

**DEMAND REDUCTION :
THE ROLE OF SMART METERS**

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**SUSTAINABILITY FIRST –
SMART METER STUDY ***

- **Multi-Sponsor** - Centrica, EdF Energy, Eon, RWE-npower, Scottish and Southern Energy, Ampy Meters, IBM Business Consulting, EST, energywatch.
- **Focus** - Costs and benefits of smart meters in GB ; policy and regulatory options.
- **Context** - Ofgem Meter Innovation Review ; Energy Review ; Climate Change Programme; EU Energy End-Use Efficiency and Energy Services Directive ; Government matched funds for Energy Demand Reduction Trials ; Development of EEC 3.
- **'SMART METERS: COMMERCIAL, POLICY AND REGULATORY DRIVERS'**. Report by Gill Owen & Judith Ward for Sustainability First. March 2006.

METER TECHNOLOGY

Meter unit - cost differences not material.

Communications-capabilities – one-way / two-way – largely determine functions.

Functions – **vast choice** - simple remote meter-read (AMR) thro' to real time-of-use tariffs (AMM+interval).

Communications – main cost differential - mobile and fixed / targeted or geographic coverage / data-reliability / maintenance / learning-curve

**STRONG CASE FOR
BETTER CONSUMER FEEDBACK**

- **Smart meters can show consumption & tariff-related data** – but – a display in a prominent place costs extra.
- **Electronic display of consumption & expenditure feedback important** – with / without smart meter.
- **'Smart devices' - feedback / display from existing meter**
- **Better supplier-feedback important** – bills, internet, tariffs etc

**INTERNATIONAL EXPERIENCE –
COSTS & BENEFITS**

- In most international examples, the benefits for the energy suppliers/distributors (ie with metering responsibility) did not add up on their own to a business case for smart metering.
- Exceptions were Italy (market position ; fraud); Sweden (frequent meter reading required); Northern Ireland (PPM costs)
- Victoria, Ontario, California and the Netherlands - benefits exceeded costs when economy-wide / societal benefits included (supply-security; peak-demand reductions ; less risk of black-out).
- In most international examples, cost / benefit assessments did not include possible benefits of overall demand reduction - nor of lower carbon emissions. These were not main-drivers for the first wave of overseas smart meter investment.

**COST-BENEFIT - ELECTRICITY
SMART METER COSTS**

- Basic meter - £7-8
- Advanced meter +communications (meter only) - £37-80
- Advanced meter + communications + installation and system costs - £70-180
- Choice of communications technology - major factor in costs
- Conveniently sited customer display – costs

**SMART METER BENEFITS
– VALUE TO UK SUPPLIERS ?**

- **£20 pa cost-to-serve each customer on average***. Estimate **£5 annual saving per customer from smart meter.**
- **Averages conceal wide range** - benefits do not apply evenly across all customers
- **Business case for** : prepayment token meters; customers who are costly to serve (e.g. debt prone, many meter read attempts, remote location)
- **No outright business case for GB suppliers to introduce residential smart meters on a widespread basis.**

* £20 cost-to-serve = £6 meter read, £10 service centre, £4 billing and payment.

**SMART METER BENEFITS
- VALUE TO UK CUSTOMERS ?**

- **Three main customer benefits :**
 - More accurate bills → better budgeting & payment
 - Better information → potential for energy (and money) saving;
 - Potential for more efficient market
- **Prepayment customers** – further benefits

BUT

- Winners and losers as cross-subsidies unwind.
- Customers may not get displays

**SMART METER BENEFITS –
PEAK-LOAD / SUPPLY SECURITY?**

- **Time-of-day tariffs should enable more domestic demand-side response** – thereby offering scope for reduced capacity overall and / or lower stand-by & operation of expensive peaking plant.
- **Distributed Generation** - help realise true value.
- **Network investment / network knowledge** - could allow better targeting.
- **BUT - potential benefit of residential smart meters to GB suppliers and distribution / transmission companies in achieving either reduced demand overall – or peak-load shifting - seems lower than elsewhere.**

EVIDENCE FOR RESIDENTIAL ENERGY SAVINGS IN UK FROM ELECTRICITY SMART METERS ?

- Major long term evidence from Norway – study on ‘informative billing’ and electric heating – savings 4-8% - *not* smart meters.
- Wright et al suggest 3-5% for UK homes without electric heating
- Northern Ireland - 3% (over short term)
- 1-3% a reasonable estimate
- 3% = £10.50 a year (av. bill);
- 1% saving = 8% domestic CO2 target

**SMART METERS –
COST-BENEFIT SUMMARY**

- Assuming cost recovery over a 15 year period (life of asset) the extra costs per customer per year could be around £13-18 .*
- At 3% residential energy saving then overall cost-benefit calculation likely to be positive.
- At 1% energy saving may be positive depending upon level of supplier and network benefits and other benefits to customers (e.g. better competition).
- Smart meters could play a greater role in an overall energy saving strategy if:
 - Customer feedback thro’ clear, well-positioned, easy-to-understand customer displays
 - Time-of-day or time-of-use tariffs available
 - Info from smart-meters combined with other actions – advice, packages of energy savings measures etc

*California - assumed extra cost per customer pa is \$24. Ontario \$36-48.

UK COMPETITIVE FRAMEWORK FOR METER PROVISION – PROSPECTS FOR SMART METERS ?

Suppliers are looking at ‘retail-led’ smart-meter initiatives BUT combination of:

- Lack of clear-cut supplier business-case
- Two-yearly inspection requirement
- Regulatory incentives and competitive pressures leading to like-for-like replacement – rather than improvement or upgrade
- 5% pa meter replacement rate – ie 20 years

Causing inertia

OFGEM PROPOSALS – JUNE ‘06

- Work with the industry to agree common standards on interoperability
- Remove possible barriers in supply licences – eg requirement for manual meter-read every two years.
- Coordinate major government co-funded two-year trials of smart-meters and feedback-devices.
- **BUT** - will these measures prove sufficient ?

COMPETITIVE FRAMEWORK - FURTHER INTERVENTIONS ?

- Smart-meter duty on suppliers – for new and replacement meters from 2008 (EU Dir.)?
- Require a standard of ‘smartness’ ? DTI/ OFGEM would need to lead and set a timetable.
- Require suppliers to accelerate the current 5% rate of meter-replacement ? - e.g. to 10% or more a year.

COMPETITIVE FRAMEWORK - PROS & CONS OF FURTHER INTERVENTIONS ?

- **Advantages**
 - Points down path-way for systematic upgrade of meter-stock.
 - All suppliers in same position – potentially removes ‘first-mover risk’ – can spread costs across all customers.
- **Disadvantages**
 - Extra customer-cost – uncertain size of benefit
 - Low-volumes could increase overall cost-to-serve
 - 20-years very slow – no ‘scale’ benefits - unless accelerate

GEOGRAPHIC ROLL-OUT - Pros & Cons ?

Elsewhere, domestic smart meters have been rolled out geographically – and investment costs recovered via regulatory arrangements for network or supply tariffs.

- **Advantages**
 - Geographic roll-out could deliver significantly lower costs thro scale-economies / organisational efficiencies
 - Full supplier benefits could be realised – potentially some gain for consumers in supply prices.
 - Cost to consumer can be spread over 10-plus years
- **Disadvantages**
 - High-cost to consumers – uncertain benefit.
 - Potential technology and implementation risk transfers to consumers – unless meter-provider incentivised to take some risk.
 - Early large-scale lock-in to technology choices – esp. while communications options still evolving

SMART METERS – IMPORTANT GATEWAY

- **For Energy Suppliers to improve market operation**
 - Better ways to tackle energy management activity
 - New retail opportunities
- **For SMEs and households to achieve**
 - Energy savings through improved feedback on consumption and expenditure
 - Demand-response at an individual level.
 - Micro-generation
- **Pathways needed to that gateway – more intervention will probably be required – trial information should be useful**

FURTHER SMART-METER WORK BY SUSTAINABILITY FIRST

With support from earlier sponsors and others we are now looking at :

- **Gas smart meters** in more detail
- **Demand elasticity for both electricity and gas** - and likely scope for domestic demand-reduction in response to smart meters and time-of-day tariffs.
- **Risks and benefits of various smart-meter policy options**

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Report by Gill Owen & Judith Ward for Sustainability First, March 2006.

Report and Appendices available at – www.sustainabilityfirst.org.uk

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