THE CASE FOR PROVIDING A MEANS OF ISOLATION IN SMART METERS

Introduction

The Smart Meter programme presents a once-in-a-lifetime opportunity to address a longstanding electrical safety issue across Great Britain. This issue concerns the temporary de-energisation of electricity supplies to domestic and similar premises to enable electricians to safely carry out certain electrical installation work, including the replacement of consumer units (fuse boxes). It is estimated that over 400,000 temporary de-energisations need to be made each year for this purpose.

Current options

At the present time, there are four options for electricians when carrying out work for which temporary de-energisation of the supply is necessary:

1. Arrange for the cut-out fuse to be withdrawn (and later replaced) by the meter operator
2. Arrange for the meter operator to install an isolator between the meter and the consumer unit
3. Remove and replace the cut-out fuse themselves

Options 1 and 2 are currently the only ones recognised by electricity suppliers, meter operators and distributors.

Despite some effort made by suppliers to improve the availability and level of service, Option 1 is generally considered to be impractical in terms of time, effort and normal domestic electrical installation working practices, at least in the electricians’ competitive, commercial world.

With regard to Option 2, if the isolator is not installed at the same time as a meter, the cost to the property owner can be around £130 which, compared with Options 3 and 4, is not particularly attractive to either electricians or property owners.

Option 3 is believed to be by far the most common approach currently taken by electricians though this is not without risk, especially where the service head is metallic.

Option 4 carries a significant safety risk to the electrician, and is likely to be in direct breach of the Electricity at Work Regulations 1989 and the Health and Safety at Work etc Act 1974.

Assumptions

- The number of smart electricity meters to be installed during the programme – 28 million
- Service life of smart electricity meters – at least 15 years
- Number of temporary de-energisations required in Great Britain by electricians – at least 400,000 per year.
Possible future options

Option A – Modify the design of the currently-specified single-pole ‘remote disablement switch’ in the smart meter to permit manual isolation by an electrician

Benefits:

- Good, safe, engineering solution
- No less safe means of isolation for electricians than is currently achieved by withdrawing the cut-out fuse
- Cut-out fuse secure and unaffected
- Takes advantage of the switching facility already allowed for in the smart meter specification
- Likely to cost significantly less than a separate integral isolating switch (Option B)
- Significantly less costly than Option C (separate isolating switch)
- Avoids the need to call out meter operators to effect temporary isolations, avoiding wasted time for electricians and additional third party costs for consumers
- Significantly eases the regulatory burden on small electrical contracting businesses
- Reduces the likelihood of illegal abstraction by ensuring that all necessary seals can remain intact
- Overall size of meter unlikely to be increased
- No additional space required for a separate isolating switch between the meter and consumer unit
- Provides for unsealed access to the outgoing terminals of the meter, enabling electricians to tighten connections, replace meter tails etc without the need to call out the meter operator
- In new properties, provides for the distributor’s service head and the meter to be installed and left energised awaiting connection of the electrical installation by the electrician
- No costs incurred in providing a separate isolating switch between the meter and consumer unit
- No initial or ongoing costs for electricians to be authorised to remove cut-out fuses

Disadvantages:

- Small increase in the smart meter unit cost
- Although single-pole isolation at the service head has been custom and practice in the electricity supply industry since 1937, double-pole isolation is preferable for TT systems.

Costs:

- Significantly less than the £1.8m to £9.3m per year range identified for Option B.

Option B – Incorporate an additional manually-operated single-pole or double-pole switch in the smart meter to provide for isolation

Benefits:

- All the benefits of Option A above
- Proven technology and method of working - electricity meters with integral single-pole switches and unsealed outgoing terminals have been in service for the past 20 years.

Disadvantages:

- Overall size of meter more likely to be greater than for Option A
- With regard to the alternative single-pole switch arrangement, although single-pole isolation at the service head has been custom and practice in the electricity supply industry since 1937, double-pole isolation is preferable for TT systems.

Costs:

- At an estimated additional cost £1 - £5 per meter, the total additional cost would be between £28m and £140m for benefits spread over at least 15 years, i.e. between £1.9m and £9.3m per year.
Option C – Install a separate double-pole isolating switch at the same time as the smart meter

Benefits:

- An existing engineering solution, but not the best, the most practical or the most cost-effective option
- Cut-out fuse secure and unaffected
- Avoids the need to call out meter operators to effect temporary isolations, avoiding wasted time for electricians and additional third party costs for consumers
- In new properties, potentially provides for the service head, meter and isolating switch to be installed and left energised awaiting connection of the electrical installation by the electrician
- Significantly eases the regulatory burden on small electrical contracting businesses
- Reduces the likelihood of illegal abstraction by ensuring that all necessary seals can remain intact
- Overall size of meter unaffected
- No initial or ongoing costs for electricians to be authorised to remove cut-out fuses.

Disadvantages:

- Significantly more costly than Options A or B
- Additional space required to mount the separate switch – may not be possible to accommodate in a significant number of installations
- Four additional site-made connections (potential weak points) required in meter tails than for the integrated switch approach (Options A and B)
- Would not provide full access to the consumer’s equipment for maintenance, repair or replacement, i.e. to the isolating switch or the meter tails between the switch and the meter.

Costs:

- The cost of installing a separate isolating switch at the same time as a smart meter (space permitting) has been estimated at around £18 (£7.50 for the isolator, £1.50 for new meter tails, plus labour and profit). Total cost would be around £504m, or about £17m per year over 30 years (the notional service life of a double-pole switch).

Option D – Introduce a system for the authorisation of competent non-supply industry personnel to withdraw cut-out fuses

Benefits:

- More efficient use of electricians’ time and resources than can be achieved using the service provided by meter operators
- Third party attendance costs would be reduced
- The common practice of electricians removing cut-out fuses would become legitimate and, with training, potentially controlled and safer
- Electricians would be able to confirm the suitability of the rating of the cut-out fuse for increased loading etc (which at present they are unable to do legitimately)

Disadvantages:

- A bureaucratic, costly, non-engineering solution that can be avoided if smart meters incorporate an isolating switch
- Individual competent persons would need to be trained, assessed and registered with a recognised personnel certification scheme
- Previous efforts to introduce such a scheme have been rejected by DCUSA
- Electricians would incur initial and ongoing costs for gaining and maintaining registration
- Would result in an increase in the regulatory burden and costs on electrical contracting businesses
• Registered persons would need to notify every intended withdrawal of a cut-out fuse in advance to avoid abortive investigation time/effort by distributors in response to false ‘loss of supply’ alarms from smart meters (‘last gasp’)
• Distributors would need to put a system in place to accept notifications of intended cut-out fuse withdrawals
• The meter operator would still need to be called out if there was a need to replace the meter tails or to check the tightness of the connections at the outgoing, sealed terminals of the meter
• Additional costs would be incurred for the purchase and control of sealing pliers
• Wider circulation of sealing pliers would increase the opportunity for misuse leading to potential for increased revenue protection issues

Costs (based on an EN 17024 personnel certification scheme):

• Initial training and off-site assessment of each individual as a pre-cursor to registration and authorisation – one day course £180 including VAT (assuming individual is a competent electrician). Total cost* over say first 5 years = £5.4m
• Initial training and assessment of new electricians joining the scheme, based on a 5% churn, ie 1,500 per year over 14 years = £3.8m
• Annual site surveillance visits to confirm individual is following safe and appropriate isolation practices and procedures (including re-sealing cut-outs etc) - £350 per person including VAT. Total cost* over 15 years = £157m
• Re-assessment of competence every 5 years for continued registration – half-day off-site refresher training and assessment - £90 plus £40 re-certification fee including VAT. Total cost* over next 10 years = £7.8m
• Fee for annual registration with scheme operator(s) - £50 per person including VAT for scheme administration. Total cost* over remaining 15 years = £21m
• Operation by distributors of a reporting scheme for intended fuse withdrawals – £1.50 per electronic notification to distributors (400,000 per year). Total cost over 15 years = £9m
• Total cost over a nominal 15 year period £204m = £13.6m per year.

* Assumption: At least one person from 75% of the Part P registered firms in England and Wales will register for practical and business reasons over the first 5 years (when unauthorised cut-out fuse removals will no longer go unnoticed) - 37,000 x 0.75 = 28,000 approx. Say 30,000 including electricians in Scotland.

Option E – Continue to rely on the service provided electricity suppliers/meter operators

Benefits:

• None likely to be perceived by electricians or householders

Disadvantages:

• Perceived as bureaucratic, inefficient and impractical, and therefore largely avoided by electricians
• Often difficult to identify and contact the relevant electricity supplier
• Provides no reduction of the regulatory burden on small electrical contracting businesses
• Would encourage the practice of ‘working live’ (Option 4) to avoid triggering ‘last gasp’ alarm in smart meters
• Meter operator resources would need to be increased significantly if smart meter alarms result in electricians having to use the service on every occasion, resulting in increased direct and indirect costs to consumers, and probably extending the time needed to complete each job. This is particularly likely when meter operator resources are heavily loaded during the roll-out phase.

Costs:

• At a typical call-out cost of £35 - £45 per de-energisation, between £14m and £18m per year over a nominal 15 year period
• Plus distributors’ costs for the repair of service heads damaged during the unauthorised removal of cut-out fuses
Cost summary:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Total cost</th>
<th>Cost per year</th>
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<tbody>
<tr>
<td>A</td>
<td>Modify the design of the currently-specified ‘remote disablement switch’</td>
<td>Significantly less than £28m to £140m over 15 years</td>
<td>Significantly less than £1.9m to £9.3m</td>
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<td>B</td>
<td>Incorporate an additional manually-operated single-pole or double-pole switch in the smart meter</td>
<td>£28m to £140m over 15 years</td>
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<td>C</td>
<td>Install a separate double-pole isolating switch at the same time as the smart meter</td>
<td>£504m over 30 years (the nominal service life of an isolating switch)</td>
<td>£17m</td>
</tr>
<tr>
<td>D</td>
<td>Introduce new system for the authorisation of non-supply industry personnel to withdraw cut-out fuses</td>
<td>£204m over a nominal 15 year period</td>
<td>£13.6m</td>
</tr>
<tr>
<td>E</td>
<td>Continue to rely on the service provided by electricity suppliers/meter operators</td>
<td>£210m to £270m over a nominal 15 year period</td>
<td>£14m to £18m</td>
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Conclusions

- The Smart Metering delivery programme provides an ideal opportunity to resolve this longstanding issue.
- There is a clear cost/benefit case for selecting Option A or Option B.
- Selecting Option A or B creates little or no impact on the physical smart meter installation process.
- Changes made to the base meter specification before the point of equipment selection minimises equipment cost impacts.
- Options A, B or C are based on engineering solutions that are far simpler and immediate than the ongoing schemes required for Options C and D.
- Options A, B or C would greatly improve a situation which currently is at best confused and at worst hazardous.
- The provision of a locally-actuated means of isolation provides for improved local security and the opportunity to adopt safer working practices.
- The incorporation of a ‘last gasp’ alarm in smart electricity meters means that the current situation, which relies on a large proportion of temporary de-energisations being unauthorised, cannot continue indefinitely.
- If the Government and the electricity supply industry are unable to address the issue at this opportunity, the result will be a continuing legacy issue at the service head for decades to come.

Industry support

- Representatives of the electrical installation industry (ENA, ECA, ELECSA, NAPIT, NICEIC and SELECT) strongly recommend Option A or Option B.
- The Electrical Safety Council also strongly recommends Option A or Option B.
- It is understood that representatives of AMO also strongly support Option A or Option B.