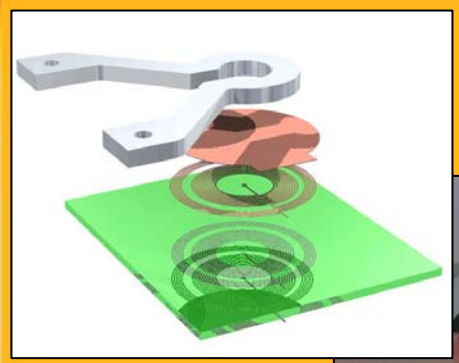
Smart Meters for Dumb Markets

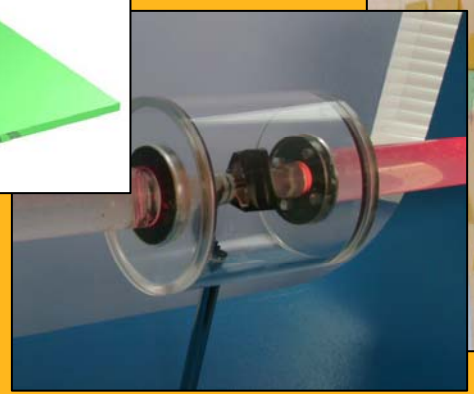
The global experience

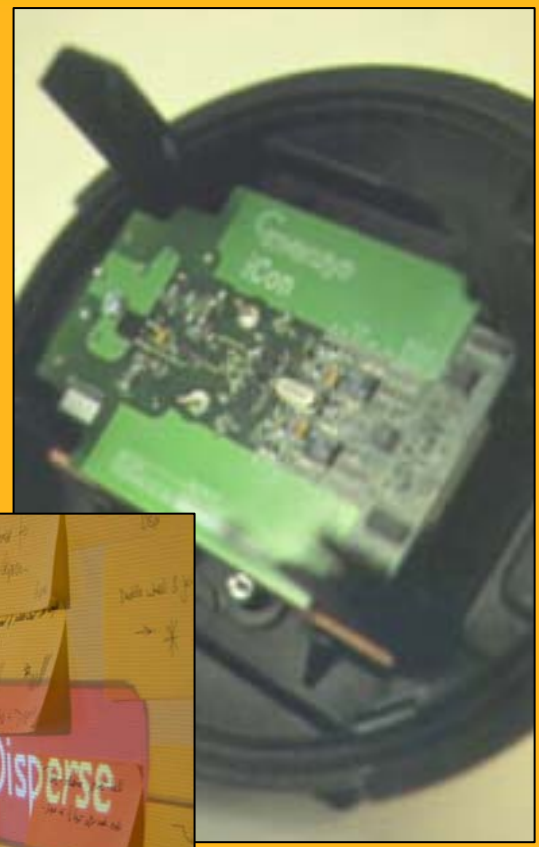
MAKING A WORLD OF DIFFERENCE

Context: Sentec's business

Sentec provides revolutionary technologies for the utilities industry, through contract R&D services and licensing intellectual property







Smart Metering: why bother?

- UK homes use 33% of total electricity generated every year (~17 GW p.a.)
- It has an important part to play in a low carbon economy
- Smart metering promotes behavioural change
- It makes commercial sense
- Adds in other benefits up and down supply chain

What is a smart meter?

sentec

WIKIPEDIA

'Perhaps the most general definition defines the device as a type of advanced meter that identifies consumption in more detail than a conventional meter, and optionally communicates that information via some network back to the local utility for monitoring and billing purposes. Typically the term "Smart Meter" refers to an electrical meter, but the term is also starting to be applied to the measurement of natural gas and water consumption'

NOT just a bolt-on radio…

Automated meter reading

Active load management

Time of use data

Fault/tamper reporting

Power quality monitoring

What can smart meters do?

Real time feedback

Reduce consumption

Defer consumption

More comparative information

Consumers

More accurate billing

(Meter reading service)

Lower cost to read meters

Reduced complaints

Energy retailers

Sell information and advice

Increased levels of service

Improved customer retention

Generators/distributors

Reduced peak load

Better information for forecasting peak load

Behavioural change

- Studies show range of response, influenced by:
  - –support from utility, housing condition, nature of feedback, market context
- Typically reductions of between 5-15% noted
- ‘Feedback is a necessary but not always sufficient condition for savings’

Source: ‘Making it Obvious: designing feedback into energy consumption’ Environmental Change Institute

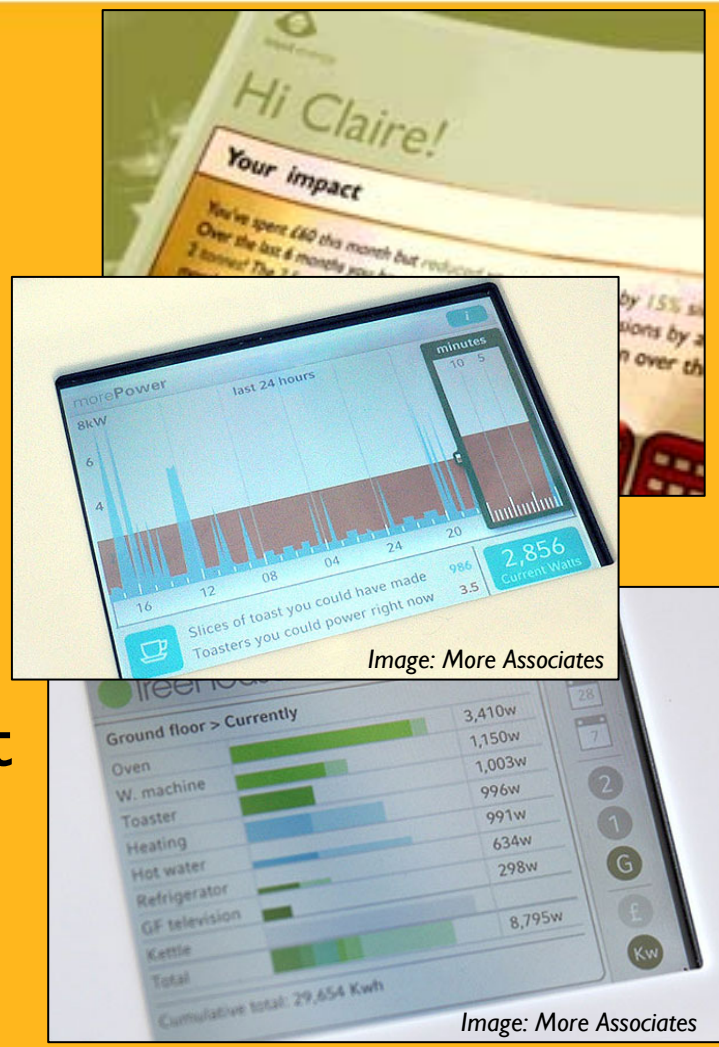


Image: More Associates

Behavioural change

Is most likely to be effected where:

- Households are already energy conscious
  - more than 33% of 'very' or 'fairly' energy conscious households (>80% of sample) check bills and meters already
- Individuals have opportunity for repeated feedback, information and action
  - high correlation between households seeking energy advice and installing efficiency measures
  - suggests requirement for energy advice from suppliers – business opportunity?
- Sources of information are trusted and immediate

Source: 'Making it Obvious: designing feedback into energy consumption' Environmental Change Institute

The full system…

SMART METER	TIME OF USE TARIFF
ENERGY CONSUMPTION DISPLAYS	HOME AUTOMATION

DESIGN CHOICES

- Place of display (central, mobile)
- Motivational factors (self competition, goal seeking, social reward, monetary reward)
- Display units (environmental impact, kWh, money)
- Display methods (tables, numbers, language, graphs, pictures)
- Information categories (appliance/activity, by room, by time period, by person)
- Timescale (past performance, future predictions)

The international experience

- Metering innovation largely adopted in electricity
  - Where smart metering is already used worldwide in commercial and industrial meters
- For the domestic market there is widespread adoption or advanced plans in:
  - USA, Italy, Canada, Australia, Sweden, N. Ireland
- Different markets have different drivers:
  - Reduce peak demand
  - Reduce cost of read
  - Reduce fraud

  } All *commercial* drivers

  - Not generally to reduce consumption

The global experience: USA

- Fragmented electricity market, vertically integrated by region
- Drivers for smart metering
  - Reducing cost of meter reading
  - Reducing peak load demand
  - Preventing black/brown outs in certain areas
    - April 2006: mid-south Texas looses power for up to five hours due to excessive air conditioner use.
- Supporting activities (California)
  - Designing dynamic pricing tariffs
  - Public education of benefits

The global experience: Italy

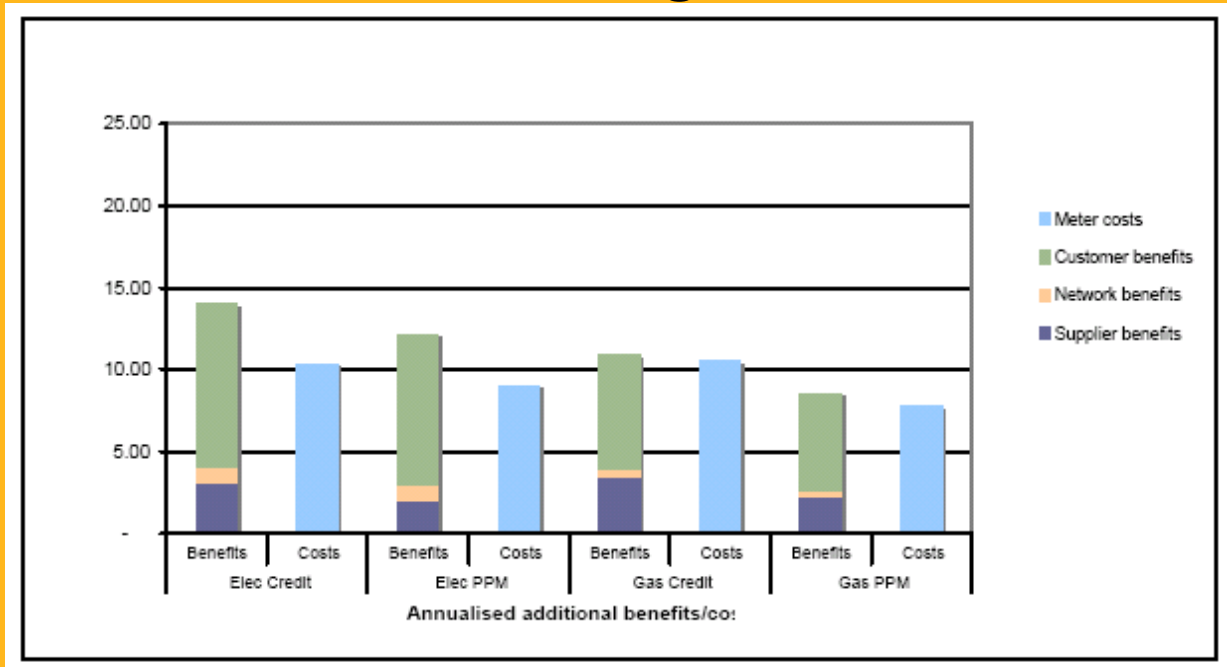
- Domestic market dominated by one player: Enel
- 'Telegestore' system implementation began 2001
  - 40,000 meters *per day* being installed
  - Smart meter that allows for meter management as well as better data
- Driven by business needs:
  - Reduce number of meter visits
  - Reduce fraud and bad debt
  - Improve data to better manage generation and prevent blackouts
  - Get Enel into good position for introduction of competitive electricity supply market (2007)
- Results:
  - Enel calculate a 2.1 B € investment, against cost savings of 500 M € pa
  - Investment has driven new smart meter designs at very low cost

The global experience: Sweden

- Competition in energy retailing
  - Over 200 suppliers with three market leaders having >50% of market
  - Meters provided by distributor, not retailer
- 2003: government statute to introduce monthly billing:
  - Primarily to strengthen consumer feedback
  - Also to improve accuracy of bills
- Results:
  - Vattenfall alone have installed over 100 000 household meters to date – calcuate savings on meter readings will cancel out costs
  - Rapid development of new low cost meters from suppliers

Reality bites: the UK experience

- Ofgem's latest cost benefit analysis shows clear overall smart metering benefit:



Source: Domestic Metering Innovation, Ofgem Consultation Paper 2006

- BUT benefits accrue to different parties in the chain, no one party can afford the cost

Result?

Poor design of UK market prevents widespread adoption of metering innovation, so that the UK market:

- Cannot influence customer behaviour effectively
- Has poor real time data quality
- Fails to provide a bill based on actual consumption for 36% of customers each quarter
- Has 60 million customer queries on bills per year, at an estimated cost of £90 million

Does this sound like a smart market to you?

Options for adoption in the UK

OFGEM OPTIONS:	SENTEC COMMENT:
• Address barriers to innovation	• BUT major benefit to one group is cost to another
• Enable customer to contract for smart meter	• Smart meters alone are not sufficient product
• Impose an obligation on suppliers	• As per Sweden
• Re-bundle metering services into networks	• As in Italy
• Await international evidence	• Long grass
• Instigate a trial	• Long grass

What can technology do?

- Already here:
  - AMR (for many situations)
  - Time of use data
  - Meter management software
- First generation:
  - Consumer displays of gross usage
  - Smart water and gas metering
- Potentially:
  - Web based consumption data
  - Estimated usage by appliance (*not* easy)
  - Lower cost smart meters

Conclusions

- Smart metering can have significant impact on consumption
  - With appropriate support from government and utilities
- It is also commercially viable
  - As proven in other markets
- To make it fly in the UK market would require some alteration in structure
- To maximise impact on consumer behaviour will require further technical input

Only then…