

Managing residential electricity demand: Learning from experience in the UK and Ontario

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Workshop Report

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Event organised and sponsored by:



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Executive Summary

Introduction

This workshop brought together 36 experts including policy makers and advisors, scientists and residential electricity management stakeholders to provide a neutral forum, under Chatham House rules, for full and frank dialogue relating to sharing lessons learned and developing strategies and policy recommendations emerging from managing residential electricity demand in the UK and Ontario, Canada. This was an opportunity to reflect upon our various roles within the broader context of residential electricity demand management. The aim of the workshop was to draw out recommendations and actions for demand reduction, load management and carbon reduction. The workshop outputs will provide a base for continued collaboration and identification of new research initiatives.

The workshop explored three objectives:

1. Share lessons learned from the UK and Ontario, Canada regarding demand response and demand reduction initiatives;
2. Examine possible strategies; and
3. Develop policy recommendations and actions for demand reduction, load management and carbon reduction.

Workshop Process

The context for the workshop was set by a brief introduction by Sarah Darby, followed by overview presentations from Peter Love (Ontario) and John Scott (UK). These presentations illustrated the characteristics of the electricity systems in each location. They were followed by brief presentations on specific issues, organised into two sessions. The first session was on existing residential conservation and demand management strategies, while the second attempted to analyse the lessons learned from implementing strategies for residential electricity demand. Discussants drew out key issues in the two jurisdictions. The remainder of the workshop was spent in small working groups, convening for plenary discussions to report the results of small group work. Discussions were recorded on flip chart paper, table clothes and notebooks, and summarised on pre-defined poster templates and power point presentations. The final plenary provided for a discussion on next steps and feedback on the content and process of the workshop. This report reflects the written record of the two and a half day workshop.

Key Messages

As the workshop progressed, participants formulated conclusions and questions that were both general and specific in nature. By the final plenary, the following messages had been identified:

General

This is an exciting time for electricity conservation, with high levels of interest, many technical opportunities, and important policy issues. 'Smart' meters are going to form an intrinsic element in shifts to lower consumption, more distributed generation and better customer engagement.

Electricity suppliers need to respond to customer needs in the short term, but residential demand management involves long-term customer engagement and planning for this is urgently needed. Government climate change targets and evolving policies accentuate the need for such planning.

A common vision, collaboration and 'societal permission' are imperative for a transition to 'smart grids'. This will require far more than new technologies. Smart meters are not an end in themselves, but a means of providing information to utilities and their consumers with the intent of creating a conservation culture. There will need to be a transition from transactions to dependencies, from data and information to knowledge and wisdom. Understanding the human dimension is critical.

For action

Government actions (direct or indirect) are possible with technologies in each stage of their life cycle. Speculating about the future involves analyzing where a technology/opportunity is today and therefore what actions may be appropriate in the future. Workshop participants identified the following as priorities:

- Consumer education in the purpose(s) of a smart meter, allowing shifts in usage to off-peak times and providing a measure of control over costs.
- Widespread education and public debate on issues surrounding electricity demand reduction and load management, and on the issues surrounding an advanced metering infrastructure.
- Development of standards for advanced metering. These can stifle innovation but will be necessary at some point to allow the technology to move forward. Standards may focus on the interface between brawn (basic metering functions) and brain (communications), allowing the brains to be modified as needed over time.
- Removal of barriers to local action on energy conservation (much cultural change happens from the bottom up), followed by the creation of measures and frameworks that support such action by provincial/national governments.

For research

We need processes to encourage more R&D on demand-side issues (supply has dominated thinking in the past). Priorities were identified as:

- Customer responses to rising prices, changes in metering and tariffs, and changes in the information they receive from bills, displays etc.
- A better understanding of the personal priorities of consumers, with analysis of electricity use from the consumer's viewpoint

- Adoption of electric vehicles and micro generation – patterns, reasons and impacts;
- Which organisation(s) are best placed to take forward advanced metering, in a fragmented energy market?
- Adapting grids and metering systems for distributed generation;
- Analysis of electrical system efficiency, rather than the efficiency of individual products
- Clarity on 'smart meter' drivers, e.g. societal and carbon benefits, operational benefits, meter/grid interoperability, drivers of DSM, influence of supply mix on the system (now and in future).

Organisation of the report

The report begins with a backgrounder explaining the rationale for the workshop. This is followed by an introduction by Dr. Sarah Darby to provide the context for the workshop. This is followed by overviews of the UK Electricity System by John Kema and the Ontario Electricity System by Peter Love. Residential Conservation and Demand Management Strategies are briefly presented from an economic, educative and regulatory perspective, followed by summaries of the small group discussions. A synopsis of the session on Implementing Strategies for residential electricity demand – lessons learned is provided, followed by group work summaries. The final group work review is presented, concluding with notes of the final plenary discussion, feedback session and closing remarks. Appendices 1 is the workshop programme, Appendix 2 lists participants, affiliations and email addresses.

Throughout the document there are process notes, highlighted in shaded boxes with the following symbol:



Throughout the report, spellings have been standardised, abbreviations spelled out and punctuation inserted where it may help to clarify meaning.

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Workshop Background

Context

The context for this workshop includes:

- Increased concern about security of supply and climate change
- Changes in supply infrastructure – replacement of capacity and debates on the scale and composition of replacements; the extent to which distributed renewables will feature.
- Changes in metering and billing for electricity; extensive trials of both. Smart electricity metering is already being rolled out in Ontario and there are debates on the future of metering, billing and displays in Ontario and the UK.
- Concerns about the distributional impact of variable pricing for electricity as part of demand response programmes – will low-income and low-consumption households suffer?
- Debate about the relative importance of overall demand reduction and demand response/load management, and the relationship between the two.

We aim for a socio-technical approach, recognising that technology and infrastructures shape individual and social behaviour, while behaviour and perceptions influence new technological and organisational developments.

Key questions

The workshop will address the following key questions:

1. What are the lessons to be learned from demand response and demand reduction initiatives (primarily in Ontario and the UK) and where are there significant differences of opinion and/or data shortages?
2. What are possible strategies for the short, medium and long term?
3. What are the most promising ways forward in terms of regulatory policy and demand reduction practice, with a view to influencing policy in the UK and Ontario.

Following on brief presentations in plenary, these questions will be addressed in small working groups who will then present their work to all participants towards the end of the workshop.

In order to prepare participants and use the time together at the workshop as profitably as possible, we sought presentations covering:

- (Utility focus.) Electricity systems in Ontario and UK, with associated energy conservation and demand management challenges. Basic information on geography, generation mix, organisational structure. Relationships between peak

demand and overall demand. What end-uses are most important as constituent of peak demand, summer and winter? What scope is there for reduction of peak demand and what would be the carbon consequences? What are the likely rebound effects?

- (General) Residential conservation and demand management strategies in both jurisdictions, and the impact of these to date. These can be divided into economic, regulatory and 'educative' strategies. For the first of these, we are looking for evidence on the impact on carbon emissions and equity of different forms of load-related pricing (eg RT, time-of-day) and demand-related pricing (eg progressive block tariffing) for residential users. For the second, an overview of regulatory policy over the last decade or so and its consequences. And for the third, a summary of educative options, broadly defined, including information campaigns, advice programmes, community energy programmes, LZC technology adoption and the learning that stems from that
- (Household) What is known about the consequences of householders handing over at least some of the responsibility for managing their energy usage, eg via an ESCO or via direct load control by their utility.

The workshop is structured into 3 phases as follows.

Phase 1

The workshop itself will start in information-sharing mode to set the scene, with presentations based on briefing papers. The aim is that everyone should have a clear sense of the context in the UK and Ontario, the main issues and areas of agreement and disagreement.

Phase 2

In this, we focus on analysing the experience of policy implementation over the last decade or so, looking at economic, regulatory and educative approaches and asking questions along the lines of

- a. What agents and instruments have been involved in a shift away from selling kWh, apart from the utilities and their customers? This discussion should include codes and standards for buildings and appliances, along with procedures for evaluation.
- b. What have been the most promising avenues for awareness-raising, education and moral suasion?
- c. What have been the most promising options for improving direct interactions between supplier and end-user?
- d. What progress has been made to meet the requirements of demand reduction and an increase in distributed generation and building-integrated generation?
- e. Where are there significant differences of opinion and/or data shortages?

The approach is to share information and experience, as in the first phase, but also to explore ideas and approaches. We will be talking about approaches that are still on the drawing board or being tested, as well as those that are well-established. At the end of this phase, we should be in a position to identify roughly where each jurisdiction is at present.

We should also have identified the main questions that we wish to address in the final part of the workshop, and have some sense of the relationships between them.

Phase 3

The aim is to air the main questions arising from phases 1 and 2, then to develop 'ways forward' in groups, in terms of demand reduction, load management and carbon reduction, with a view to influencing policy in the UK and Ontario/Canada. The idea is that each group should begin work with a focus on a specific objective, eg increasing the proportion of renewables in electricity generation to 15% by 2020, cutting peak demand by 20% by 2020, maximising equity in electricity consumption. (These objectives will be framed in the course of Phase 2 of the workshop). They will then develop a strategy based on that objective (this might be a back-casting exercise) and assess how far it might meet other objectives identified as important, or stand in their way. They will also identify who should be part of the solution / who are the actors? What roles should they play? When should particular initiatives be taken, under what conditions (sequencing)?

For this part of the workshop, participants will be allocated a group of 6-8 participants, so that different stakeholder interests are represented in each group. The groups can then develop a portfolio approach to present towards the close.

Welcome and Introductions

Co-chairs Virginia Graham and Ian Rowlands welcomed participants and introduced the anticipated outcomes of the workshop as follow:

1. Share lessons learned from UK and Ontario demand response and demand reduction initiatives;
2. Examine possible strategies; and
3. Develop policy recommendations and actions for demand reduction, load management and carbon reduction.

The Co-chairs invited participants to do table introductions following the process noted in the box below.



Participants spent 3-4 minutes introducing themselves to the rest of the people seated at their table by providing the following information:

1. **Name**
2. **Affiliation**
3. **Expertise/Interest in residential electricity demand**
4. **Two expectations you have of this workshop**
5. **The best thing about the country where you work**

Expectations were recorded on sticky notes and then posted on the wall for all to view. See Appendix 6 for a record of expectations.

Context Setting

Dr. Sarah Darby, Oxford University

The context for the workshop included increased concern about energy security and climate change, changes in supply infrastructure and in metering and billing for electricity, and debate about the relationships between overall demand reduction and demand response/load management.

Sarah presented three considerations to guide thinking during the workshop. Her first slide showed the extent of fossil fuel resources around the Arctic, highlighting the extent to which previously uneconomic fossil fuel sources are increasingly being exploited in the northern reaches of the globe. This provides an indication of the importance of energy security as well as climate change issues, and of our need to rethink the way we 'do energy'.



The second slide provided examples of the proliferation of energy efficiency measures for the household, along with the increase in plug loads. In the UK there is roughly a 1% increase in electricity consumption every year; efficiency gains are not producing a reduction in demand.

The third slide was from Lewis Carroll’s ‘Through the Looking Glass’.



‘When *I* use a word,’ Humpty Dumpty said, in rather a scornful tone, ‘it means just what I choose it to mean -- neither more nor less.’

‘The question is,’ said Alice, ‘whether you *can* make words mean so many different things.’

‘The question is,’ said Humpty Dumpty, ‘which is to be master -- that’s all.’

When we are looking at the future of electricity demand, there are crucial questions about ‘who is to be master?’ – for example, utilities or householders? We also need to be cognisant of language differences between ourselves.

Session 1: Overview

Electricity systems and conservation in Ontario

Peter Love, Ontario Power Authority

<http://www.ukerc.ac.uk/Downloads/PDF/Meeting%20Place/Events/2008/05UKcanadademandred/Love,%20Peter.pdf>

to access the powerpoint slide presentation

Peter provided an overview of Ontario's energy situation in terms of demographics, economics and key players. Energy is still relatively inexpensive, in one of the most energy-intensive jurisdictions in the world, with a retail electricity price of 11.4 ¢/kWh. He also pointed out that the Canadian constitution gives provincial government significant authority over natural resources including electricity. Residential electricity use comprises 33 % of the whole, and the average homeowner uses 900 to 1,000 kWh/month. All homes are to have smart meters and time of use rates by 2010

Ontario's first comprehensive electricity system infrastructure plan in about 15 years is expected to be under regulatory review by the Ontario Energy Board for a year or more. This plan, which has a 20-year outlook, will be updated every three years.

The plan has four key features:

1. Projected growth in peak demand is reduced by 75 % through conservation.
2. Coal is replaced in the supply mix with renewable energy and natural gas.
3. Nuclear power is restored through refurbishments and new builds.
4. Transmission is reinforced for reliable service and to connect renewable energy to population centres.

The plan calls for \$10 billion to be invested in conservation. It also calls for a \$4 billion investment in transmission, \$15 billion in renewables and \$30 billion in other forms of new generation.

Peter's slides included supply mixes in Ontario to 2027, the benefits of conservation the conceptual approach being used and a snapshot of Ontario's contribution to meeting targets to reduce emissions. The importance and role of building codes and equipment standards was stressed. He concluded by noting the relative invisibility of conservation was a critical challenge and that what is required is a "Culture of Conservation"

Discussion:

Have you accounted for electric vehicles?

Not at this point. The infrastructure plan will be redone every three years to incorporate new developments. The plan is for Ontario to have an electricity system, based on gas, nuclear and wind. We're probably 10 years away from 'greening' transport. We have enough on our hands trying to close coal-fired plants.

Could you give a brief idea of how much gas is available to residences?

We have the National Energy Board, though not represented here at this workshop. The NEB has a policy that you can export gas as long as not needed domestically. By 2020, we will no longer be exporting gas to the United States. The long-term availability of gas is questionable. Fast depletion levels, especially in Western Canada. There is some switching from electricity to gas for cooking, etc, but no application for air conditioning, which has moved the highest electricity peaking from winter to summer.

Is a decentralised generation mix being considered in Ontario?

It is, for less than 10Mw, with a feed-in tariff. We do competitions, though results have not been as strong as we'd hoped. There is some use of co-generation in the

summer. District energy systems produce cooling. In our plan, there is much larger potential for co-generation on a small scale. An example of a success is the renewable energy standard offer programme. This was just signed with contracts totalling 1300 MW, all renewable. Surprisingly, 400 of these have been solar PV.

Our image of Canada is of substantial increases in carbon extraction and emissions, yet you've given tough targets and you've said this is all voluntary. Can you explain this?

Canada has just reported its first reduction in CO₂ emissions. Ontario doesn't have tar sands – the picture is dramatically different than that of Alberta. We have both codes/standards and voluntary actions. One of our consultants estimates that 70% of reductions will come from codes, 30% from voluntary measures.

Residential demand: A European/UK perspective

John Scott, KEMA

Click here <http://www.ukerc.ac.uk/Downloads/PDF/Meeting%20Place/Events/2008/05UKcanadademanded/Scott,%20John.pdf>

to view a copy of John's PowerPoint presentation.

John gave a three-pronged presentation, looking first at smart meters/smart grids, followed by the challenges of transformation and the implications for Europe and the UK.

Smart Grids/Meters

John defined a smart grid as 'an electricity network that can intelligently integrate the actions of all users connected to it - generators, consumers and those that do both - in order to efficiently deliver sustainable, economic and secure electricity supplies'. A "Smart Grid employs innovative products and services together with intelligent monitoring, control, communication, and self-healing technologies to:

- better facilitate the connection of generators of all sizes and technologies;
- allow electricity consumers to play a part in optimising the operation of the system;
- provide consumers with greater information and choice in the way they secure their electricity supplies;
- significantly reduce the environmental impact of the total electricity supply system; and
- deliver enhanced levels of reliability and security of supply"

John provided a vision of an emerging internet-like power grid, with the key drivers identified as cost, supply security, sustainability and supply quality. In his 'Elements for Change' slide, John identified a common vision, collaboration and 'societal permission' as imperative for a transition to smart grids.

Challenges for Transformation

John provided examples of housing and transport alternatives for the future. A transition will require much more than just new technologies. There will need to be a transition from transactions to dependencies, from data and information to knowledge and wisdom. "Intelligence is knowing that a tomato is a fruit, Wisdom is

knowing not to put it in a fruit salad..." Understanding the human dimension is critical for any transformation.

Europe/UK – the implications

John gave an overview of the introduction of smart metering in the UK, The Netherlands and Ireland. He presented slides on the role of Distribution Network Operators in a low carbon world and identified 9 issues regarding smart metering:

1. Facilitation of smarter appliances, both demand and generation, promise energy efficiency benefits (costs and carbon) and commercial services to network companies
2. Aggregation of controllable load and/or generation to provide VPP (virtual power plant) capabilities e.g. ancillary services to distribution and transmission companies;
3. Understanding network loading trends, time of day utilisation, and phase balance, enabling capacity to be optimised for cost and security and improved relationship management between customer and supplier/retailer/network;
4. Potential to keep customers much more effectively informed and thereby build goodwill and enhance Corporate Social Responsibility.
5. Increasingly, relationship enhancement will have strategic value for a company. It could be the sexy side of energy that moves the sector away from 'being taken for granted'.
6. Support for the social engagement to care more effectively during supply failures for customers with special needs.
7. In the longer term, there may be advantages in designing networks for intentional islanding, for example in areas of high distributed generation, to enhance supply security, or optimise network investment to manage planned outages.
8. Also in the longer term, smart grids could be an integral element in transport strategies using electric vehicles: a vehicle parked at home is potentially a substantial new demand (perhaps controllable via a smart meter), and also a substantial source of electricity export. Wide-scale domestic storage, managed through smart meters, would enable more effective management of intermittent generation sources, and islanding becomes more achievable.
9. The strategic benefits may be helpful in decision making, especially in situations where the cost-benefit case is marginal and where companies have a strong strategic vision.
10. In conclusion, John emphasised that trust and relationships will be key to any energy transformation. Technology challenges can be overcome, but societal & business issues are also critical 'it's about human beings in their homes'.

Discussion

How well-placed is the UK to replace grids?

Grid replacement will be a massive task. At Ofgem, financial incentives are available for innovation. I recommend visiting their web site for effect of this:

<http://www.ofgem.gov.uk/Networks/Techn/NetwrkSupp/Innovat/Pages/Innvition.aspx>.

For 14 years, there was a decline in research and development spending in the UK. This has gone up every year since Ofgem's innovation incentive. The question remains as to whether it will actually result in deployment of new ideas. The UK does excellent R&D, but consistently fails on the commercial roll-out front. We are starting to see some companies differentiating themselves.

Trust is a central theme in your presentation. Please comment on redress and representation.

It depends on whom we are talking about. Do you mean customers? There is value to a 'no surprises' culture. Never surprise your customers, even with good news.

If you were a betting man, when would this transformation happen?

I don't expect to see a whole-sale roll-out. I think we will see smart-grids emerging in hotspots, perhaps in eco-towns. We may see this starting to begin in renovation projects, or in social housing.

Session 2: Residential Conservation and Demand Reduction Strategies



A 10 minute Ontario and UK perspective presentation was given on economic strategies, educative strategies and regulatory strategies. Following the two presentations, a five minute response from an invited discussant was given.

Economic Strategies

Ontario Perspective

James Douglas, Ontario Utilities Smart Metering Working Group

Click here

<http://www.ukerc.ac.uk/Downloads/PDF/Meeting%20Place/Events/2008/05UKcanadademanded/Douglas,%20James.pdf>

to connect to James' PowerPoint presentation.

James provided an overview of Ontario's plan for smart meter rollout:

- 800,000 smart meters installed by Dec 31, 2007
- Remainder of the province to be completed by Dec 31, 2010.

Installing a smart meter network can provide a list of benefits:

1. Improve service reliability through outage and restoration notification;
2. Improved theft detection and elimination of potential safety hazards;
3. Asset management capabilities (e.g. pre-fault notification, voltage monitoring, transformer loading, hot socket detection);
4. Automation of operational equipment (e.g. load fault indicators, switches);
5. Collection service options (i.e. remote disconnect, load limitation, prepay);
6. The ability to implement new rate models such as Time-of-Use or Spot;
7. Enhanced customer service through access to consumption patterns;
8. Enhanced conservation programs (i.e. load control thermostats, water heaters, in home displays and other gateway accessible devices).

James showed slides on Time-of-Use as a tool, and illustrated the results of an Ontario time-of-use pilot. Residential conservation programmes were briefly discussed. In conclusion, James made the following points:

- Consumers need to be educated on this provincial initiative in order to understand not only the purpose, but also how the installation of a smart meter can empower consumers, allowing them to shift usage to off-peak times and providing a measure of control over their own costs.
- Educational programs and research into customer tools are necessary in order to allow consumers to learn and benefit from the technologies in place.
- Smart meters are not an end in themselves, but a means to providing information to utilities and their consumers with the intent of creating a conservation culture.

UK Perspective

Dr. Nick Eyre, Environmental Change Institute, Oxford University

In the UK, the domestic sector uses 28% of all energy consumed. Economic policies for household energy efficiency include:

- Carbon Emission Reduction Target (CERT) - obligations on electricity and gas suppliers to deliver projects in homes
- Government grants - funding of basic measures (heating systems and insulation) in private, low income households
- Fiscal incentives - reduced Value-Added Tax for some energy efficiency and renewable energy installations

Why no household energy or carbon tax?

- Political reality
- 1996 – Government nearly brought down over the imposition of VAT on household energy
- 2000 – Protests against transport fuel costs
- Social policy
- Ending fuel poverty is a central objective of Government energy policy, now unlikely to be delivered because of rising world prices

Nick provided an overview of the EU Emissions Trading Scheme, noting that the limited upstream price mechanism alone provides only a weak incentive for energy efficiency.

Potential new policies applicable to households include:

a) Fiscal incentives – no firm proposals

- Incentives focussed on home energy performance, e.g.
 - stamp duty on house purchase
 - Council Tax

b) Trading – ongoing consultation on options

- Either 'White certificates' – a fully tradable version of CERT, or
- Energy supplier 'cap and trade' obligations

Finally, Nick presented options for household carbon trading, including Personal Carbon Trading, White certificates, and Supplier carbon cap and trade.

Discussant

Eoin Lees, Eoin Lees Energy

Similarities between energy efficiency and common sense. Nick correctly identified CERT as a key programme, but I'd argue not a fiscal policy, but a regulatory policy. Whatever you call, it just needs to be done. This is a government programme, done well, great success resulting in 500,000 cavity walls being insulated. But this has not been done with expensive buildings with solid walls. If you look at retrofit, we're doing about 75,000 per year.

There are issues of cost and equity with solid wall constructions.

Two options exist:

1. Green investment funds with preferential interest rates. Could encourage this through ESCOs;
2. The unmentionable – tax breaks.

We could also regulate for social housing and provide tax write-offs.

Educative Strategies

UK Perspective

Jenny Boyd, Northern Ireland Electricity

Click here

<http://www.ukerc.ac.uk/Downloads/PDF/Meeting%20Place/Events/2008/05UKcanadademanded/Boyd,%20Jenny.pdf>

to view Jenny's PowerPoint presentation.

Jenny presented the Northern Ireland experience with keypad meters. 202,000 keypads have been installed, representing 27% of customers. In 2007/08, there was 4.9% overall lower consumption by those who had keypad meters installed, compared with controls. Jenny provided results from the time-of-day trial research, which showed a 10% saving in the evening peak. She concluded by stating that:

- Evidence of savings when customers switch to keypad – mostly for higher usage customers
- Time of day tariff enables customers to save money through a mix of 'active' and 'passive' saving
- Customers like the wide range of benefits from keypad
- Strong business case for keypad (cost to serve, debt prevention/management, sustainable social tariff)

Ontario Perspective

Corey Diamond, Summerhill Group

Click here <http://www.ukerc.ac.uk/Downloads/PDF/Meeting%20Place/Events/2008/05UKcanadademanded/Diamond,%20Corey.pdf>

to view Corey's PowerPoint presentation

Corey provided an overview of the Summerhill Group and discussed some of the strategies they have implemented that intend to move the market toward better choices for consumers and the environment. Summerhill initiatives include:

- Keep Cool
- Car Heaven
- Smartstat
- Bright Ideas
- Flick Off
- Cool Shops
- Catch the Sun
- Mow Down Pollution

Corey emphasised the targeting of early adopters, as well encouraging laggards. Summerhill's strategic marketing has included publications in many languages to reach diverse communities in Ontario.

Below are examples of three of Summerhill's marketing campaigns:



Discussant

Michael Lio, Executive Director, Consumers Council of Canada

Consumer-targeted energy efficiency programming needs to consider the lens that consumers use to view the various offerings that compete for their attention. Consumer decision-making is often founded on trust and the trustworthiness of the organization making the offer. Trust is earned and should not be assumed.

Business, governments and utilities sometimes lose sight of the factors that contribute to their trustworthiness and to the characteristics of their consumer-targeted energy efficiency programs that engender trust.

The International Consumer Rights and Responsibilities are being used by many organizations as a framework to build trust among consumers.

In summary:

1. Consumers have the right to basic goods and services which guarantee survival. In many respects climate change issues can be considered part of our basic survival needs.

2. Consumers have the right to goods and services which are not hazardous to health and life.
3. Consumers have the right to be protected against dishonest or misleading advertising or labelling and the right to be given the facts and information needed to make an informed choice.
4. Consumers have the right to choose products or services at competitive prices with an assurance of satisfactory quality.
5. Consumers have the right to be represented and to express their interest in the making and execution of policy.
6. Consumers have the right to be compensated for misrepresentation, shoddy goods or unsatisfactory services.
7. Consumers have the right to acquire knowledge and skills necessary to be an informed.
8. Consumers have the right to live and work in an environment which is neither threatening nor dangerous and which permits a life of dignity and well-being.

Energy efficiency policies and programs that are tested against these consumer rights are more likely to be trusted and accepted by consumers. A set of simple questions can be posed as a first step in examining trustworthiness, for example:

- Are energy efficient products safe? Do they perform as expected?
- Is easy-to-understand information provided to consumers in a way that facilitates choice?
- Are consumers involved in the development and implementation of energy efficiency policy and programs?
- Are redress mechanisms available that enable consumers to complain and to be helped where products or services are unsatisfactory?
- Is consumer education a core component of the energy efficiency program?

Consumer acceptance of energy efficiency programs is often founded on trust. Trust gives programs the resiliency they need to succeed year after year.

Regulatory Strategies

Ontario Perspective

Tony Rockingham, Ontario Ministry of Energy

Click here

<http://www.ukerc.ac.uk/Downloads/PDF/Meeting%20Place/Events/2008/05UKcanadademandred/Rockingham%20Tony.pdf>

for Tony's PowerPoint presentation

Click here

<http://www.ukerc.ac.uk/Downloads/PDF/Meeting%20Place/Events/2008/05UKcanadademandred/Rockingham%20Paper.pdf>

for Tony's paper

Tony presented his views on what future conservation activities will look like in Ontario, and what the major policy issues are. He started by describing the

background to conservation in the province, and also a model, a product cycle for conservation, that is helpful in understanding Ontario's approach.

To date, the Government has:

- created a body (Ontario Power Authority) that has the ability to procure both conservation and new supply, and launch programs in these areas. The OPA has the responsibility for preparing an Integrated Power System Plan for a 20 year period,
- given itself the ability to set goals for electricity conservation that the Integrated Power System Plan must meet.

In June 2006 the government set an ambitious goal for conservation - about 20% of future demand for electricity will be met by conservation by 2025 - and recognized explicitly the intent to use regulations under the Building Code and the Energy Efficiency Act. In June 2007 they published a climate change plan (www.gogreenontario.ca) that recognizes the government role in research, development and demonstration and in demonstrating leadership in greening its operations.

The task of looking at conservation in the future in Ontario can be made easier using a product cycle model. Government actions (direct or indirect) are possible with technologies in each stage of their life cycle. Speculating about the future involves analyzing where a technology/opportunity is today and therefore what actions may be appropriate in the future. Although this is an appealing model of how policies will interact with incentive and awareness programs and technologies there are still policy issues.

Tony concluded by saying it is an exciting time for conservation: lots of technology opportunities, lots of interest in greater conservation, and lots of important policy issues to address.

UK Perspective

Paul Egerton, Department for Business, Enterprise and Regulatory Reform

Click here

<http://www.ukerc.ac.uk/Downloads/PDF/Meeting%20Place/Events/2008/05UKcanadademanded/Egerton,%20Paul.pdf>

for Paul's powerpoint presentation

Paul provided key points on the UK approach to saving energy. He noted that approximately 20% of domestic carbon dioxide emissions come from lighting and the use of appliances.

Actions to reduce emissions include:

1. The Carbon Emissions Reduction Target (CERT), a supplier obligation that increases every three years;
2. Improved product standards;
3. Energy Performance Certificates;
4. The Warm Front programme (grants for insulation and heating improvements);

5. Advice on energy efficiency through its "Green Homes Service"; and
6. Promotion of micro-generation technologies.

The government has yet to decide on how to move forward with its supplier obligation, from the current measures-based to an outcome-based approach that fits with cap-and-trade mechanisms. It will be consulting on this in the autumn.

Discussant

Mark Garner, Ontario Energy Board

Mark described the regulator as in the middle, sandwiched between policy makers and industry. As a regulator, we're looking for policy clarity. What policies are we pursuing: demand management, affordability, conservation? With the UK smart metering – what are you looking to achieve?

Regulators look for evidence-based decision-making. Is ethanol, for example, evidence-based? They are also big believers in markets. Mark concluded with questions back to the audience about the role of ESCos and the function of advanced metering, eg Time-of-use meters for price flattening – what do you do when electricity prices flatten through market mechanisms, without requiring TOU pricing?

Knowledge Café: Identifying issues and sharing lessons learned



Knowledge Café

The Knowledge Café had 6 tables, each with a host (see questions and host noted below). Participants had 20 minutes per table at four different tables. The conversations were intended to build on each other as participants moved between four of the six groups, connecting ideas and revealing insights into the six issues identified below:

1. What are the issues arising from the economic strategies presentations? Host: **Nick Eyre**
2. What are the issues arising from the educative strategies presentations? Host: **Peter Love**
3. What are the issues arising from the regulatory strategies presentations? Host: **R. Hamblin-Boone**
4. Where are there gaps in knowledge? Host: **Sarah Darby**
5. Where are there promising areas for further application/research? Host: **Ian Rowlands**
6. What opportunities exist for testing or applying lessons learned? Host: **Virginia Graham**

At the end of the four Café rounds, the six table hosts provided a brief summary of key discussion points in a plenary session:

1. What are the issues arising from the economic strategies presentations?

Wider Economic Instruments? How effective can these be?

- Utility programmes focus on cheap resources. What do we want suppliers to do?

- Tax breaks may be better for expensive measures
- What are the aims – carbon? Energy? Load? Money? Possibly all?
- Which taxes? Consumer system benefit fund. What motivates consumers?
- Increased electrification.
- Upstream taxation – currently huge windfalls.

2. *What are the issues arising from the educative strategies presentations?*

What is education about? Agree this is a broad issue, with cultural considerations. Date, information, knowledge, wisdom
We need to listen to the customers!

Why educate? The 'whys' are difficult. In the UK, it's carbon. In Ontario, it is less clear. Some are focussed on the electricity system, some on the environment, some on saving money. In Sweden, there is hydro-nuclear generation. Carbon is not an issue, but environment is.

Who: is it the retailers, the contractors?
Need identified for coordination. UK is doing this through the Energy Savings Trust.

Hard for people to understand carbon. Need to better communicate this message.
Ton of Carbon hard for people to understand. Why not regulate, not educate?

3. *What are the issues arising from the regulatory strategies presentations?*

Regulators could stimulate innovation. Without incentives, little following. Question, however, as to whether this is their role.

Issues of double-counting:
Regulator have role in disenfranchised consumers
Regulators need to strengthen market and enforce: anything else down to the industry

Suggestion that regulator inhibits innovation. Bolt-on policy

Does regulator need to play role in levelling the playing field?
Question of whether you need a level playing field, or leave a role for competition.

More flexibility for other market models to work?
For example, insulation. Propped up a new industry. Another way, could you develop a self-sustaining industry?

Regulation – can't force paradigm shift.

Policy needs to be clear for regulation to work.
Heavily politicised.

4. *Where are there gaps in knowledge?*

In understanding definitions: primary energy use, load management, demand reduction, etc. Not often precise - we use terminology in different ways and need to

clarify in policy.

We urgently need to map the relationship between load management and demand reduction.

Retailers do not know enough about what their customers want.

Gaps in knowledge of the infrastructure needed for concerted action – joining up the various elements.

5. Where are there promising areas for further application/research?

1. Customers: what they understand
 2. 'Invisibility' of issue
 3. Level of knowledge now
 4. Motivation/value
- Thinking laterally. Health and happiness do motivate. How do people react to changes, prompts?
 - What is the permanence of any reactions we see?
 - What is the impact of the rebound effect?
 - Also research on future of whole system.
 - Disrupter technologies - can we anticipate these?
 - Should we develop rewards?
 - Use of backcasting
 - Policy by codes or by choice
 - How do we delink wealth and energy consumption?
 - Technical elements, grid questions
 - Explore links between technical/social.

6. What opportunities exist for testing or applying lessons learned?

1st issue; need to understand bias in consumer testing
 Discussion about vocabulary: consumer acceptance, consumer conditioning

Who is telling who what to think and on what basis?

Do we have the philosophy right?

UK context: so many market actors, which are difficult to test and bring together.

What do people want to know?

Trying to understand links between education, awareness, information

Are we talking about saving money, KWh, CO₂?

Evidence-base – is it both testing before and after designing programme?

Links between ????, self interest, peer pressure

How do you test what people think and do?

Misalignment of costs and benefits – how do we re-align?

Difference of regulatory and voluntary mechanisms. Some curious mixture of both.
 Where does choice come in? Compulsion?

Practical testing:

How much information do people really want?

How can you set up ways to recover up-front costs?

Look ahead, issues to be current 10 years from now.



Reflecting on our Conversations

Following the group presentations, the whole group was invited to take a few minutes of silent reflection and consider the following:

1. What deeper questions are emerging as a result of our conversations?
2. What new insights do we have as a result of our conversations?
3. What have we overlooked in our conversations?

Group Reflection - comments

- Are we doing the best for the consumer?
- Can we actually deliver on what we are talking about? The rubber has hit the road
- Are we being honest with ourselves?
- I've spent my life doing evidence-based work. Am now starting to question this. Should we really be more inspirational. We've shown energy efficiency is possible – can we now just do this.
- Different organisational set-ups in Ontario and the UK. The existence of the agency to deliver government policy in Ontario is enlightening. Should the UK be agency-route based?
- We're time constrained. What can we do quickly for our children?
- Let's get away from setting targets and seriously over-achieve
- How do we get benefit from overachieving and get mechanisms to encourage people to do something.
- In three years time, will we be talking about energy efficiency or about carbon?
- We all agree energy efficiency is great, but we don't know why.
- Consumers versus people. Climate change is about global citizens. Need coherence, and understanding that we are dealing with people, not just people as consumers.
- What is the big problem we are trying to solve?
 1. Living off our resources
 2. What are the most appropriate solutions
 How do we engage everyone with the big problem?
- Completely new markets: this is an opportunity. Decouple energy and growth. Reality is that energy is cheap and available.
- The market won't work how we want it to. Therefore need government
- The mechanisms we need to put in place are not there at the moment.
- If we look at science, we have 10 years to do something. The 'Inconvenient Truth'. What we need is really drastic change.
- The carbon focus has certainly come up strongly. The work of smart grids. Is this the same as a carbon focus? Understanding of carbon-labelling of food (eg Tesco). Why are we being so slow?

Session 3: Implementing strategies for residential electricity demand – what lessons have we learned?

3.1 Utility led

UK Perspective

Derek Lickorish, Lickorish Consulting Ltd.

Click here <http://www.ukerc.ac.uk/Downloads/PDF/Meeting%20Place/Events/2008/05UKcanadademanded/Lickorish,%20David.pdf>

for Derek's PowerPoint presentation

Derek presented the National Grid system context and a timeline of demand side management from 1980 to present. He noted that the key political drivers are:

- Legally binding carbon reduction targets
- Increased renewable energy targets
- Energy Bill – medium and (potentially) small businesses for smart metering
- EU Energy Services Directive – member states to determine interpretation
- Government desire for greater micro generation and innovation
- CERT – facilitates some innovation

Derek presented options for future action and discussed what he has learned. He concluded by making the following points:

- Residential demand side management is a long term customer engagement opportunity;
- More research to understand customer attitudes, electric vehicle and micro generation penetration required;
- Smart gas and electricity meters are intrinsic to carbon saving and customer engagement; and
- What is the organisation to take this forward in a fragmented energy market?

Ontario Perspective

Bryan Boyce, Electricity Distributors' Association (EDA)

Click here

<http://www.ukerc.ac.uk/Downloads/PDF/Meeting%20Place/Events/2008/05UKcanadademanded/Boyce,%20Brian.pdf>

for Bryan's PowerPoint presentation

Bryan presented the strategy for conservation and demand management program delivery by Ontario's electricity distributors. The EDA as an association represents over 80 electric utility members.

The policy context is that new generation and transmission are required, and there is a need to emphasize renewable energy and energy efficiency as part the effort to manage supply challenges. The Ontario government target is to reduce load by 6,300 megawatts by 2025. The distribution utilities which make up the EDA are tasked with leading conservation and demand management in each of their franchise

areas in Ontario. Results are promising, with summer peak savings of 9.4MW (2005) and 141MW (2006).

Provincially, some of the programmes in place for conservation and demand reduction include

- Great Refrigerator Roundup – removal of old, inefficient refrigerators, freezers and air conditioners
- Summer Savings – customers receive a 10% bill credit if electricity consumption reduced by 10% over previous year – ran July to August
- peaksaver® - during high electricity demand load control devices on central air conditioners / electric water heaters allowed utility to ramp down electricity use remotely

Bryan noted that the Smart Meter Initiative is a centrepiece of government energy policy. By 2010, installations of 4.5 million smart meters are expected in every residence and small business in Ontario. Time-of-use pricing to begin roll-out in 2008.

Bryan concluded by noting that there is increasing attention on the attributes of distributed generation. He expects this to be a key industry issue as future role and responsibilities of distributors are determined. The EDA is conducting a sector-wide visioning exercise that will include this issue.

Discussant

Russell Hamblin-Boone, Energy Retail Association

- Parallels between Ontario and the UK – coal-fired shut down, and a background of promoting energy reduction while still experiencing increased demand. How do we move towards a low carbon economy?
- If we use de-carbonised energy in the future, does demand still need to go down? How can a business case made for reducing energy sales?
- Price signals – much more influential in the UK; not as strong an issue in Ontario. Customer relation management and diversity of product offers is only way to gain competitive advantage e.g. energy services.
- An Ombudsman scheme in UK – ensures energy suppliers are accountable for customer service.
- Retailer energy efficiency products - what organisations do consumers like, such as big supermarkets? Do we tell consumers about environmental levies they don't know they're paying?
- Less consumer push wanted, and more consumer pull. Let consumers drive the market. Instead of creating new products and trying to sell them, energy companies need to ask what customers want and then develop the product. This

is pertinent with the opportunities for new products that smart meters will facilitate.

- What contextual information do we give consumers so they can answer the questions we want to ask i.e. what would trigger you to use less energy in the home and what products would you need to achieve this? Informed consumers are empowered consumers.

3.2 Non-utility led

Ontario Perspective

Paul Shervill, Ontario Power Authority

Click here

<http://www.ukerc.ac.uk/Downloads/PDF/Meeting%20Place/Events/2008/05UKcanadademandred/Shevill,%20Paul.pdf>

for Paul's PowerPoint presentation

Paul presented part of the Ontario Power Authority's research programme, which is used to design and market programmes and awareness initiatives. The OPA has a three-pronged research programme which is discussed further in Paul's presentation:

- a) Conservation Usage and Attitudes Survey
- b) Consumer Segment Profile
- c) Research on individual programs

a) Conservation Usage and Attitudes Survey results show that in Ontario:

- No sense of urgency about conservation
- Top electricity priorities for government: alternative sources and reliability of supply
- Less than half see need to change behaviour and lifestyles
- Conservation not on radar for those concerned about environment
- Almost all report they are doing something to conserve at home
- Only 25% feel they are doing all they can to conserve

b) Disaggregating data based on population information, four 'consumer segments' were characterised:

- Live for Today
- Budget-Driven
- Pragmatic Conservers
- Green Champions

Green champions were characterised as follows:

- Motivations
 - Care deeply about conservation/sustainability for its own sake
 - High social responsibility, lowest tolerance for pollution, optimistic about change, low consumerism
 - Willing to spend more, do more and learn more to make their homes and lifestyles more sustainable
- Behaviour
 - Turn off lights when not in use, buy CFL bulbs, use programmable thermostats, buy energy-efficient appliances

- Profile
 - the most urban of all segments, overrepresented in the City of Toronto
 - mainly female (nearly 7 in 10)
 - slightly overrepresented in the 36 to 55 age cohort
 - just slightly above the average in household income

c) Paul highlighted the Peaksaver programme as an area of individual programme research.

Paul concluded by listing 3 priorities for further research:

1. Better understanding of personal priorities of consumers
2. Analysis of electricity use from the consumer's viewpoint
3. Continued sharing of research with LDCs.

UK Perspective

Gavin Purchas, Sustainable Development Commission

Click here

<http://www.ukerc.ac.uk/Downloads/PDF/Meeting%20Place/Events/2008/05UKcanadademandred/Purchas,%20Gavin.pdf>

for Gavin's PowerPoint presentation.

Gavin presented the post 2011 Supplier Obligation Policy. The Government aims to reduce emissions from the household sector from 40 MtC to 30 MtC by 2020 (with 3-4MtC reduced though use of the Supplier Obligation), yet domestic consumption continues to increase and the potential for cheaper measures to reduce energy demand is decreasing.

Gavin identified several opportunities:

- Climate Change Bill and Carbon Budgets from 2008-2022
 - Potential for an 80% reduction by 2050
- Renewable Energy Target – 15% by 2020
- Rising energy prices create incentive to save energy and for Govt to put in place policies to support energy efficiency.
- Big policy space to be filled to decarbonise heat supply (some of which is still electric).

Gavin noted five issues that must be addressed:

1. Current policy creates a perverse incentive for supply companies to continue to make profit from selling more kWh while installing efficiency measures, energy efficiency needs to become a core part of the supply companies business;
2. Cheaper measures such as cavity wall and loft insulation will run out. More expensive measures and behaviour change will be required. Current SO policy doesn't create a strong incentive for either;
3. Equity: it will be important to target those able to pay for more expensive efficiency measures, to avoid spreading the cost across all customers;
4. Increasing demand for electricity, especially from lighting and appliances;

5. The more outcome-focused the SO policy becomes, the more likely that high-emitting low-income consumers (fuel poor) will become unattractive to the industry.

Gavin highlighted five points regarding the proposed solutions and the Supplier Obligation policy:

- Is Cap and Trade the answer?
 - Puts cap on person who is not the decision maker
 - Requires emissions reductions through decreased sales rather than through decreased carbon content of product.
- SO will need a comprehensive social package to tackle fuel poverty, dealing with price, measures, income and advice.
- SO is going to need supporting policies to drive customers to supply companies, to reduce search costs and limit the impact on consumers bills. Will also need fiscal incentives and regulatory requirements, e.g minimum standards for rented accommodation, Housing Health and Safety Rating System.
- SO will need to retain focus on measures but also give greater certainty over the outcome. 'Hybrid design' is the subject of research at present.
- Could be different SO policies for electricity and gas, given the different policy landscape of each fuel.

Discussant

Warren Heeley, Heating, Refrigeration and Air Conditioning Contractors Association

Our association members sell the products that use your electricity. What we have learned:

- Partnership
- Shifting decision-making to increase efficiency

In the presentations, noted that Canadians are looking at Megawatts, whereas UK folks are looking at Carbon.

Issues and greater clarity required around consumer awareness and supplier obligations. Consumer awareness should be an issue at the time of purchase. The consumer needs simple, credible information from credible sources.

The problem with incentives is that there is confusion by the consumer on what these all mean. Key messages are that:

1. Investing in partnerships is important
2. How to mobilise people in the homeowners' homes is important.
3. A combined effort on these will give the best results.

Discussion

What model has incentivised the Ontario experience?

In delivering programmes, partnerships are important. Providing customers with long term contracts. Whether utilities should be given over-arching responsibility is debatable.

For three years in Ontario, loss was captured through rate structure. In the UK, are suppliers looking at reverse-generation from not selling products?

There are technical and non-technical (theft) losses. For suppliers, where there are losses they have incentives to go after that.

In terms of selling overall less energy, the mechanism doesn't work

We talk to friends, family members if we want to find a builder, for example. Engaging in communities. A whole way of thinking we need to tap into and should pay attention to this.

- This is a good point regarding social networks. Who are the key buying influences? Often with your local contractor. Therefore, need contractors network as they are the trusted ones for advice.
- Part of the role ESCOs play is to satisfy customers. We are customer-facing and this therefore requires trust.
- Some companies are putting forth ideas without regulatory measures.
- 52% of the market switches between 6 different companies. Therefore, great corporate reward if you can attract customers.

How much loss is there on the Ontario distribution system?

- Regarding losses, we don't know. We suffered 3.5% on our distribution system. Part use of conservation funds is infrastructure depreciation.
- You may find losses going up, depending on the utility.
- One programme about to launch is the Aggregator program

In the EEC, it is policy to move companies into energy services.

Short, medium and long-term strategies for managing demand



In six self-selected groups, participants were asked to develop strategies for managing residential electricity demand in the short term (to 2012), medium-term (2020) and longer-term (2050). Using prepared templates, participants recorded their strategies presented below. Two groups worked on each of the three time periods independently.

Strategies for Managing Residential Electricity Demand to 2012

A)

Desired Outcome(s):

<ul style="list-style-type: none"> • Preparation for a sustainable future/outcome • Political Consensus • International Cooperation • Smart Meter Rollout
<p>Rationale:</p> <ul style="list-style-type: none"> • Decarbonise energy – government decision required • 2050 Roadmap
<p>Detailed description of what needs to be done (and by whom):</p> <ul style="list-style-type: none"> • Update building codes and regulations: government • Buildings regulations enforcement – government • Appliance standards – government • Building capacity – industry • EU-ETS – to be made international – National governments and G8
<p>Implementation/feasibility issues and suggestions to overcome:</p> <ul style="list-style-type: none"> • Communications programme – everyone, with government to simplify • Fair price for micro-generation • Aggregate and receive rewards (supermarket rewards) for demand side management.
<p>Existing evidence and evidence needed:</p> <ul style="list-style-type: none"> • EU-ETS • CERT (Certified Emission Reduction Targets) • Building market transformation
<p>Other points to consider:</p> <ul style="list-style-type: none"> • Lead time for legislation • Consumer Protection • International Climate Change Agreements

B)

<p>Desired Outcome(s):</p> <ul style="list-style-type: none"> • En route for 2010 by 2020 (CO2 at 1990 levels) • We want to see significant consumer pull • Sustainable energy is natural choice
<p>Rationale:</p> <ul style="list-style-type: none"> • Kyoto – impact of carbon • Economy depends on it • Energy security
<p>Detailed description of what needs to be done (and by whom):</p> <ul style="list-style-type: none"> • Extend labelling beyond existing products • Start to focus on transport • Work out who we are not focussing on – google? • Community focus • No free EU allowances/size of supplier obligations • Energy Display Certificate linked to council tax/property/income tax • Carbon budgets – individuals, Personal Carbon Allowances • Solve fuel poverty to reduce impact or carbon price on this group • Ban top 10 worst products • International agreement on standards • How can we use technology/internet? • Carbon army – community initiatives • Feed-in tariffs/sustained support for micro-generation • One stop communication of carbon to customers • Smart meters • Heat, other domestic fuels • Government – clear guidance (UK rationalise brands/agencies, less

government bureaucracy)
Implementation/feasibility issues and suggestions to overcome:
<ul style="list-style-type: none"> • Implementation: getting there, journey; EU constraints; government study • Feasibility: Getting consumer buy-in; government may be unwilling to take big steps/risk averse.
Existing evidence and evidence needed:
<ul style="list-style-type: none"> • Existing: worldwide • Needed: none
Other points to consider:
<ul style="list-style-type: none"> • Differences in government approach: UK and Canada

Strategies for Managing Residential Electricity Demand to 2020

A)

Desired Outcome(s):
<ul style="list-style-type: none"> • 40% of energy demand met by renewables • Better energy literacy and access to tools; wisdom
Rationale:
<ul style="list-style-type: none"> • Balancing power – do we engage the residential sector? • Load reduction • Building integrated renewables • Keep open options, for smart grid development
Detailed description of what needs to be done (and by whom):
<ul style="list-style-type: none"> • Implement proper fuel mix disclosure – suppliers • Fridges and freezers installed with demand response chips – manufacturers and government • Address charging of electric vehicles – toll tariffs • Smart metering: load reduction and balancing power
Implementation/feasibility issues and suggestions to overcome:
<ul style="list-style-type: none"> • Dealing with transport load, charging vehicles, time of use pricing. • Boosting supply, small and large scale – planning issues • Need to reform regulatory system

B) 2020 step to 2050

Desired Outcome(s):
<ul style="list-style-type: none"> • LEDs • Product standards • Behaviour • No air conditioning • Zero carbon extension – PV as well? • Combined heat and power • electric heating ? • Finish smart meters • Clarity past 2020 electricity generation • Smart grid trialled • Trial and consider personal carbon allowances
Rationale:
<ul style="list-style-type: none"> • Need to deliver from residential, to make up for transport failures
Detailed description of what needs to be done (and by whom):
<ul style="list-style-type: none"> • Product standards: EU standards, 'permission to manufacture'?

<ul style="list-style-type: none"> • Education, change attitudes (therefore repeat purchases), in schools and ?
<p>Implementation/feasibility issues and suggestions to overcome:</p>
<ul style="list-style-type: none"> • LEDs brighter and cheaper with EU support – government procurement to kickstart; top performer – mission by 2015 • Distribution capability – mass PV rollout
<p>Existing evidence and evidence needed:</p>
<ul style="list-style-type: none"> • Electric heating projection and electric transport and potential for low carbon generation.

Strategies for Managing Residential Electricity Demand to 2050

A)

<p>Desired Outcome(s):</p>
<ul style="list-style-type: none"> • 80% cut in CO2 by 2050 • Minimal impacts on the social economic system (measured in terms of a happiness indicator, not GDP) • Resilient and robust systems • Increasing natural capital • A low transport society (reconfigured communities)
<p>Rationale:</p>
<ul style="list-style-type: none"> • Avoiding societal collapse • Future proofing our energy sources • Environmental stability
<p>Detailed description of what needs to be done (and by whom):</p>
<ul style="list-style-type: none"> • Connecting research and practice • More money for research to delineate the role that behavioural interventions versus pecuniary and legislative measures – what works, what doesn't
<p>Implementation/feasibility issues and suggestions to overcome:</p>
<ul style="list-style-type: none"> • Political and societal will to change; • Capital stock/infrastructure turnover needs to be taken advantage of
<p>Existing evidence and evidence needed:</p>
<ul style="list-style-type: none"> • Near unanimous scientific consensus on impacts • Evidence of what to do, rather than why to do it • How to engage people in societal priorities like climate change
<p>Other points to consider:</p>
<ul style="list-style-type: none"> • Education is fundamental



At the end of this session, posters were displayed on a graffiti wall at the back of the room and participants were invited to review each other's posters and policy actions. Post-it notes were made available for participants to add comments to the ideas presented.

Issues, Best practices, Gaps and Actions



Participants were invited to identify issues they wished to explore further. Eight issues were identified, and four chosen to be explored further in small working groups. Five questions were given to guide discussions as follows:

1. What have we learned about this issue?
2. What are 'best practices' on this issue?
3. What do decision-makers need to address this issue?
4. What are gaps in knowledge on this issue?
5. What needs to be done on this issue?

The four issues and the resulting work is given below.

Issue: Codes and standards

What have we learnt about this issue?

Issues:

- *Levels (how to set them – set new standard to eliminate bottom 10%, or set standard to match top 10%)*
- *Lead times (how long to give industry to meet the standard)*
- *Cycle times (how often the standard is reviewed and new levels set)*
- *Proving new products in the market (do you have to have 5% sales in the market, or 30%)*
- *Measurement (need time with new products to learn how to set a testing protocol)*
- *Labelling (ensuring the labels allow consumers to understand the important characteristics of a product (lighting quality, flicker of CFLs))*

Other issues

- *Looking at the efficiency of the system rather than the efficiency of the products*
- *Size creep: fridges are more efficient but getting bigger*
- *enforcement*
- *should the government lead the process or allow industry to lead (in Ontario product standard setting is lead by government, building code process is dominated by industry)*
- *Should technology laggards get funding to help them meet new standards*

Standards for smart meters

Standards can stifle innovation but are necessary at some point to allow the technology to move forward

Standard may focus on the interface between brawn and brain, and allow the brains to be modified (plug and play)

Technology development and standards

Need a process to encourage more RD&D on conservation (supply has dominated thinking in the past)

- *At universities provide more funding to enthusiastic conservation researchers*
- *Assist in IP to help move products out of the University*
- *Link to manufacturers to commercialize quickly*
- *Roadmap for funding conservation product cycle may be different from the roadmap for supply*
- *Valley of death in venture funding is an issue – may be a government role.*

Conservation culture

Need to ensure that bright and passionate people are ready to have a career (university, industry, government) in conservation

Issue: Smart Meters and Smart Grids

What have we learned about this issue?

The importance of

- Leadership
- Capability
- Ownership
- Process
- Vision
- Transformation – smart meters /smart grids can transform whole energy system operation and customer relationship
- Importance of market context

What are 'best practices' on this issue?

- Guidance on pilot design, eg ESMA guide. To include customer interaction
- Getting to best approach to interoperability (HAN, LAN, WAN) – see mobile phones

What do decision-makers need to address on this issue?

- Building a robust evidence base
- Market design
- DNOs to develop understanding of smart grids – have demonstration project
- Issues related to community energy and energy services

Where are gaps in knowledge on this issue?

- What is a smart grid?
- International comparisons
- Clarity on smart meter drivers, eg societal and carbon benefits, operational benefits, SM/SG interoperability, drivers of DSM, influence of supply mix (now and in future), electric vehicles, how microgen fits in
- Managing data, defining data needs, data security issues

What needs to be done on this issue?

- Timetable clarity
- Decision makers to declare ownership of gaps in knowledge and their resolution
- Public debate and communication (along with developing awareness, education)
- Work on planning now, while trials etc are in progress

Issue: Communication to Education: Creating a “Culture of Conservation” or a “Culture of Carbon Reduction”

What have we learnt about this issue?

- *Cultural shift is bottom up*
- *Need for continuous activity*
- *Different starting points*
 - *Geographically (e.g., Ontario, UK)*
 - *Within societies*
 - *(e.g., 25% conservers vs. Other)*
 - *Distribution of conservation activity in Toronto area*
- *Companies need to respond to customers in short term; longer term thinking/planning needed for larger shifts*

What are ‘best practices’ on this issue?

- *Multipronged approaches , multiple channels*
 - *Paper (e.g., comparative billing, leaflets)*
 - *People (e.g., community leaders, non-utility actors, students, celebrities)*
 - *Places*
 - *Demonstration sites (e.g., Centre for Alternative Technology)*
 - *Open houses (e.g., Community Energy Day)*
 - *Websites (e.g., CO2 Online)*
 - *Programs*
 - *Formal education (e.g. Grade school thru graduate school)*
 - *Informal education (e.g., via media, or at places above)*

What do decision-makers need to address on this issue?

- *Who ARE the decision makers?*
 - *Society?*
 - *Energy Industry?*
 - *Politicians*

Where are gaps in knowledge on this issue?

- *Will smart metering or microgeneration change behaviour & knowledge significantly?*
- *What does motivate change?*
- *Are there “tipping points”?*
- *Long term impact of communication? Education*

What needs to be done on this issue?

- *A lot (no single easy solution)*
 - *MORE INVESTMENT*
- *Culture shift*
- *Continuous education*
 - *Information=>communication=>education*
 - *May be “disruptive” influence!*
- *Recognize different starting point*
 - *Differentiated messages*

- Variety of channels
- Variety of educational levels

Issue: Community Issues – Generating collective local action in order to reduce carbon

What have we learned about this issue?

- Collective local action requires both local government/municipal action as well as action from community members
- Need a willing individual to drive things
- It is very hard to do and requires a lot of different players, and action will mean something very different to each person.
- Action is slow to get going but once it reaches a tipping point it takes off.
- The results are visible
- Community level action is absolutely essential.

What are 'best practices' on this issue?

- Kirklees Council
- Woking Council
- Alyth Community Energy Challenge
- Okotos – Geo – Solar (Ontario)
- Solar Bulk Buying Club
- Needs a champion
- Needs a supportive local government
- Needs a supportive/responsive industry

What do decision-makers need to address on this issue?

Decision makers need to have a driver, by way of a target or duty
There need to be significant levels of funding to support action
LA and central government must show leadership

Decision makers need to start by removing barriers to local action and then creating supportive measures and framework

Decision makers need to promote local competition or competition between communities.

Local Authorities need a dedicated climate officer capable of getting funding from numerous different sources.

Where are gaps in knowledge on this issue?

- Need better documentation of case studies
- Need key learnings from anti-smoking, and drinking campaigns
- Is it ignorance or apathy that is leading to inaction
- How do you make big houses, big cars etc "un-cool"
- When is the tipping point? Are we almost there?

What needs to be done on this issue?

- Celebrate low carbon lifestyle
- Make carbon a health/safety issue
- More positive/sexy messages
- Set up the carbon army
- Piloting (e.g crags, PCSs, buying club, monitors)
- Harness Social Networking (e.g facebook)
- Mobilize baby boomers
- Community carbon trading
- Libraries, hair-dressers, pubs need to be forums for discussion and action

Next steps



Ian Rowlands and Virginia Graham invited participants in plenary to state how this workshop should be followed-up. All points were recorded on a multi-media projector as noted in the text below.

1. Communicate results;
2. Do this (workshop) again, follow up;
3. Encourage people here to talk to their respective organisations;
4. ESMA guide to be updated every year – to include best practices and open to contributions;
5. Those interested in Supplier Obligation to stay engaged with the Sustainable Development Commission (UK);
6. Keep in touch – joint web site, uploading new information. Things related to our discussions here;
7. Email prompt preferred mode of communication;
8. Conversations between Ian and Sarah to continue, as well as others;
9. Contact Jurek for information on Scandinavia.

Feedback



In plenary, participants were invited to provide feedback on what they liked about the workshop, what they learned and what they would do differently. All points were recorded on a multi-media projector. Individual feedback forms were distributed and any results received were compiled and presented in Annex 5.

Participants liked:

- Congratulate Ian and Sarah for taking risks – to see what happens, this was tremendous
- The group, people I met. Wasn't sure what I was expecting, but got more
- Networking
- Open space, for interaction and physical space
- Good size for interaction
- Things flowed well (except at end with malfunctioning technology)
- Good chairpersons
- Good people and ideas
- Liked the group work
- Hearing others' perspectives
- 36 was a good size
- Enthused
- Spirit of collaboration
- Liked the form – mixture of presentations and formats
- Conference management
- Got out of my silo, batteries recharged
- Stimulating, friendly, found out what people are doing
- Barbra's speech a highlight
- Emphasis on practical solutions helpful
- Venue tremendous: grounds and facilities

Participants learned:

- We are all concerned about one thing - a message I will take place
- We're all in the same position – expected UK much ahead
- Learning a lot through interaction with suppliers, others. Greater knowledge base for which we can discuss in some depth, particularly with central government
- Going through same as computer revolution
- There is no roadmap on both sides – need to continue the collaboration. Keep in touch to see what is working
- Learned more about the electricity side of things – in Ontario not as engaged with our industry. Will take back to our association
- How to apply what I've learned to my work
- Different perspectives on smart meters
- Still so much to do to build consensus and get momentum – how best to do this still a question
- Need to start doing things, trialing ideas
- Need customer feedback (which could be learned through trials)

- Learned how much social, institutional context matters. Things can be different – helpful to look at higher level.
- Clarified my views on many issues – clearest about the importance of smart grids. Worried about technology, but technology I'm taking away.
- Some surprises – imagined Ontario had more smart metering than they had
- Thought UK had more ambitious targets, but inspiring to see what Ontario is achieving
- Better understanding of conservation in more mature system in UK

Suggestions for improvement, or ways to do things differently:

- There are other product supplier groups that could be engaged
- Shame that Ofgem not here
- Would be nice to consider something shorter, more interactive regarding case studies
- CO2 online – energy communication more generally. More out of the box aspects
- 3 day event better for this group – MP to consider this (2 or 3 day events)

Other points

- Welcome opportunity to host in Ontario
- Agreed that needed the 3 days
- Good opportunity
- Lot still to learn about how things work/don't work in different countries
- Initially concerned about the last session – but effort everyone put in made it work
- Originally concerned not enough focus – resolved in morning of third day
- Dream team from Ontario to share ideas – great opportunity
- Concerned about the title of this workshop, still don't have a clear picture, but not many do.
- Lots of expertise about individual facets for MRED [???], but don't have a complete vision of where we want to go.
- How do you make most of individual champions, but not be wholly dependent on them. A challenge

Concluding Remarks

Ian Rowlands and Virginia Graham

Virginia and Ian thanked the Meeting Place, St. Hugh's College, the Steering Committee and all participants for contributing to a lively and engaging workshop. Sarah Darby and Ian Rowlands began discussions on the workshop issues two ago; agreed a meeting would be productive. They will reflect on the messages participants provided on how to continue this work, and plan to take this forward as appropriate, including the possibility of an academic paper and web site.

Appendix 1: Workshop Programme

DAY 1, 21 May

15:30 **Registration and coffee**

16:00 **Introductions and Welcome**

*Co-chairs: Virginia Graham, Sustainable Energy Policy Advisor
Ian Rowlands, University of Waterloo*

16:30 **Context Setting:** Dr. Sarah Darby, Oxford University

16:45 **Session 1: Overview**

- Electricity systems and Conservation in Ontario *Presenter: Peter Love, Ontario Power Authority*
- Plenary questions, comments, additions from participants
- Electricity systems and Conservation in the UK *Presenter: John Scott, KEMA*
- Plenary questions, comments, additions from participants

18:15 **Adjourn**

18:30 **Pre-Dinner Drinks**, St. Hugh's College

19:00 **Dinner**, St. Hugh's College

DAY 2, 22 May

8:30 **Refreshments on arrival**

9:00 **Welcome and announcements**

Chair: Ian Rowlands, University of Waterloo

9:15 **Session 2: Residential Conservation and Demand Management Strategies**

- Economic Strategies – Ontario perspective, *Presenter: James Douglas, Ontario Utilities Smart Metering Working Group*
- Economic Strategies – UK perspective, *Presenter: Nick Eyre, Environmental Change Institute, Oxford*
Discussant: Eoin Lees, Eoin Lees Energy
- Educative Strategies – UK perspective, *Presenter: Jenny Boyd, Northern Ireland Electricity*
- Educative Strategies – Ontario perspective, *Presenter: Corey Diamond, Summerhill Group*
Discussant: Michael Lio, Consumers Council of Canada
- Regulatory strategies – Ontario perspective, *Presenter: Tony Rockingham, Ontario Ministry of Energy*

- Regulatory strategies – UK perspective, *Presenter: Paul Egerton, Department of Business, Enterprise and Regulatory Reform*
Discussant: *Mark Garner, MD, Market Operations, Ontario Energy Board*

10:30 Refreshment Break

11:00 **Group Work**

12:30 **Plenary: review results of group work**

13:00 LUNCH

14:00 **Session 3: Implementing strategies for residential electricity demand – what lessons have we learned?**

- Overview of UK perspective – utility led: *Presenter, Derek Lickorish*
- Overview of Ontario perspective – Utility led: *Presenter, Bryan Boyce, Chair, Electricity Distributors Association*
- Discussant: *Russell Hamblin-Boone, Director of Corporate Affairs, Energy Retail Association*
- General Discussion

- Overview of Ontario perspective – Prospects for utility-customer cooperation
Presenter, Paul Shervill, Ontario Power Authority
- Overview of UK perspective – Non-utility delivered programmes: *Presenter, Gavin Purchas, Sustainable Development Commission*
- Discussant: *Warren Heeley, Heating, Refrigeration and Air Conditioning Contractors Association*
- General Discussion

15:15 Refreshment break

15:30 **Group Work**

17:00 Refreshment break

17:30 Plenary – identification of the main issues to tackle tomorrow, and their relationship to each other. Identify groups for Day 3 and membership of each group

18:00 **Adjourn**

19:30 Pre-dinner drinks

20:00 **Conference dinner, Ashmolean Museum**

Dinner Speaker: *Barbara Hammond, Chair, Renewables Advisory Board at BERR*

Day 3, 23 May

8:30 **Refreshments on arrival**

9.00 **Review of previous day discussions** *Chair Virginia Graham*

9:15 **Overview of Day 3**

9:30 **Breakout Groups**

11:00 Refreshment Break

11:30 **Plenary – Presentation and discussion from group work**

13:00 LUNCH

14:00 **Small Groups**

14:15 **Plenary: Next steps and feedback session**

15:00 **Concluding remarks** – *Ian Rowlands and Virginia Graham*

15:30 **Close**

APPENDIX 2: Workshop Attendee List

First name	Surname	Email	Organisation
Stephen	Andrews	stephen.andrews@lowerwatts.co.uk	Lower Watts Consulting
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