenarios</b>			
TRAS	Zero (Domestic)	Set up costs: £1m	Set up costs: £1m
+Enhanced audit	Zero (Commercial)	Annual benefit: £4.5m	Annual loss: £15.6m
TRAS	Zero (Domestic)	Set up costs: £3m	Set up costs: £3m
+Enhanced audit	3,551 (Commercial)	Annual benefit: £16.5m	Annual loss: £3.6m
+ 80% cost sharing			
TRAS	28,000 (Domestic)	Set up costs: £3m	Set up costs: £3m
+Enhanced audit	3,831 (Commercial)	Annual benefit: £55.9m	Annual benefit: £35.8m
+ 80% Cost sharing			
+ £400 Detection-based incentive capped to £12.8m			

\* Compared to the counterfactual of no investigations or detections.

### 1.18. Our analysis shows the following:

- The current reported level of theft detection activity by suppliers already delivers some benefit to the industry (£20.1 million). This level of activity is greater than the level of activity predicted by our quantitative model under the “no policy measure” scenario.
- The levels of predicted activity, and associated financial benefits, under each of the first two alternative scenarios are also lower than the base case. This leads to a lower absolute financial benefit relative to the base case.
- Of the scenarios assessed, only a combination of measures that includes the TRAS, enhanced audit, 80 per cent settlement cost sharing and a detection-based incentive scheme is predicted to lead to higher levels of theft detection and incremental financial benefits compared to the base case. This will lead to increased financial benefits to the industry.
- Although we have assumed an incentive payment rate of £400 per detection and an incentive pot size of £12.8 million, other values could also deliver benefits compared to the base case.

### 1.19. Our expectation is that all of the benefits from improved theft detection are spread uniformly across all suppliers and they would be passed through to

consumers in terms of lower bills. The precise extent to which supplier-specific benefits are passed through to consumers would depend on the nature of competitive pressures acting on those suppliers. For the purpose of this impact assessment, we have assumed that competitive pressures in the market would encourage suppliers to pass through the full extent of benefits to consumers.

### **Summary of the qualitative assessment**

1.20. This section summarises the qualitative analysis of the impacts of the proposed measures on suppliers and competition in the market. It explains how the detection incentive and cost-sharing schemes can promote electricity theft detection.

1.21. The financial benefits to a supplier from detecting electricity theft are likely to be smaller than the financial benefits to the industry as a whole. The industry could gain from lower electricity consumption. However, the supplier detecting the theft does not benefit from this saving to any greater degree than other suppliers. In addition, in relation to lawful consumption following detection, the total industry benefit is the total revenue from that consumption (which includes energy, network and balancing costs), while the specific benefit to that supplier is only the profit it earns on that supply (revenue minus its costs).

1.22. The costs faced by an electricity supplier in detecting electricity theft may be greater than the costs to the industry as a whole. In particular, when it detects electricity theft by one of its customers, the supplier may incur liabilities relating to generation, network and balancing costs. These are the costs associated with the entry to the settlement system of an estimate of the volume of electricity stolen by that customer. On the other hand, this action does not lead to an increase in costs at the level of the industry as a whole. This means that theft detection activity by an electricity supplier imposes a positive externality on other suppliers in the industry and, in turn, on consumers.

1.23. The incentive and cost sharing measures we propose are aimed at encouraging theft detection by transferring some of the industry-wide benefits to the individual supplier that has incurred the cost of detection. Table 3 summarises the impact each policy measure could have on different aspects of supplier behaviour.

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**Table 3 - Summary of impact on suppliers**

Desirable actions	Enhanced audit of settlement	Detection-based incentive	Settlement cost-sharing
Action to investigate and detect theft	Likely to deter supplier action to detect theft since there is a higher risk of settlement liabilities. Suppliers who already report accurate estimates would not be affected.	Likely to encourage detections. Low value and easy to detect theft would be particularly profitable for the supplier.	Likely to encourage detections since settlement liabilities would be lower.
Action to prevent and deter theft	Likely to improve incentives for theft prevention action as it is more difficult to pass on the cost of unrecorded volumes to other suppliers and customers.	Likely to weaken incentives to prevent theft. Re-offenders or repeat offenders become lucrative for the supplier. There is an indirect deterrent effect through the increase in the perceived risk of detection as a result of publicity surrounding detections.	Likely to weaken incentives to prevent theft. There is an indirect deterrent effect through increase in the perceived risk of detection through publicity surrounding detections.
Reporting accurate estimates of unrecorded volumes for settlement	Provided there is a credible threat of enforcement action, this is likely to encourage more accurate estimates for settlement.	No impact	Positive impact through reduced liabilities for suppliers when volumes are reported for settlement.
Recover money following theft detection	Likely to improve recovery rates since suppliers are exposed to the full cost of stolen electricity.	No impact	No impact

Source: Ofgem analysis, 2013

## 2. Summary of responses

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### Chapter summary

This chapter lists all those that responded to our July 2013 consultation and summarises their views.

2.1. Our July 2013 consultation and draft Impact Assessment (IA) sought the views of interested parties on a range of proposals to tackle electricity theft. We received 21 responses.

#### List of respondents

	Name
1	British Gas
2	Consumer Futures
3	EDF
4	ElectraLink
5	Electricity North West Limited
6	Elexon
7	Energy UK
8	E.ON
9	Haven Power
10	National Assessor Revenue Protection
11	National Grid Gas Distribution
12	Northern Powergrid
13	Npower
14	Scottish Power
15	SmartestEnergy
16	SP Energy Networks
17	SSE
18	UK Power Networks
19	UKRPA
20	Vernon Coaker
21	Western Power Distribution

2.2. We have published responses that were not marked confidential on our website ([www.ofgem.gov.uk](http://www.ofgem.gov.uk)). Copies of non-confidential responses are also available from our library.

2.3. The following is a summary of the responses we received. The summary has been organised by themes rather than specific questions. This is because respondents raised several broad issues under different questions.

### Chapter 3: Enhancing obligations on suppliers

*Objective and requirement to detect, prevent and investigate theft*

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2.4. Respondents generally supported our proposals to introduce new electricity supply licence obligations in relation to theft. Some respondents considered that licence obligations would help ensure that suppliers have incentives to be proactive in identifying and tackling theft in a consistent manner.

2.5. Several suppliers and Distribution Network Operators (DNOs) supported the proposed alignment of electricity supply licence obligations in relation to theft with obligations introduced into the gas supply licence in 2013. They considered that this would help create a coherent approach to tackling theft for customers and suppliers across the energy supply market. However, one small supplier considered more detailed licence requirements to be repetition given the existing statutory obligations on electricity suppliers in relation to theft, and argued for better enforcement of the current Standard Licence Conditions (SLCs).

2.6. One respondent considered that the smart meter rollout presents an opportunity to check every meter as they are exchanged with smart meters. The respondent argued that smart meter consumption data should not be used in isolation to try to identify theft. It considered that the regulatory framework should be capable of responding to the dynamic nature of electricity theft as technological developments lead to new methods of theft.

2.7. Some respondents stated that the consultation had focused on domestic issues including cannabis cultivation and consumer vulnerability, and one respondent considered that greater clarity is required around the potential impact of the proposals on the half-hourly and non-domestic markets.

### *Standards of customer treatment*

2.8. Two Big 6 suppliers considered that a clearer, more robust legal definition of theft and consumer offence is necessary to ensure that suppliers do not interpret the meaning and scope of theft in different ways. This would avoid any potential detriment to customers.

2.9. Several respondents deemed that whilst licence obligations that seek to provide protection to genuinely vulnerable customers are appropriate, it would be unreasonable to maintain supply where there is an unsafe connection or where the crime had been repeated in order to ensure repayment and customer safety

2.10. Several of the Big 6 suppliers considered the definition of 'customers in vulnerable situations' in the draft licence conditions to be unclear and subject to interpretation. These respondents argued that the current drafting might force a supplier to keep supplying increasing numbers of customers who are known to have stolen electricity, which may impact their ability to support those most in need. All of these respondents proposed to apply the definition of 'vulnerable customers' used in the gas licence conditions. They argued this would avoid confusion and concerns amongst customers and avoid unintended discrimination between customers based on the fuel supplied.



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2.11. The majority of respondents agreed that suppliers should be required to offer vulnerable customers and customers that would have genuine difficulty paying, a range of methods for the repayment of charges associated with electricity theft as an alternative to disconnection. Two respondents said they currently offer alternative payment methods, with one supplier stating that it considers this to be in the interest of both the supplier and the consumer. One supplier considered that such obligations already exist under SLC 27, and that customers who undertake theft should not be afforded a higher level of protection than honest customers having a genuine difficulty making payments.

2.12. One respondent held the view that the proposal to require a range of payment methods did not consider the possibility that a consumer may re-offend. It argued that any such obligation must be effective in remedying the matter, i.e. paying for the stolen electricity and preventing future theft. In general, other respondents believed that disconnection of supply should be deemed as a last resort but should still remain as a deterrent to theft.

2.13. Several respondents stressed the importance of industry self-regulation mechanisms such as the Energy UK 'Safety Net' as an additional tool for protecting vulnerable customers, and as an example of industry's current efforts in this area.

### *Implementation timescale*

2.14. The majority of respondents supported the view that the licence condition should be implemented as soon as reasonably practicable.

2.15. Several respondents considered that it may be more sensible to align changes in gas and electricity. A number stated that, particularly with respect to the establishment of the TRAS, this would minimise the cost of consequential system changes and increase efficiency in preventing and detecting theft. These respondents suggested that, if the changes were to be introduced separately in gas and electricity, the proposed electricity TRAS should not be implemented until the gas TRAS has been tested and the key findings from its early operation have been analysed.

## **Chapter 5: Assessment of policy proposals**

### *Ofgem's assessment and assumptions*

2.16. There was broad support across respondents for our assessment of the existing financial disincentives for suppliers to undertake theft investigations, and of the various impacts of electricity theft under the existing industry arrangements. Several respondents suggested amendments and presented additional information.

2.17. Two of the Big 6 suppliers considered that suppliers already have incentives to engage in activities which make an indirect contribution to theft prevention and detection by domestic customers since it is expected that revenue from their



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unlawful consumption and future lawful consumption can be recovered. These respondents considered that the financial disincentive for suppliers was restricted to electricity theft by non-domestic cannabis farms.

2.18. One respondent suggested that the draft IA did not cover all disincentives suppliers face in investigating theft. They noted that: suppliers have limited legal powers to deal with cases in which contractors break meter or supply seals when performing their work; revenue protection staff faces health and safety risks; and suppliers face the risk of reputational damage when disconnecting re-offending customers.

2.19. One respondent questioned the statement that small suppliers would be impacted more than larger suppliers by the smearing of costs related to electricity theft under current industry arrangements. This is because group correction smearing in settlement is distributed according to market share.

2.20. One respondent noted that the draft IA would have benefitted from greater clarity on the obstacles currently preventing suppliers and their agents from remedying non-compliance with their existing obligations and with arrangements under the BSC for entering stolen energy units into settlement.

2.21. Several respondents expressed the view that it was difficult to make robust assumptions from which robust analysis and conclusions can be drawn because of the lack of available information regarding the current value of theft. One supplier considered that suppliers may interpret activities that constitute theft differently. The same respondent also proposed that suppliers submit their unbilled purchase volumes to Ofgem regularly to provide a correlation with theft levels that can be publicly monitored.

2.22. Most suppliers identified customer type, geographical distribution of customers, and economic conditions as contributing factors to the distribution of theft cases between suppliers' customer portfolios. One Big 6 supplier noted that 40% of its domestic theft cases were identified at properties where the customer has been identified as vulnerable or potentially vulnerable, and another noted that a high proportion of its offenders use prepayment meters. Several suppliers expected theft to be more prevalent in cities, where customers tend to be more transient and where cannabis farms were deemed to be more prevalent. Several respondents deemed that suppliers with predominantly half-hourly metered customers would subsidise the detection of theft disproportionately under incentive schemes since theft amongst these customers is considered rare.

2.23. Most suppliers noted they use a combination of appliance audits, historic consumption data, post-theft meter reads and, as a last resort, average consumption estimates based on profiling, to establish estimated volumes of stolen electricity to be entered into settlement. Two suppliers considered that the Balancing and Settlement Code currently made it difficult for suppliers' data collectors to enter stolen units into settlement. One of these respondents requested clarification on the length of the period over which suppliers are expected to correct their usage data as



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within a settlement period a supplier may be unable to re-bill a customer and may also be prohibited from back-billing beyond 12 months.

2.24. Respondents reported a wide range of detected re-offending rates of between 8% and 50% when inspecting sites where previous meter tampering had occurred. All who responded noted that change of tenancy and change of supplier to avoid detection create a strong likelihood of underestimation of true re-offending rates.

### *Impacts on consumers and competition*

1.26. Several respondents held the view that the proposed compliance measures for each policy measure outlined, in combination with the proposed Distribution Connection and Use of System Agreement (DCUSA) Revenue Code of Practice, would be sufficient to ensure suppliers conduct investigations to satisfactory standards and thereby protect consumer interests.

### Incentive schemes

2.25. Two respondents considered that the financial incentive schemes could result in a negative impact on honest consumers by discouraging parties from sharing information. One of these respondents also considered that such incentive schemes may create perverse incentives for suppliers to investigate and label any unrecorded consumption detected as theft, irrespective of whether consumers have knowingly engaged in theft. This was considered as potentially harming those customers inhabiting premises with meters that were tampered with by previous occupants.

2.26. Most respondents supported some form of incentive scheme in combination with enhanced audit and settlement measures, and had a range of views on which incentive schemes had the best potential to realise targets for theft detection that are proportionate to the potential consumer benefits, if calibrated carefully.

2.27. Two respondents expressed concerns over the assumptions on set up costs and operating costs in relation to the detection-based and volume-based incentive schemes. They believed the actual costs would be significantly higher.

2.28. Three suppliers considered that a volume-based incentive scheme for theft detection would be preferable. An argument made in favour of this form of incentive scheme was that volume-based rewards would encourage detection of theft in non-domestic cannabis farms where volumes stolen are usually larger than in domestic cases. This incentive scheme was considered to be an appropriate mechanism for tackling disincentives to investigate theft related to cannabis cultivation caused by the perceived difficulty of detection and low likelihood of recovering debt. A detection-based incentive scheme, it was argued, may lead to inefficiently high spend on investigations of low value theft that would not benefit the industry as a whole. Respondents also deemed that this scheme would not incentivise underestimation of stolen energy units entered into settlement as the detection-based scheme would.



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2.29. Two respondents supported a detection-based incentive scheme for improving theft detection with one suggesting that this allocation of rewards would be more appropriate as a true reflection of the nature of detection costs. The detection-based incentive scheme was also seen as preferable to a volume-based scheme as the latter may distort detection rates and lead to suppliers focusing on high volume potential thefts.

2.30. Three respondents proposed an alternative hybrid incentive scheme with a fixed fee per detection coupled with a volume-based incentive linked to the number of energy units entered into settlement. One respondent expressly considered that, due to the likely mixture of frequently occurring /low volume and seldom occurring/high volume instances of theft, a mixed incentive scheme would be sensible.

2.31. Three respondents expressed concerns that any form of incentive scheme would not deliver the intended outcomes, and would instead create competitive distortions between suppliers depending on the prevalence of theft in their customer base leading to increased industry costs. One respondent suggested tiered incentive payments for different consumer types to negate the potentially adverse impacts of all suppliers competing for a single incentive pot. Another of these respondents considered that the financial incentive schemes would reward those suppliers who are currently doing little to address electricity theft amongst their customers at the expense of more proactive suppliers.

2.32. Respondents had a range of views on the benefits of implementing a cap on incentive pots. Some respondents considered that a cap would not help to reach theft targets that are proportionate to consumer benefits. They noted that, after the annual pot has been spent, theft reporting and settlement of stolen units may be delayed until the next year, or detection costs that have already been occurred may be passed on to honest consumers.

2.33. Arguments respondents made in favour of capping financial incentives included: a cap would quantify the costs of the incentive scheme and limit the financial impact on small suppliers; and a cap on the amount of time elapsed since the estimated starting date of theft - for a volume-based incentive scheme - would prevent suppliers from allowing theft to continue once detected in order to get greater financial rewards.

2.34. Several respondents supported a cost-sharing mechanism for the liabilities created by stolen energy units entered into settlement as an effective mechanism for addressing the disincentive suppliers otherwise face, particularly as a package with the enhanced audit and settlement proposal.

2.35. One respondent considered that a cost-sharing mechanism in isolation would not counteract the disincentives suppliers face to enter stolen units into settlement as the cost burden would be too high without a volume or detection-based incentive scheme in place. Conversely, three respondents argued that an incentive scheme would unnecessarily replicate the redistribution of theft detection costs between suppliers that the cost-sharing mechanism intends to achieve. Two of these



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respondents noted the complexity of using a reduction in settlement liabilities to achieve this shared intended outcome, given the system changes required to administer it.

2.36. Two respondents expressed concerns regarding the cost-sharing mechanism as an effective remedy to the settlement volumes disincentive that suppliers face in detecting theft. One questioned whether this mechanism would differ from the existing Group Correction Factor from the point of view of the honest customer, whilst the other cited the additional risk and uncertainty this mechanism would bring for suppliers.

2.37. The enhanced audit and settlement proposal was generally supported as a commercially necessary accompaniment to a volume-based incentive scheme and one small supplier supported this proposal as the only appropriate solution amongst the policy measures identified in the consultation. One respondent expressed reservation, however, regarding the practicalities of combining enhanced audit, settlement-cost sharing and detection or volume-based incentive schemes. The respondent stated that it is not currently possible to allocate all stolen units to a given supplier whilst also distributing the liabilities from entry of unrecorded units to all suppliers for settlement purposes.

### TRAS

2.38. There was broad support amongst respondents for the establishment of an electricity TRAS, and agreement that it should help increase theft investigation and detection levels. Some respondents called for a delay in delivering this proposal until the equivalent gas TRAS had been proven to be effective, whilst others considered that a dual fuel TRAS would lead to cost efficiencies in procurement, ongoing operational synergies, and greater effectiveness in detecting theft.

2.39. A Big 6 supplier and a central body considered that the assumptions made on the set up and operating costs for the TRAS were incorrect and significantly below the likely costs. One noted that their experience of developing the requirements for the gas TRAS had informed their view, whilst the other highlighted that the TRAS would be required to consider a wide intelligence network including, for example, the police and fire services that could increase costs. One respondent held the view that the draft IA would have benefitted from a consideration of the benefits of a dual fuel TRAS and suggested that a combined delivery project could reduce operating costs by 20-30 per cent.

2.40. Several respondents expressed concerns that the proposals to require suppliers to investigate all leads reported by the TRAS reports would lead to unnecessary costs and an inefficient allocation of resources towards investigation. One Big 6 supplier suggested that the TRAS should work alongside a volume-based incentive scheme whereby suppliers would be required to investigate a minimum volume of theft detection but thereafter would have discretion to investigate those leads with the highest likelihood of detection.



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2.41. Two respondents did not express any preference for or against the incentive proposals, but provided comments on the different approaches.

### *Impacts on sustainable development*

2.42. Six respondents supported our initial view on customer behaviour in respect of energy efficiency, with some suppliers considering that they had evidence, following detection, of price-sensitive behaviour and moderated consumption at sites where theft had taken place. Other respondents agreed that this view was likely to be the case due to customers reducing their usage of appliances in response to cost if they have the means to, as opposed to investing in energy efficiency measures. These respondents stated, however, that they did not have sufficient evidence to support this analysis.

### *Impacts on health and safety*

2.43. Most respondents who considered that the proposals would have direct or indirect impacts on health and safety stated that the financial incentive schemes rewarding detections would have the greatest impact on health and safety. It was considered by these respondents that, in leading to successful detections, health and safety would be directly improved but that, in response to incentives to identify and investigate theft, suppliers and their agents would potentially take on greater health and safety risks to detect theft.

2.44. Several respondents also noted that the incentive schemes may discourage information sharing between suppliers and lead to health and safety risks as a result. In light of the importance of cooperation between suppliers and information sharing in targeting safety risks, these respondents considered the TRAS as the proposal with the most potential to improve health and safety.

2.45. Other measures that were cited as having the greatest potential to beneficially impact health and safety included: providing suppliers with statutory rights to disconnect the supply on the grounds of safety; public education on signs of tampering at meter sites to generate more leads on unsafe meters; and a code of practice detailing common standards for the conduct of theft investigations.

### *Alternative industry proposals*

2.46. Alternative policy measures and actions that suppliers could take to tackle theft which we did not consider in the consultation and draft IA were suggested by respondents. They include:

- an Estimated Annual Consumption (EAC) correction which one supplier considered would remove one of the disincentives facing suppliers but would also act as an incentive measure to increase theft detection

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- new industry arrangements to move unregistered customers on to supply contracts to ensure any further units consumed are placed into settlement rather than considered as losses
- greater legal remedies for suppliers and DNOs in dealing with customers who flout the law and stronger law enforcement in response to existing criminal practices
- increased awareness of the risks presented by theft activities through media campaigns
- greater publicity of the proposed tip-off line to aid prevention, investigation and detection.

### **Chapter 6: Establishing principles for DNOs**

2.47. Respondents gave a range of views in response to our proposal that DNOs should, for the time being, not be included in an incentive scheme. Nine respondents disagreed and considered that DNOs should be included in an incentive scheme at the same time as suppliers. Eight respondents agreed.

2.48. Most respondents that expressed disagreement with our view considered that DNOs must be incentivised to address theft in conveyance since such volumes would not enter into settlement and thus would not be captured by the incentive schemes proposed for suppliers. These respondents suggested that a collaborative approach from all industry stakeholders to create an incentive scheme for suppliers and DNOs would be a more sensible approach.

2.49. One respondent noted that DNOs previously had a specific financial incentive to investigate theft but that this was no longer the case. They therefore considered there to be an asymmetry arising from the assumption that DNOs will proactively investigate theft through a licence obligation alone, whereas suppliers were identified as requiring an incentive scheme.

2.50. Amongst the respondents who agreed that DNOs should not be included in an incentive scheme at this stage, it was argued that DNOs do not interact with most individual customers on a regular basis in the way suppliers do.

2.51. All respondents agreed that DNOs should have licence obligations to tackle theft in conveyance, bar one DNO who suggested that the intended outcomes could be achieved by industry code modifications. The support for licence conditions was generally supported by the argument that, without obligations, it is unlikely that DNOs would be properly incentivised to address theft in conveyance, and that obligations were necessary to complement requirements placed on suppliers.

2.52. Several respondents noted that the proposed draft of the licence condition covered an obligation for DNOs to tackle tampering the DNO network, as well as dealing with customers consuming electricity without being registered to a supplier. Whilst these respondents expressed support for DNOs dealing with unregistered customers, some DNOs stated that this obligation must be strictly enforced only once DNOs have been made aware of an unregistered site.



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2.53. Several DNOs also requested clarity as to how their costs from undertaking theft investigation and those associated with any remedial action would be recovered in the absence of an incentive scheme. Two respondents further considered that DNOs do not have the necessary powers to incentivise customers to register with an energy supplier since there are currently no mechanisms in place to recover lost Distribution Use of System revenues where an unregistered site has been detected.

2.54. Respondents generally stated that their favoured combination of licence obligation and incentive scheme for DNOs or licence obligations alone would create sufficient incentives for DNOs to pursue and deal with theft in conveyance. Some suggested additional measures.

2.55. One respondent highlighted the RIIO ED1 proposals for DNOs to apply for a discretionary reward subject to demonstrating that losses have been reduced. The respondent considered that the reward should only be awarded if DNOs can demonstrate they have increased theft (in conveyance) detection levels above the level funded through price controls. Another respondent suggested that the decision on whether the TRAS arrangement could be appropriate for DNOs should only be taken if the gas TRAS arrangement for suppliers proves successful.

2.56. Two DNOs requested clarification of a DNO's disconnection powers in relation to theft in conveyance, and noted the need for additional new industry arrangements which swiftly place unregistered customers on to supply contracts. One DNO considered that the agreement of a supplier to take on an unregistered customer was necessary to aid DNOs in tackling theft since they do not have a broad ability to disconnect customers or to recover lost revenue through prepayment meters. The respondent proposed a financial incentive scheme for suppliers to take on Meter Point Administration Number registrations and a rota allocations of unregistered customer referrals from DNOs to suppliers.

## 3. Assumptions

3.1. This chapter provides details of the modelling assumptions and input data applied to the quantitative impact assessment summarised in Chapter 1 of this document.

### Key input data and modelling assumptions

3.2. We have relied on a number of input data items relating to industry-wide characteristics and costs. These are set out in [Table 4](#) below.

**Table 4 - Summary of input data**

Input data item	Source and details	Value used in the model
Aggregate number of domestic customers (MPANs)	Total number of domestic MPANs taken from all DNO CDCM models for 2013/2014. The number includes all types of DNO and IDNO connected domestic MPANs.	27,392,045
Aggregate number of commercial customers (MPANs)	Total number of non-domestic MPANs taken from all DNO CDCM models for 2013/2014. The number includes all types of DNO and IDNO connected non-domestic HH and NHH metered MPANs.	2,387,975
Individual supplier market share used in the model	A single market share assumption is used for domestic and non-domestic markets.	15 per cent
Retail price of a unit of electricity (£/kWh)	The value is an approximation based on suppliers' published price lists.	£0.15
Wholesale, network and balancing costs of a unit entered into settlement (£/kWh)	The value is calculated as the sum of: DUoS charges (2.6p/kWh): Average domestic unit rate from all DNO CDCM models for 2013/2014. TNUoS/BSUoS (0.75p/kWh): From National Grid charging statement from 2013/2014. Cash out 5.3p/kWh: Ofgem analysis.	£0.0865
Wholesale cost of electricity (£/kWh)	This is based on the cash out average "System Buy Price" for 2012 - Ofgem analysis	£0.053
Supplier gross margin on each unit supplied and paid for (£/kWh)	This is based on the supplier gross margin for April 2013 reported in the Ofgem "supply market indicators" publication.	£0.03
Average monthly consumption by domestic	This is estimated as the average forecast consumption per domestic MPAN per month using data from all	333 kWh/month

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site (kWh/month)	DNOs CDCM models 2013/2014.	
Average monthly consumption by a commercial site (kWh/month)	This is estimated as the average forecast consumption per non-domestic MPAN per month using data from all DNOs CDCM models 2013/2014. (Only small non-domestic unrestricted and two rate MPANs were included).	1,195 kWh/month
Average monthly consumption by a cannabis farm (kWh/month)	No reliable estimates are available. Our number is a rough estimate based on evidence from a range of sources (anecdotal evidence, supplier and DNO questionnaire responses)	9,000 kWh/month
Total annual cost of the TRAS (£)	Exact cost is currently unknown, to be decided through industry governance arrangements. Based on gas TRAS assumptions.	£1.5 million
Total annual industry cost of operating a detection-based incentive scheme (£)	Exact cost is currently unknown, to be decided through industry governance arrangements.	£1 million
Total annual industry cost of operating a volume-based incentive scheme (£)	Exact cost is currently unknown, to be decided through industry governance arrangements.	£1 million
Total annual industry cost of operating a settlement cost sharing scheme (£)	Exact cost is currently unknown, to be decided through industry governance arrangements. The BSC Issue 39 report from Elexon contains some indicative information, but these would need to be refined in light of more concrete proposals.	£2 million
Total number of investigations by suppliers	This is an estimate based on responses to the Ofgem 2011 questionnaire.	Domestic: 41,670 Commercial: 4,744 Cannabis: 1,683
Total number of detections by suppliers	This is an estimate based on responses to the Ofgem 2011 questionnaire.	Domestic: 15,956 Commercial: 750 Cannabis: 1,683
Total number of theft cases occurring at any time (Domestic cases)	Estimate of approximately 1 per cent of domestic MPANs. This is consistent with feedback received from suppliers that the total value of electricity stolen is approximately £250 million a year.	275,000
Total number of theft cases occurring at any time (Commercial cases)	Estimate of approximately 2 per cent of small commercial MPANs. This is consistent with feedback received from suppliers that the total value of electricity	5,000

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	stolen is approximately £250 million a year.	
Total number of theft cases occurring at any time (Cannabis cases)	Rough estimate based on a combination of previous detection figures and on feedback received from suppliers that the total value of electricity stolen is approximately £250 million a year.	4,500

3.3. We have also relied on a number of assumptions relating to the characteristics of electricity theft and the associated supplier costs. For each, we have considered high, medium and low values to reflect the limited nature of information we possess on these. The modelling results set out in Chapter 1 use the medium values throughout. These are set out in [Table 5](#) below.

**Table 5 – Assumptions on the nature of theft and associated supplier costs**

Input data item	Low	Medium	High
Annual fixed cost of theft detection and prevention (£/MPAN)	0.00	0.10	0.20
Marginal cost of each domestic investigation (£)	200	300	400
Cost incurred by supplier if a domestic theft is detected (£) (Excluding settlement charges)	100	200	300
Marginal cost of each commercial investigation (£)	200	300	400
Cost incurred by supplier if a commercial theft is detected (£) (Excluding settlement charges)	100	200	300
Marginal cost of each cannabis farm investigation (£)	200	300	400
Cost incurred by supplier if a cannabis theft is detected (£) (Excluding settlement charges)	300	400	500
Detection rate for the first investigation	0.50	0.60	0.70
Average duration of a domestic or commercial theft before detection (months)	12	24	36
Average duration of a cannabis farm theft	3	6	9

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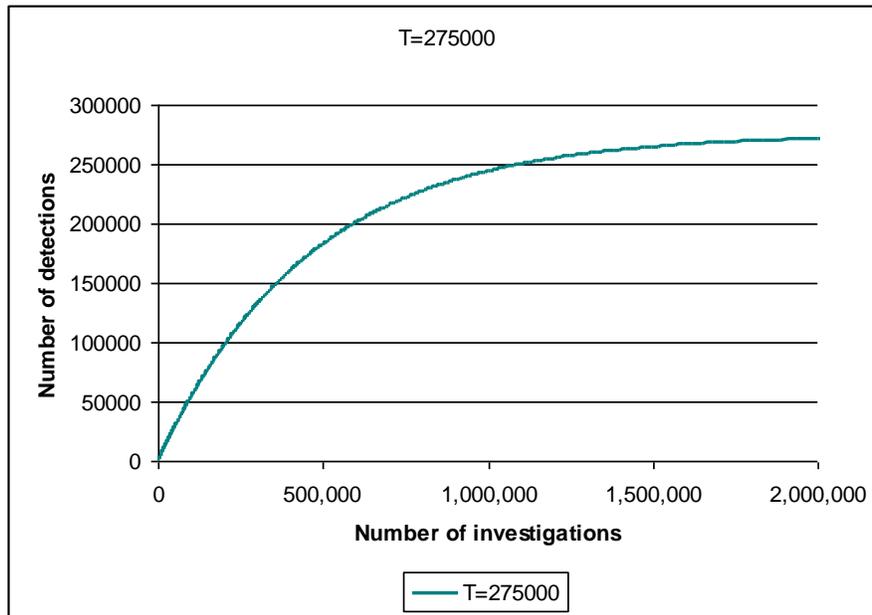
before detection (months)			
Proportion of actual stolen units that is assessed as stolen for settlement purposes (current, without regulatory intervention)	0.50	0.75	1.00
Number of months of legal consumption following detection – domestic	24	36	48
Number of months of legal consumption following detection – commercial	24	36	48
Total duration of operation of a cannabis farm (In the absence of any action by the supplier)	6	9	12
Average recovery rate for domestic cases	0.20	0.25	0.30
Average recovery rate for commercial cases	0.20	0.25	0.30

3.4. We have tried to make our assumptions as representative as possible. In doing so, we have drawn on information provided by electricity suppliers and DNOs in response to a questionnaire circulated by Ofgem in January 2011. We have met with several suppliers and DNOs to check that the data in these responses are still valid, and to reduce the risk that we misinterpret the data provided.

3.5. An important aspect of the model is the detection rate per investigation. The model contains an equation for the detection rate which means that, as the number of investigations increases, the detection rate falls. This equation would fit with a situation in which a supplier is able to identify the most likely cases of electricity theft and investigate these first, thereafter facing diminishing marginal returns as it increases the number of investigations he carries out. The starting rate (ie the rate at the first investigation) and the estimated total number of theft cases occurring at any point in time (detected and undetected) are input data to the model. The specification of diminishing marginal returns to investigations, combined with costs from carrying out investigations, means that there is an optimal number of investigations that maximises the net benefit from carrying out investigations (ie maximise total benefit from investigations minus total costs).

3.6. The relationship between the number of investigations and number of detections for a given number of theft cases occurring at a time (275,000) is shown below.

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# Appendix 1 - Feedback Questionnaire

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1.1. Ofgem considers that consultation is at the heart of good policy development. We are keen to consider any comments or complaints about the manner in which this consultation has been conducted. In any case we would be keen to get your answers to the following questions:

1. Do you have any comments about the overall process, which was adopted for this consultation?
2. Do you have any comments about the overall tone and content of the report?
3. Was the report easy to read and understand, could it have been better written?
4. To what extent did the report's conclusions provide a balanced view?
5. To what extent did the report make reasoned recommendations for improvement?
6. Please add any further comments?

1.2. Please send your comments to:

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