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# **Smart Metering Implementation Programme**

## **HSL Consultation Response**

### **Abstract**

DECC have published various documents concerning the “Smart Meter” Implementation Programme, including a call for evidence on data access and privacy. This document is offered in response to this consultation, and provides responses to the questions asked.

To put the responses in context, there is a short description of what HSL believes an intelligent metering system should offer. This would be significantly cheaper and more useful than the proposed programme, and does not require the collection of vast quantities of privacy invading data.

Many of the reasons for HSL believing that the proposed implementation programme is a huge and expensive mistake, and will fail almost all of its stated objectives, concern the invasion of privacy, and the loss of consumer freedoms, that the programme involves. We are grateful for the opportunity to express these views.

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Date:

13 October 2011



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# 1 Introduction

This is a response to the DECC Smart Meter Implementation Programme call for evidence on data access and privacy. It is submitted by Hirst Solutions Limited (HSL), a company providing consultancy in support of sustainable electricity and pursuing intellectual property in the field. It has been prepared by David Hirst, who invented the technologies being commercialised by RLtec (although there is no relationship between RLtec and HSL.)

The basis of the submission is that the DECC Smart Meter programme, as currently envisaged, is a waste of time and resources; will not achieve the benefits it claims; and that, unless changed, will be a barrier to more sensible and sustainable electricity consumption for the foreseeable future. The reasons for claiming this are:

- The presumption that people will track the current price of electricity (or gas), and will use this information to significantly adjust their consumption behaviour. This is unsupported by the evidence, and by common sense – the value of modified behaviour is far too small to justify the effort and attention involved.
- The failure of the programme to provide any assurance that any visible price of electricity (or gas) reflects what will be billed. This is because the billed charges have to include many fixed cost elements that are unrelated to the costs of the energy that the meter measures, but that are bundled in to the overall tariff.
- The failure of the programme to provide effective means of updating tariffs in a way that is fair, meaningful, or useful to enhance the efficiency of the electricity system as a whole.
- The approach requires a very expensive, centralised, and monolithic communications and data processing infrastructure, to be used by all consumers and all suppliers (and some further parties). This is risky, wasteful and will “lock in” consumers and the industry to an already obsolete and inappropriate accounting and settlement approach.
- The programme gives energy suppliers (i.e. retailers) tools that deprive consumers of freedoms and privacy, and enhances risks to them. The balance of power and influence is already seriously unbalanced to the favour of the suppliers, whose tariffs have collectively bamboozled their customers towards greater costs, and the current programme increases this imbalance without compensation, choice or consumer benefit. This document concentrates particularly on this aspect of the programme.

## The need for change

There is undoubtedly a need for metering that is more intelligent than that invented over a century ago, and now no longer fit for purpose. The Smart Meter programme does not provide this, but locks us in to a market structure that prevents innovation, and blocks rewards to those who consume in ways that make the system more efficient.

The approach advocated is for a “flowcost” meter, in which it is the intelligent meter that performs the billing calculations, based on prices that are previously broadcast, and that can continuously change. The prior broadcasting allows consuming devices to plan their consumption to minimise their costs, as well as giving the meter the information to perform the billing calculation (consumption times cost) at short intervals (such as a few seconds). The continuous change avoids the risk of large numbers of automated devices synchronising their behaviour – a possibility that risks large scale blackouts triggered at any significant tariff boundary – particularly the times when the system conditions are changing most quickly, and the system is most difficult to keep stable.

The same price curve can be used to reward local generation (duly adjusted for any buy:sell margin), and so allows flexible local generation to plan for the times when its output is most valuable.

Since it is the meter that performs the consumption times cost calculation, there is no need to transmit the consumption data back to a central system. Current processes for data collection remain valid and useful. Export metering can be embedded with the accumulation of costs, or maintained as a separate total.

As the privacy invasion from the collection, transmission and processing of vast volumes of data is unnecessary, (the key benefits and functions of intelligent metering can be delivered without it), the current implementation

programme should not proceed. It deprives consumers of liberty and privacy, and gives power, without accountability, to corporate entities that have shown they put profit above fairness, transparency, and even honesty in their tariff related dealings with consumers.

### **A note on energy efficiency.**

There are broadly three ways to enhance energy (and or emissions) efficiency, and so reduce costs.

1. Improve the efficiency of the process consuming the energy. In the case of houses, the obvious example is improvement of insulation. In most other cases the improvement will need investment in, or replacement of, consuming devices. For example, replacing a plasma TV with a LED one with low standby consumption.

Such investment decisions need review of consumption over a period, with an analysis of the contribution of things that can potentially be changed. Such analysis can be done most cheaply by energy monitoring devices, in some cases specific to candidate consumptions (e.g. fridges, heating systems, TVs or computers). Metering of aggregate consumption (however smart) can help a bit, but is not directly useful. Currently envisaged smart meters cannot directly identify individual appliance consumption, and so do not contribute to energy efficiency.

2. Avoid valueless waste. The classic example of this is changing habits about switching off lights when not in use. For the short periods during which people are aiming to change their habits, it can be useful to have frequent prompts: “Switch out the lights!”. However, these are useful only for a short time, as it is a race between people becoming habituated to the prompts – learning to ignore them – or changing their own habits – when the prompts are no longer needed. Meters, however smart, do not help much with this.
3. Changing the timing of consumption so as to enhance the efficiency (or reduce the emissions) of the system as a whole. In the past, the greatest gains were from “levelling the load” between peak and off peak times. If one could “chop the peaks”, then there was less need for the “peaking plant”, which were expensive to run (and had high emissions). The off peak valleys tend to be good times in which to take flexible consumption, such as laundry machines, dishwashers, water heaters, and the coming electric vehicles, whether battery or hydrogen. In the future, greater gains will come from timing consumption to coincide with higher wind times, and avoid it during lower wind times. Wind can reliably be forecast more than a few hours (4-48) ahead, so these times will vary each day. It is in facilitating this that intelligent metering and related intelligent appliances can make the greatest contribution to energy, and particularly emissions efficiency. The current programme may (but may well not) support this efficiently.

## Responses to Specific Questions

1. *Please submit any further evidence, such as surveys or consumer research, regarding privacy issues and smart metering. In particular is there evidence available about the effects of the availability and aggregation levels of more granular data (for example daily)?*

No specific evidence to submit. There is anecdotal evidence that access to short period metering data can provide convincing evidence of activities within a house (such as whether ironing was happening or not). The data can also be used to detect whether a house is occupied, and so for criminal purposes, as well as for criminal investigation purposes.

2. *To what extent would different rules for access to data between suppliers and third parties be expected to impact on the development of an energy services market (in terms of product and tariff innovation and / or entry to the energy market by third parties)? What are the particular data uses to which these concerns apply?*

Effective energy services offerings will need to have their own monitoring and control systems, separate from the meter. While their market research and their identification of candidate customers would (no doubt) find the meter data useful, it would not be enough to provide a realistic savings or cost quotation. It is inappropriate for the data to be used for any purpose other than billing, as this risks intrusive invasion of privacy with no assurance of benefit.

3. *Are there any data uses, apart from those set out below, where the arrangements for access to data could have an impact on the benefits of the programme. How does this analysis differ for the gas market?*

For electricity, all the benefits of an intelligent meter programme are available with no disclosure of metering data (apart from the total cost) to any parties. The only possible exception may arise from the need for both suppliers (i.e. retailers) and the consumers to have confidence in the accuracy of the billing calculations, and thus to enable independent auditors to review the meter behaviour. All other data can be more selectively captured for specific purposes without access to the meter.

For gas, there are no consumer benefits from the meter changes. There are increased safety risks if the meter can be used to remotely disconnect supply.

4. *What types of energy services and energy advice could be provided by the market (by suppliers and / or ESCOs / potential new entrants) that require access to specific levels of data?*

Energy advice would be better provided by review of the bills and analysis of the fleet of consuming devices, supplemented, if necessary, by selective (and privacy protected) monitoring of individual devices. Energy services need specific separate monitoring.

*What level of data granularity (frequency, time-lag) are needed to provide such services and what is the potential impact of these services in terms of percentage energy savings?*

This cannot be predicted, as it depends on the fleet of consuming devices. Any such needs should not be anticipated by the “statutory” meter. Data collection needs should be specific to the service on offer.

*Please provide empirical examples and explain the basis of any assumptions and distinguish between gas and electricity.*

Flexible consuming devices will often be most effective if they can plan consumption within a precision of about a second. This can be done with advance pricing information, and retrospective analysis offer negligible, if any benefit.

Domestic flexibility in the timing of gas consumption is of negligible value to the system. There is substantial storage within the system. Without major investment in increased thermal storage there is little scope for shifting demand across days. So, for gas, there are broadly no benefits from the smart meter programme.

5. *Should theft management be considered a regulated duty for which suppliers should have access to a certain level of smart metering data? What level of data would be required and how would this be used to manage theft? Please provide practical examples.*

It is reasonable for suppliers to request a consumption audit if they have grounds to suspect theft. Similarly, it is reasonable for a consumer to request confirmation of the correct functioning of the meter and the tariffs fed to it if they have grounds to believe them to be unfair or inappropriate. In neither case is it necessary for the fine scale consumption data to be visible to either party.

Broadly, the consumption data should belong to the consuming party. Suppliers have rights to the financial billing data, but there is no value in that being shared with any other party. A consumer may choose to share this data.

6. *Does data need to be collected from all customers all of the time, for theft management, or could there be a trigger for accessing more detailed data (for example where theft is suspected)?*

Only billing data, that is, the accumulation of many consumption times price calculations should be routinely collected, and can reasonably be analysed to try and identify potential theft. Other data may be retained for a short period within a meter, but should be accessible only to independent auditors. It would be for auditors to decide what information they need. Consumers may capture and store any data they choose, but will have no obligation to share it with anybody. It would be inappropriate for suppliers to use any such data (however collected) without the relevant consumers permission.

7. *What level of take-up of time-of-use tariffs could be expected under different scenarios for access to data? What information is needed to design time of use tariffs? In particular would sample or anonymised data be sufficient?*

Take up of appropriate time of use tariffs (i.e. flowcost tariffs), will depend upon the availability of devices able to plan their consumption based on the ToU tariff, such as Laundry machines, dishwashers, car chargers, heating controls and hydrolysers for cars. Indeed, everybody would be better off if the installation of the relevant devices and the relevant intelligent meter coincided, and were part of a single deal.

Clearly, if the choice of appliances is not to be constrained by the capability of a smart meter, and choice of smart meter is not to be constrained by the appliances chosen by a consumer, protocols to allow them to work effectively together need to be standardised. Such effective working must ensure that the price understood by an appliance when making a decision to consume is going to be the price used by the meter.

Since the major benefits of intelligent metering (for both consumers and suppliers) will follow from devices and appliances optimising consumption times, it is appropriate for the investment in smart meters to be aligned with the take up of intelligent appliances. This makes it hard, at present, for anybody to make meaningful projections. There is no basis for forecasting.

8. *Do you agree that individual half-hourly data is not currently required for suppliers to meet their obligations in relation to settlement? Over what timescale are any changes to settlement likely to take place and what might the implications be in terms of data requirements?*

If the half hourly data is not to be used for settlement, there is no value (at least to consumers) from the programme. The data collected would serve only as an extra cost and an intrusion into the lives of consumers.

The current profile system used in settlement is a major barrier to intelligent low carbon behaviours by consumers and their devices, and needs to be changed. This is because low carbon such behaviour means departure from the assumed profile, and so, potentially, divergence between the electricity purchased by a supplier, and that deemed to have been consumed by their customers. This will increase the risks and costs to retailers associated with imbalances, and so discourage new entry, unless the risks are hedged by countervailing rewards by generators (i.e. vertical ownership).

Thus the profile system services to corrupt the incentives on supplier behaviour.

The settlement system at present “socialises” the costs of uncertainties that already arise from the profile approach. Any evolution of the settlement system needs understanding of the uncertainties, an approach that minimises them, and fair treatment of the unavoidable residual. There is no evidence that this has been

analysed, nor any consensus reached. Thus the timescale for evolution of the settlement system depends upon some government policy in this area, and is thus currently unpredictable.

There is no point in the current smart meter programme if there is no corresponding and related programme for evolution of the settlement system, which may well suggest alternative approaches to the smart meter programme.

9. *How far would aggregated or sample data provide suppliers' with what they need in the area of wholesale hedging? Please provide examples of how the data would be used and where possible quantify potential benefits and costs.*

Without a physical ability by suppliers to influence the consumption of consumers over short timescales, any wholesale hedging is wholly financial, and solely to the benefit of generators who can vary their output. The most appropriate way to influence consumers (and their appliances) is by changes to the broadcast price curves, and so change in the consumption of devices. This sort of genuine physical hedging does need acute perceptions and realistic models of the consuming behaviour of consumers and their devices. It is likely that an appropriate, and selective, mix of aggregate and fine consumption data will serve to validate any models of consuming behaviour, but they will depend far more on a proper understanding of the behaviour of the appliances and related devices. Meters cannot be expected to provide that, and should not be used to provide this sort of blanket market research and analysis.

10. *What level of data would be required and how would this be used to manage debt? Please provide practical examples.*

Debt is best managed by prompt and frequent reaction to late payments. It may be appropriate for some consumers to expect weekly payments to meet weekly charges. It is reasonable to hold historical data on consumption. No other data is required. It would be unreasonable to expect daily payments.

11. *How would suppliers envisage using daily data to support debt management and what evidence do they have to support claims of additional savings that could be achieved with access to daily data as opposed to less frequent data?*

Daily data would normally be an unwarranted and invasive intrusion of consumer privacy.

Suppliers should not have the capability to disconnect consumption to individual homes without a site visit by a socially qualified and authorised individual, trained and aware of the social services that may be needed. Without such a site visit, they cannot be confident that a disconnection will not harm vulnerable individuals.

Similarly, a reconnection cannot safely be made without a site visit by a safety qualified and authorised individual. This is most obviously true for gas connections, but electrical equipment made inactive by disconnection may have been tampered with and so left in a unsafe condition, or just left on.

12. *How could smart metering data be used to identify and protect vulnerable consumers? Should such activity be considered a regulated duty and are any licence changes needed to create particular duties on suppliers in this area?*

If privacy invading consumption data is collected, its analysis may be helpful in first identifying vulnerable individuals. However, there are many better, cheaper and more appropriate ways of identifying and protecting vulnerable individuals, and it is foolish to expect suppliers to undertake this social responsibility. If the data is collected, then it should be analysed for this purpose, but only for this purpose. This purpose does not justify the intrusion and invasion of privacy imposed by the programme.

13. *Do you consider that use of data by network companies to support them in maintaining an efficient and economic network should be considered a regulated duty?*

No, there are many better, more reliable and more effective ways for network companies to monitor their networks. It does not justify the intrusion of privacy.

14. *Do you agree with the requirement for such data to be anonymised or aggregated wherever possible, and how should this be monitored?*

We do not agree that consumption data should be collected at all so this is a hypothetical question. The only valid use for such data is for meter audit purposes, and that should not be shared. It may be useful for suppliers and others to monitor a sample of consumers using additional monitoring equipment, but this should be subject to a separate contract with the collector of data, and subject to normal protections of anonymity and protection by aggregation.

15. *Would suppliers be expected to advise consumers of network company usage of data given network companies do not have a direct relationship with customers?*

If network companies need monitoring data (which they may), this should be a separate item of monitoring equipment and subject to a separate contract. Any meter data collected would be of low value for this purpose.

“Not having a direct relationship with customers” is not meaningful, a sort of business nonsense statement. Without a relationship they are not customers. (Their customers are formally the suppliers, but this is grossly inappropriate, and their customers is in practice OFGEM, a most inappropriate choice.)

Network companies should have a direct relationship with consumers, who should then be treated as customers of the network companies, and billed by them. This unbundling, along with other accountability changes, would encourage many network level efficiencies.

Efficiency is maximised if the bill is related to the network costs of serving the customers. Most of these costs are costs of fixed infrastructure, and so should be related to the costs of this infrastructure. Generally this means that large houses should pay more than small ones, but allocation rules would be fairer if they are more complex than that, and take other factors into account.

The network does have costs that are related to the peak and average consumption of a group of consumers. It is reasonable and appropriate that those consumers who contribute most to these costs should also contribute most in their bills.

An intelligent meter should be able to calculate the relevant parameters from consumption data, and it is only these parameters that should be passed to them. The calculation may be subject to audit.

It is also reasonable for the network companies to be rewarded for investments that reduce these costs. Meter data does not help in this. There is much work to be done in developing a sensible set of parameters for billing purposes.

16. *Are there any alternatives to a basic opt-in or opt-out approach to consumer choice such as some form of prompted choice? What are the practical and consumer protection considerations in relation to different options (for example when and how)? From a consumer perspective what alternative approaches and vehicles (for example letter, email, phone) to seek customer consent are there?*

The question makes the implicit assumption that there is possible benefit to the consumer from any sharing of the meter consumption data. There is no evidence that this is so.

Because of the utility (and thus compulsory) nature of purchases in this area, it may be desirable to strengthen the normal restrictions on “legal decent honest and truthful” requirements on advertising and marketing.

17. *What evidence is there of likely take-up rates that could be achieved through different approaches to consumer choice?*

There is no evidence that (retail) consumer choice has provided any benefit to consumers at all (with the possible exception that some minority consumers can claim a more ethical / renewables stance). There were huge setup costs, and heavy ongoing costs to maintain the infrastructure to enable competition. There has been no significant change in the nature of the service (gas or electricity). There is significant evidence that the suppliers have made the notional choice complex and confusing, and have used this confusion and uncertainty to bamboozle significant numbers of consumers (to their loss and the suppliers profit). There is overwhelming evidence that retailers penalise “loyal” customers.

Increased take up of relevant and useful services and products can be achieved only if they are clearly expressed, offered by trusted sources, such as publicly accountable bodies, overseen by political institutions, and have clear objectives related to societal and climatic well-being.

18. *What current and future technical options exist for energy consumption data minimisation / privacy enhancing technologies? How might aggregated or anonymised data be provided in practice? Would this imply additional services to be provided by DCC?*

The DCC adds yet a further burden to the already huge costs of maintaining the competition environment, and attempting to allow wholesale settlement without proper measurement of delivery. Wholesale consumption measurement is best carried out at substations, probably at 32kV or above. The DCC is incapable of providing any useful service at all. It will constrain flexibility of tariffs and future options for rewarding low carbon behaviour.

19. *What parts of the privacy policy framework do you think should be delivered by regulation and why?*

Suppliers collection, use and management of meter data should be subject to rigorous regulation. They cannot be trusted not to abuse it.

20. *What is the most effective way to set out any sector specific protections around privacy (e.g. licence conditions or other alternatives)?*

Public accountability is the key criteria, and this seems best achieved by forming a public agreement with the Information Commissioners Office.

21. *What practical options for authentication would provide the right balance between allowing easy access to consumer data in the home while providing the necessary privacy protection? Are there any other issues or options that the programme should be considering in developing the approach in this area?*

Broadly, the protection of meter data should be broadly equivalent to that for the current generation of meters. So control of physical access is the primary security provision. The meter provider should maintain tools that allow an enhanced meter to connect to some form of Domestic Area Network. All access should be blocked until some form of password authentication is provided, and this would be obtained from the supplier after normal telephone / web conversation authentication procedures. This access should NOT require the meter to be connected to any sort of Wide Area Network, but should be managed through the connections made during meter reader visits.

Subsequent automatic access controls should be rigorous, and perhaps restricted to approved software packages. This would provide consumers with means to control and be aware of any subsequent distribution of the data.

22. *Are there other issues that need to be considered to make using the HAN a viable route for access to data in the home, from either a process or consumer perspective?*

A key issue is the mechanism by which intelligent appliances are made aware of the broadcast forward price curve, and are adequately assured that the price they use in optimization planning is the price used in the meter calculations. The relevant protocols need to be standardised, and this will need government and EU sponsorship.

Such assurance avoids any need for consumption data to be retained in the meter.

If standard broadcast approaches are used (FM etc.) then both meter and appliance can receive the same signal. However, this can be subverted by accidental (or even deliberate) loss of broadcast updates, so some form of authenticated link between meter and appliances is desirable.

23. *What sort of arrangements would provide an appropriate balance between providing ease of access for consumers seeking to sign up to new services and adequate protection for consumers' data when accessed via DCC? Do you have any suggestions for alternative approaches?*

As has been discussed, the DCC is unnecessary. The proposed alternative approach – flowcost metering – has been discussed throughout this document. Domestic access to the flowcost data will meet most needs. Further needs will need further monitoring equipment.



24. *Are there other issues or options that the programme should be thinking about for the Foundation Stage or for non-domestic customers to facilitate access to data?*

The approach proposed here, (see 20 and 21) would allow all desirable features to be implemented without the DCC. It may well be that the Foundation Stage is as far as the implementation gets, so it should be planned to be scaleable.

25. *Do you have any suggestions as to how the Foundation Stage can be used to further learn about our approach to data access and privacy?*

The Foundation Stage should be used to collect evidence for the claimed consumer benefits, and confirm whether (or not) full rollout is desirable or worthwhile.