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Who is BEAMA?

- The voice of the electrical and related industries
- Wide range of sectors:
 - Power station technologies
 - All buildings based electrical equipment
 - Controls, metering, electrical heating and ventilation
 - Other water control based markets
- High level of influence in UK Government and through the European body ORGALIME in Brussels

Present members

- Actaris
- Elster
- Landis+Gyr / Ampy
- PRI
- Horstmann
- Echelon
- Itron

Smart Metering Objectives

- What is smart metering?
- What is driving current interest in smart metering?
- What does smart metering aim to achieve?
- European Smart Metering Alliance

What is Smart Metering?

- No agreement on definition
- My definition

Automatic Meter Reading (AMR)

+ Automatic Meter Management (AMM)

+ Customer Information

Must also involve new energy products

Energy Products

- Mostly kWh of energy
- Meters were invented 150 years ago to measure this
- Meters are not a product in their own right
- Meters must support the product
- New technology and lower costs mean that meters can support much more complex products

What New Energy Products?

- Customer energy usage information
- Multi-Rate tariffs
- Import / Export metering
- Demand response
- LV system data
- Energy Services

Additional Benefits of Smart Meters

- Provides feedback from additional energy efficiency measures
- Allows customers to take control of their energy consumption – no longer something that just happens to them

Smart meters – new idea?

Smart metering has been around for many years – it is not a new idea – For example:

- Credit and Load Management Unit (CALMU) was developed in 1979
- Successfully trialled in 1000 homes in 1981
- Provided “Kitchen Unit” smart display with cost of use and account information
- Employed load limiting rather than disconnection
- Load control via powerline communications from Utility to specific appliances and thermal lag circuit.

Smart metering in 2006

- It has been rolled out in some world markets: US, Italy and recently Sweden and Australia
- The commercial rational for these vary:
 - Reading meters in hard to read areas
 - Reducing the cost of meter reads and billing
 - Billing requirements
 - Load shifting – typically in the US/Australia
 - Payment systems – typically in the UK
- However the use of smart metering for energy and carbon emission reductions has not been a reason for implementation until recently

Smart metering in 2006 and future

- Why the recent interest in smarts and the potential for carbon reductions and security of supply ?
 - Increased interest by Governments and public in environmental issues
 - The recent significant increase in fuel prices
 - The increasing reliance on imported fuel supplies into the EU
 - The publication of the ‘Energy End use and ESCO directive’ in the European Journal in May 2006.
 - The need for Suppliers to maintain income in the face of falling sales

Energy End use and ESCO Directive

- The Energy End Use and ESCO directive was published in the European Journal in May 2006
- Therefore it needs to be implemented in all European States by May 2008
- Article 13 of the Directive covers utility metering:

Article 13

Metering and informative billing of energy consumption

Energy End use and ESCO Directive

Member States shall ensure that, in so far as it is technically possible, financially reasonable and proportionate in relation to the potential energy savings,

final customers for electricity, natural gas, district heating and/or cooling and domestic hot water

are provided with competitively priced individual meters that accurately reflect the final customer's actual energy consumption and that provide information on actual time of use

Energy End use and ESCO Directive

When an existing meter is replaced, such competitively priced individual meters shall always be provided, unless this is technically impossible or not cost-effective in relation to the estimated potential savings in the long term.

When a new connection is made in a new building or a building undergoes major renovations as set out in Directive 2002/91/EC, such competitively priced individual meters shall always be provided.

Energy End use and ESCO Directive

Member States shall ensure that, where appropriate, billing performed by energy distributors, distribution system operators and retail energy sales companies is based on actual energy consumption, and is presented in clear and understandable terms.

Billing on the basis of actual consumption shall be performed frequently enough to enable customers to regulate their own energy consumption.

Energy End use and ESCO Directive

Member States shall ensure that, where appropriate, the following information is made available to final customers in clear and understandable terms by energy distributors, distribution system operators or retail energy sales companies in or with their bills, contracts, transactions, and/or receipts at distribution stations:

current actual prices and actual consumption of energy

comparisons of the final customer's current energy consumption with consumption for the same period in the previous year, preferably in graphical form;

wherever possible and useful, comparisons with an average normalised or benchmarked user of energy of the same user category;

contact information for consumers' organisations, energy agencies or similar bodies, including website addresses, from which information may be obtained on available energy efficiency improvement measures, comparative end-user profiles and/or objective technical specifications for energy-using equipment

Commission Energy Action Plan

- Review wording of Article 13 of the ESD in 2009

What impact will the Directive have?

- It must be implemented in all 25 member states, But:
- Each Member State's electricity and gas metering networks are at very different stages of technical and market development
- Differing solutions to meet the directive with smarter metering will be required, but some elements will remain the same:
 - Customer displays are unlikely to be different in different markets
 - But the information may need to be different

How can smarter metering reduce carbon emissions?

- Providing energy usage data for consumers delivers energy savings
 - Evidence from a range of sources indicates typically between 5-10% reductions
- Providing customers with much better and more accurate bills
 - Less useful for immediate energy reductions
 - But can influence buying decisions for appliance purchases
- Load shifting
 - Can encourage electricity use at lower carbon intensity times
- Encourages consumer interest in micro-renewables
 - Householders more likely to be engaged

Engaging customers in energy efficiency

- Presentation of energy use data in consumer friendly formats can effect consumers in different ways:
 - instantaneous consumption readings
 - Comparative information
 - Cost information? Carbon data? Or comparisons with averages or neighbourhood usage
 - Price comparisons

Customer Information

- The best ways to present data are still in their infancy but it is clear that:
 - Information needs to be presented in clear and understandable ways
 - Can be on in-house displays (CDU's) , combined with heating controls, on Mobiles, PCs or TVs.....
 - Must be linked to simple guidance on reducing usage



**New designs are already
coming through:**

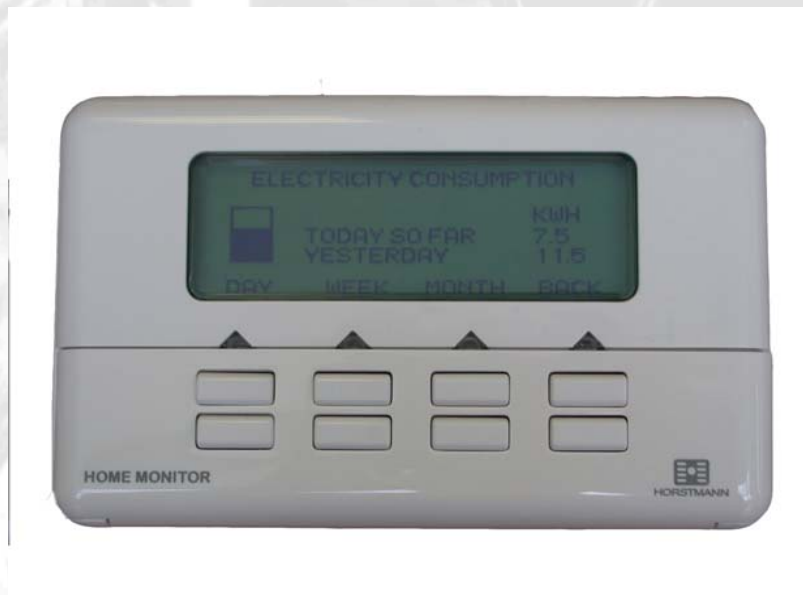
Clip-On Displays

- Electrisave + CurrentCost
- Pro's
 - Low cost
 - Simple to install
 - Doesn't depend on anyone else
- Cons
 - Less accurate than utility meter
 - Less information
 - Less functionality



New meters 1

Based on well established heating controls designs



The home monitor can show electricity, gas, water and Heat information

New Meters 2



A design developed for the Italian market

New Meters 3



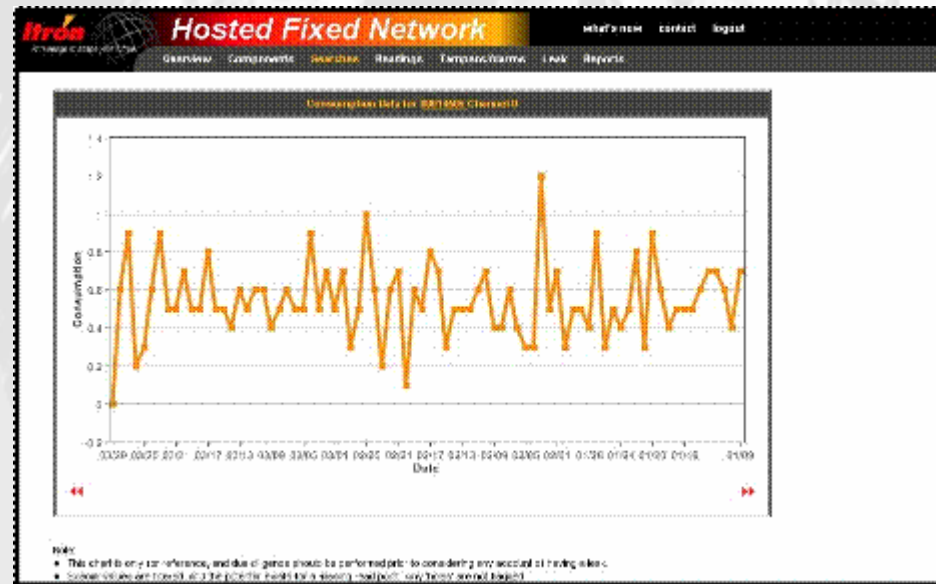
Developed for the Australian market – has 3 ways to show energy use – numerically, graphically and using coloured lights!

New Meters 4



Used in trials in the US

Web based usage data for consumers



Potential savings

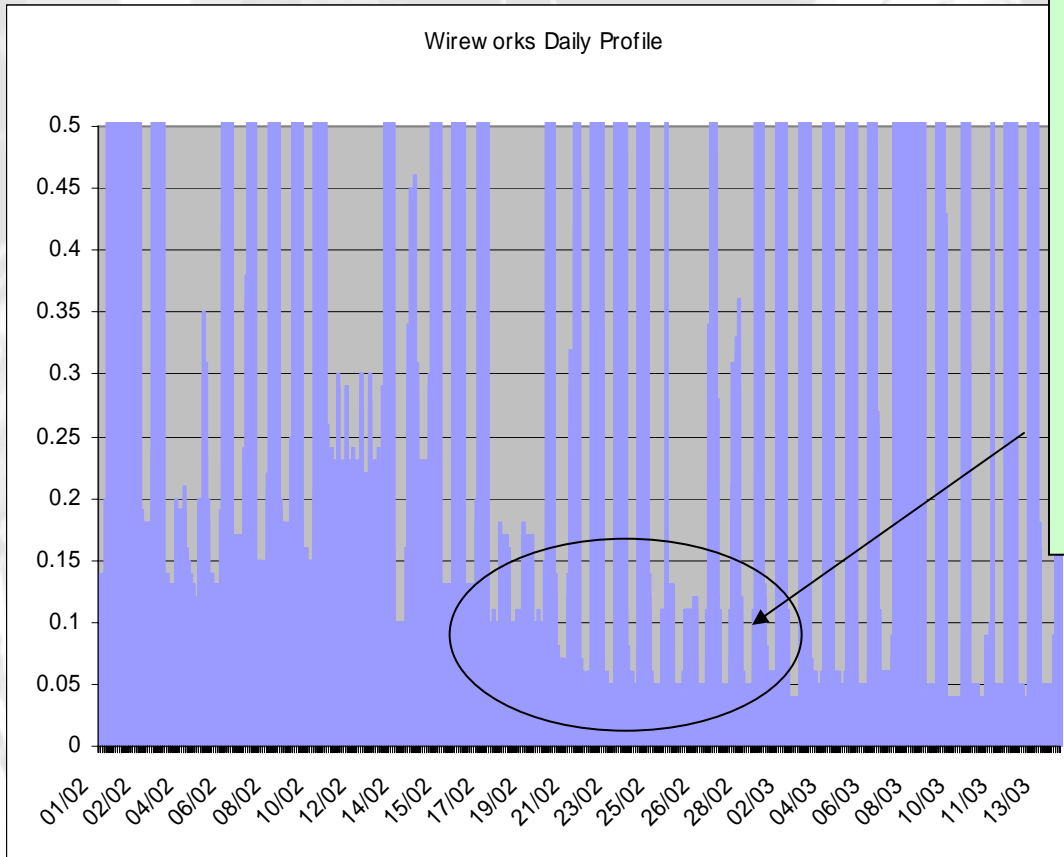
- Evidence from around the world has shown energy reductions of between 0-20% !!
- The variation in effect is due to:
 - Different product designs
 - Different climatic drivers
 - Differing market drivers
 - Often systems also include a load shifting function
- However the overall conclusion of many is that the provision of energy use data, particularly in a rising price environment does lead to measurable energy reductions.
- This will be tested in the UK over the next 2 ½ years.

UK Government funded trials

- The UK Government is assessing bids for funding in their Energy Reduction Pilot
 - £9.75M of Government money available
 - Similar matched funding from industry
 - Aims to produce valid evidence for the energy and carbon savings possible from smarter metering systems and the types of technologies and techniques that deliver the best savings

Evidence is now available from the small commercial sector

- BEAMA recently completed a project with EDF energy and PRI for the Carbon Trust
- Installed smart meters that informed customers of their current energy use coupled with energy advice into small commercial properties
- There are many examples from different types of property:



Office Owner began programme of turning all equipment and lights off at night.

Sunday Load before = 6.19kWh (8th Jan 2006)
Sunday Load after = 2.77kWh (26th March 2006)
Average hourly reduction = 0.1425kWh
Number of working hours per year = 1820 hours
Number of non-working hours = 6940 hours
Total saving = 988 kWh

Energy savings from Better Billing

- Some companies believe that the display of more energy use data on customer bills can help them manage their energy better
 - The bills can show comparative information
 - Can indicate where savings could be made
 - Better billing probably works best if combined with customer display information
- However the data required for this type of billing is very difficult to extract from the current metering systems in the UK
 - The best possible is a quarterly read which many observers feel is too long a period for customer reaction
 - More regular data measurement is required to produce genuinely better billing that will affect customer behaviour.

Load Shifting

- The concept of load shifting has been around for many years
 - The basis for electric storage heating in the UK was the availability of off peak tariffs
 - This led to ‘load shifting’
- The current reason for Government interest is flatten loads and hopefully reduce the use of high carbon intensity generation
 - In a number of markets – California, Australia – load shifting – or demand response- mechanisms have contributed to overall energy usage reductions but
 - It is not clear to what extent overall carbon emissions are reduced
- Demand response needs action at local level, coupled with macro energy policies – not an easy combination
- However load shifting is likely to become more important in the future
 - There is therefore the need for different metering systems to allow these techniques to operate

Smart metering for Household renewables

- Great enthusiasm for small scale renewables
 - PV
 - Micro wind
 - Micro CHP
- Throughout Europe different metering solution used
- In the UK Import – export metering now required
 - Measures what energy is exported, but not what is generated.
 - At present this is not smart metering
- Potential for smart metering to provide feedback for householders on
 - Comparisons of generation and usage
 - Timing of appliance use and local generation
 - Should lead to householder behaviour change
- Possible inclusion in smart metering trials



**European Smart
Metering Alliance**

Intelligent Energy  **Europe**

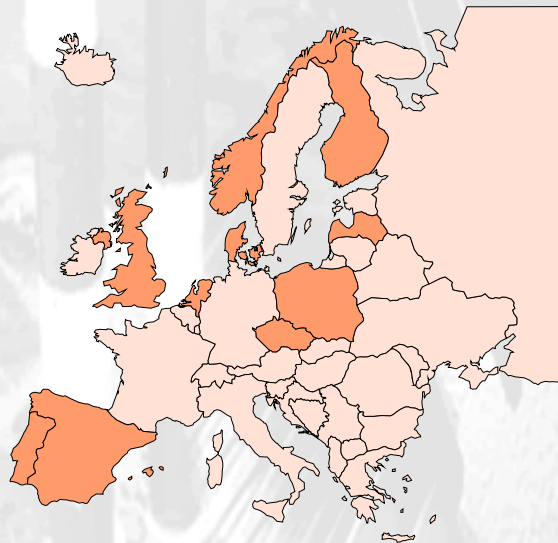
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Project Objective

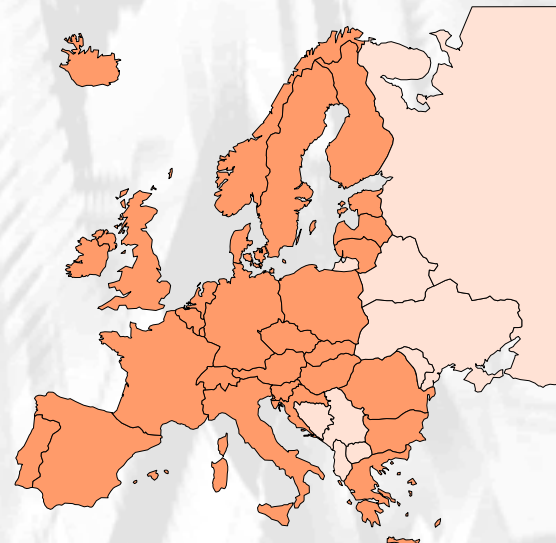
- To review and agree costs and benefits of smart metering
- To develop and disseminate best practice
- To support the introduction of smart metering into European States
- To provide a forum for stakeholders to come together and resolve issues
- To maximise the benefits of Article 13 of the Energy Efficiency and ESCO Directive
- Basic principle is to roll smart metering across Europe based on successful national implementations

Project Participants

Partic. N°	Participant short name	Country
01	BEAMA	UK
02	KAPE	Poland
03	Ea Energianalyse	Denmark
04	ECN	The Netherlands
05	VTT	Finland
06	Pilot Systems	UK
07	EDV ENERGIA	Portugal
08	SINTEF	Norway
09	SenterNovem	The Netherlands
10	EA Technology	UK
11	Ekodoma	Latvia
12	SEVEn	Czech Republic
13	ENDESA DISTRIBUTION	Spain
14	ENDESA ENGINEERING	Spain
15	SPEC	Poland



European Coverage of
Project Participants



Target Coverage of
Alliance Participants

Next Steps

- Project Kick-Off Meeting 10th Jan 2007
- Year 1
 - Reports on current conditions and state of the art – baseline
 - Application Guide for implementing smart metering well
- Produce an Annual Report on smart metering Installations, Energy Savings and changes in Barriers

Stakeholder Engagement

- Aiming to bring stakeholders into Alliance
- Will create a Council to oversee the Alliance and sign off reports – senior representation from each stakeholder group
- Want to achieve consensus within the industry

Stakeholder Groups

- RESCs
- DSOs
- Infrastructure providers
- Software and IT services providers
- Manufacturers
- Governments/Regulators
- Energy Agencies
- Consumer bodies
- General public
- Researchers / Academics / Innovators

Conclusions

- There is significant interest from all parties in the environmental benefits of smart metering
 - The combination of the implementation of the ESD and Trials in the UK and elsewhere will add to this and should lead to the rollout of systems on a major scale
 - However there are significant issues in particular for the UK, in terms of the combination of the market regulatory structure and technology interoperability
- There are of course significant other benefits for the use of smarter metering systems
 - Reduced operational costs
 - Ability to meet other regulatory requirements
- As smarter metering systems are deployed both these aspects need to be considered:
 - New products for utility companies
 - And reduced carbon emissions for consumers and the environment