



Promoting choice and value
for all gas and electricity customers

Data Use Workshop 3

3 February 2011

Review of Second Workshop

Suppliers provided details on where data was needed within the energy market and explained:

- **Billing**
- **Providing tailored advice**
- **Consumer Engagement**
- **Demand Response**
- **Demand Forecasting**
- **Settlement**
- **Back Office functions (including Theft detection)**

Accepted the challenge to provide more evidence as to what level of granular personal data was needed

Today's Meeting

- **Explanation of technical options for data minimisation**
- **An update on work going on to understand the need for granular data**
- **How regulated duties impact on consumer choice**
- **Next steps**

The background features a composite image. On the left, there are rows of solar panels under a bright sky. A large, white, 3D-style arrow points from the left towards the center. On the right, there is a close-up of a white, multi-layered mechanical component, possibly a smart meter or valve, with a blue gear-like base. The overall lighting is bright and futuristic.

Privacy-Preserving smart metering

Microsoft Research- Dr. George Denezis

Privacy-Preserving Smart Metering

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Additional work by:

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What are privacy technologies?

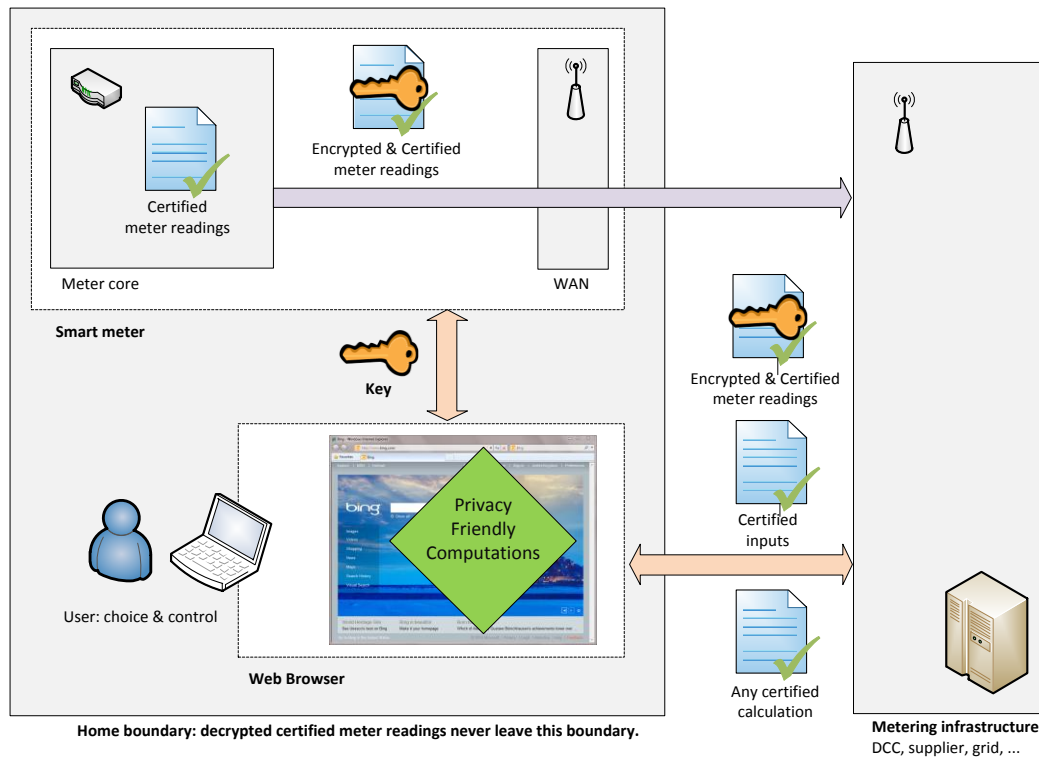
“Support equivalent functionality without leaking unnecessary personal information”

- Smart metering functionality:
 - Time-of-use billing, settlement, profiling, tariff advice, energy efficiency advice, demand-response, deep user engagement, ...
 - Personal information collection: means to an end
 - We can reach the same end without extensive collection
 - Additional security, cost, competition, user control, and openness benefits
 - Beyond the opt-in / opt-out dilemmas.

A sample of technologies

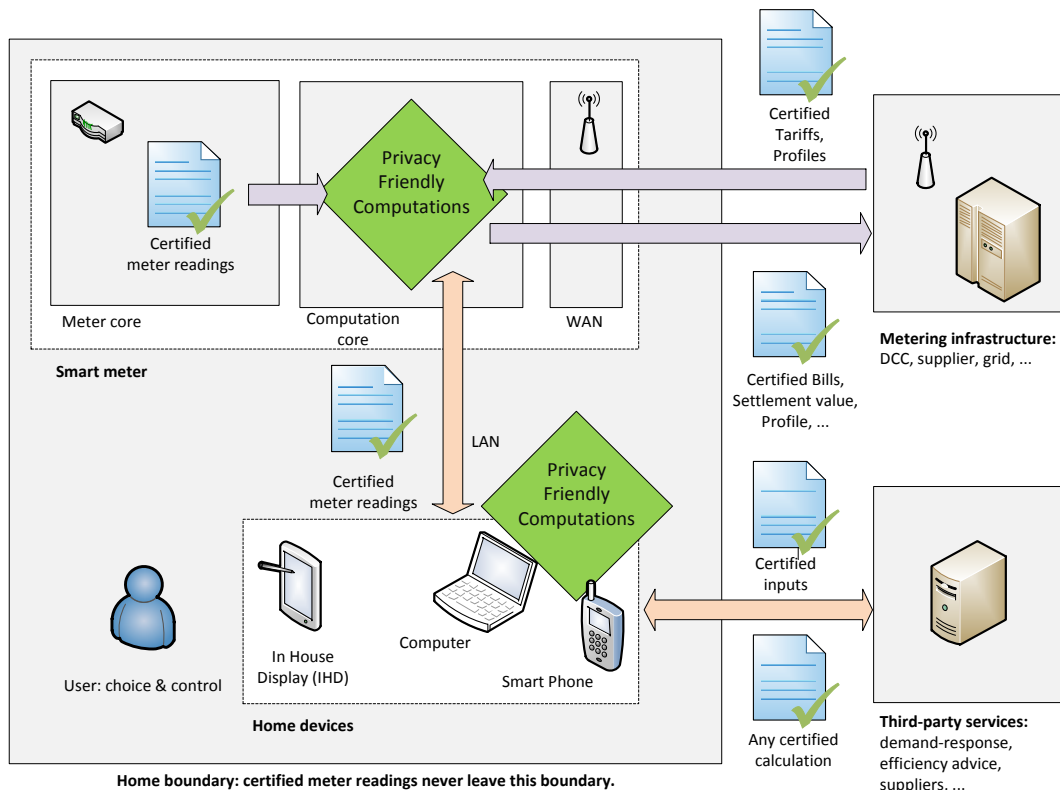
- 3 architectures for privacy friendly computations
 - Billing, profiling, abuse detection, ...
- 1 protocol for computing aggregates
- A framework for leakage free aggregation & statistics

(1) Computations on private readings



- How?
 - **Encrypted & certified readings** are sent to a database.
 - They are reflected to a user agent, that can decode them, and compute **bills, settlement values, profiles, advice & deep engagement**.
 - The **infrastructure verifies correctness** of agent computations.
 - Fall back: overcharging or get key from meter.
- Deployment:
 - **Full integration with current web browsers & smart phones** → identical online experience.
 - **Use of 3rd party services** through giving the master or session keys
 - **Off-line service** by registering with the master key.
- Other advantages:
 - Higher **integrity & privacy**
 - **Low cost meters:** no need for storage, or computations in them.
 - Opens **high-value 3rd party services**
 - Universal verification

(2 & 3) Computations on meters or local communications



- **How?**
 - Readings are certified, and stay in the meter or are given locally to the user.
 - Meter or user agents compute bills, profiles, settlement values.
 - Infrastructure verifies all calculations
- **Deployment:**
 - Utility robust when meters are involved, but shallow user engagement – good for billing, profiling, settlement
 - Integration with browser, user devices & 3rd party services, but with user transfer of data.
- **Other advantages:**
 - Physical user control of readings
 - High integrity
 - No need for meter WAN if LAN used
 - Universal verification

(4) Privacy friendly aggregation

- **Problem**

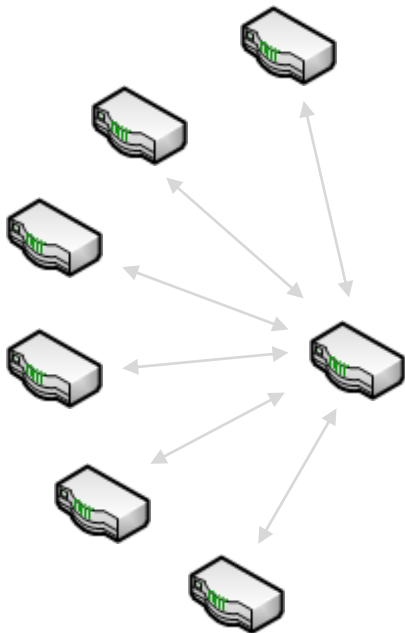
“Compute sums or averages of consumption / value / other without leaking personal data”

- **How?**

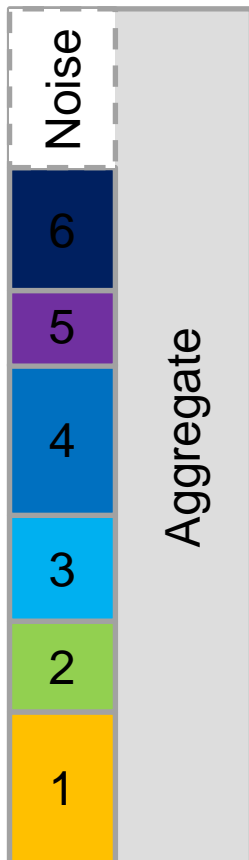
- Meters are given public keys of other meters, and output a blinded certified reading.
- Blinded certified readings can be aggregated to reveal the sum or average of readings in clear.

- **Deployment**

- Use to extract average or total consumption, value, settlement value.
- Gather statistics about meters over a demand-response point, loads, quality of service
- Compare totals with feeder meters, or voltage drops across a line for fraud detection.



(5) Differential privacy for private statistics



- **Problem:** Aggregates & statistics may also leak information – sensitive when publishing data.
 - Few people participate (aggregate of 1!)
 - A lot of side information is available (aggregate of 10 when 9 collude).
- **Solution:** “Differential privacy” allows the introduction of some noise to alleviate the problem.
 - Can determine the minimal amount of noise to protect privacy and maintain quality.
 - Aggregated datasets are then safe to publish or share
- **Deployment:** Server side addition of appropriate noise before publication or sharing of datasets.

Technological support for privacy

- Opt-in / Opt-out:
 - Necessary to protect the most vulnerable customers, but denies benefits to protect privacy.
- Trusted third parties?
 - Users will not trust them if they know functionality could be delivered without them.
- Privacy technologies:
 - Beyond the balancing act of functionality / privacy
 - Support functionality without disclosing raw data
 - Principle of user control throughout allows release of additional data, without necessitating it.
 - High integrity 3rd party services, universal verification.
 - Standard smart meters & off-the-shelf computing equipment.
 - Benefits from information society infrastructure to drive costs down, and allow immersive engagement.

The background features a composite image. On the left, there are rows of solar panels under a bright sky. On the right, there is a glowing, incandescent lightbulb. A large, white, stylized arrow graphic points from the left towards the center of the slide.

Uses of Data from smart meters

ERA- Jason Brogden

Uses of data from smart meters

Jason Brogden – SRSM Project Manager

4th February 2011 - Ofgem smart metering data privacy meeting – Data uses session 3

Introduction

- Update on evidence gathering by ERA
 - Framework in use
 - Evidence being sought
 - Expected timescales for completion
 - What else should we consider?

Update on ERA evidence gathering

- Building on the challenge from Ofgem/DECC on what data is required for what purposes
- Using a standard table format to show benefits for each requirement previously identified:
 - Billing
 - Delivering Energy Efficiency & Demand Reduction – Consumer Engagement and Advice.
 - Product & Tariff Innovation
 - Improve Debt Management
 - Demand Forecasting
 - Energy Procurement
 - Energy Settlement
 - Detection and Prevention of Theft

Using a standard table format to show

- Detail of requirement e.g. For Billing
- Benefits as detailed in the Government's Impact Assessment
- Achievable benefits of monthly, weekly, daily consumption information
- Alternative methods of using data e.g. anonymising data, aggregation, sampling etc. and latency
- Suggested policy requirements for benefits delivery

Evidence gathering format..

Requirement for meter reading data	Requirement overview	Benefits within Impact Assessment	Benefits of monthly readings	Benefits of daily readings	Benefits of Half-Hourly readings	Alternative methods to deliver IA benefits	Suggested Policy to deliver benefits
Consumer benefits:							
Billing	<p>Collection of meter readings from smart meters is necessary for billing purposes. Meter readings will be required at frequencies and levels of granularity according to the customers chosen tariff.</p> <p>In addition, customers will have access to granular information about their consumption over a period of time and are likely to have related queries about the service provided by the Supplier, their contracted energy provider. It would seem strange if the Supplier was not able to access the same information.</p>	<p>Inbound Enquiries - £1.032bn</p> <p>Customer Service overheads - £179m</p>	Impact Assessment benefits.	Impact Assessment benefits.	<p>Half-hourly meter readings will only be necessary for HH tariffs.</p> <p>There are register readings required for appropriate ToU based tariffs where the key benefit is the ability to charge for electricity consumed within particular time-bands throughout the day.</p>	<p>Energy is billed according to the consumption at a particular site. It is therefore necessary to obtain meter readings for each gas and/or electricity meter at each site. Aggregated or anonymised data is not acceptable.</p> <p>For billing purposes, meter readings do not necessarily need to be collected in near real-time. Suppliers can carry out billing activity by receiving meter readings or meter advances aligned with tariffs and execute billing runs in line with its billing cycle for each customer (e.g. monthly bills).</p>	Suppliers must be able to collect data to align with tariffs and billing.

Update on ERA evidence gathering

- Evidence being gathered from all ERA members
 - Extending this to non-ERA members, spoken to ICOS and ESTA representatives on issue
 - Recognising each supplier is likely to have a different view
 - Will seek to have quantitative data backed up with meaningful and sensible assumptions
 - Will also use evidence gathered from existing smart meter experiences

Timing for Completion

- Hope to have quantitative information by end of February 2011 where possible
- Will share initial outputs with DECC/Ofgem teams
- Finalise outputs mid-March to feed into Phase 2 work programme

What else should we consider?

- It's an open question....
 - What is the potential cost of storing & processing data?
 - What consumer research can be done to support evidence base
- Needs to be relevant and realistic
- Will work with ICO to help understand GB requirements against other EU Member States (per Article 29 Technical Sub-Group work)



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Regulated Duties

Ofgem- David Fletcher

Regulated Use vs. Consumer Choice

Need to provide clarity to consumers on what choice means:

- There are some uses of personal data that are essential in order to allow the Energy market to operate efficiently.
- **The Programme sees these as regulated uses**
- **Will be exceptional cases given precludes any customer choice.**
- There are some elements where benefit will be realised if consumers choose to share personal data.
- **The Programme sees these as areas where personal choice should be given and equity of access ensured**
- As the energy market evolves there may be other reasons for which personal data becomes essential.
- **There may be a need to change our view on regulated uses in the future.**

High level view of regulated duties

Determined by licence conditions, the relevant licences cover:

- **Gas and Electricity suppliers**
- **Electricity and Gas distribution network operators**
- **A new licence will cover the operations of DCC**

They do not cover 'Value Added Services' or third parties

High level view of regulated duties

Suppliers

- Billing
- Meter Maintenance
- Fraud/ Theft Reduction
- FITs provision (on request)

Networks

- Quality of Supply
- Network planning
- Continuity of supply
- Fraud/ Theft Reduction

NB – Consumer groups have proposed vulnerable customer protection (e.g. monitoring self-disconnection) but no explicit obligations currently in licence.

Next Steps

- **Programme working to produce consultation response**
- **Privacy Impact Assessment to be produced**
- **Data privacy and security will continue to be key to the programme in the next phase**
- **Ongoing work will need to be done on how to provide consumer choice and access**
- **Ongoing work to assess the benefits case for each area of data need identified**
- **Ongoing work to understand current consumer attitudes**
- **Ongoing work to monitor European development**
- ***Do not plan another data use workshop before consultation publication***

The background of the slide is a composite image. On the left, there are rows of solar panels under a bright sun. On the right, a hand is shown holding a white document. In the bottom left corner, a blue gas burner is visible. The overall theme is energy and customer service.

ofgem

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