climate change

Scotland's centre of expertise connecting climate change research and policy

Local Energy Systems in the UK

22 September 2016

Event Report

THE UNIVERSITY of EDINBURGH

EXECUTIVE SUMMARY

Key themes

1. Integrated not isolated

Local energy projects should not be viewed as a series of isolated, independent systems, but as components of a highly integrated, multi-scalar energy network.

Integrating physical systems at different scales requires multi-level, multi-sector governance and cooperation between diverse stakeholders, from project-level to policy-level. Building and maintaining long-term, trusting relationships between individuals and institutions is key to enabling the active and productive collaborations required.

2. Working with a place for a place

All energy projects have a local component, but 'local energy' projects actively respond to particular local needs and contexts. The place determines both the constraints and the opportunities of the system.

Local energy systems must be built in and around the existing local infrastructure. Smart technology can be used to adapt and improve this infrastructure to better align with local needs.

3. Power to the people

The transition to a decentralised, distributed energy system demands a greater role for civil society. This provides an opportunity to democratise the energy system by incorporating *people* as a key component of the system.

Local energy has the potential to benefit a wide range of different types of communities, including deprived, fragmented, and disempowered urban communities as well as more traditional, cohesive, remote rural communities.

4. Variable, flexible and adaptable

Local energy is not one thing; it means different things to different people in different contexts. Who or what qualifies as 'local' is interpreted differently, leading to a wide variety of forms of local systems in practice. There is no established 'best practice' business model or organisational structure for local energy; therefore, flexible forms of institutional and financial support are essential.

5. A learning process

Local energy projects are typically experimental and innovative, and involve new technologies and new ways of working. Embracing opportunities for learning maximises the chances of project success.

Skilled and knowledgeable individuals are required to lead and manage projects at the start, but there is significant potential for knowledge and skills transfer and development between individuals and between communities.

Challenges and opportunities for research, policy, and practice

1. Disrupting the incumbent, centralised energy system

The existing energy system is inflexible and resistant to change, which makes it difficult for new, innovative ways of generating, distributing and purchasing energy to become established. There is a crucial role for progressive legal and regulatory reforms in enabling and accelerating the uptake of local energy projects. To date, there has been little progress in this area.

2. Balancing inclusivity with strong leadership

Skilled and confident leaders are key to delivering successful local energy projects. To ensure these projects respond to collective local needs and support ambitions of achieving a more democratic energy system, strong leadership must be balanced by inclusive decision-making processes that recognise a diversity of local opinion.

There is a need for innovative ways to engage the public in a process of reshaping their relationship with energy. This must be supported by local governance arrangements and organisational structures that enable a wide range of views to be heard and taken into account, within the time and resource constraints of the project.

3. Taking risks with limited budgets

Local energy projects are pioneering and complex, and make use of unproven or untested technology and institutional arrangements. Consequently, they are bound to make mistakes and are at risk of failure and loss. These risks may deter stakeholders from investing resources and from taking a leadership role in projects. It can be difficult for businesses and public sector organisations to reconcile the need for economic accountability with the desire for innovative, socially progressive projects. Creative funding solutions are needed to support these types of projects.

4. Monitoring and evaluation

If local energy systems are to develop and improve, it is vital that the lessons learnt during these first experimental, ground-breaking projects are captured and shared. There is a role for research in evaluating that activity and supporting learning.

There is broad agreement that smart metering has the potential to deliver useful data to support efficient, local energy systems, but there is work to be done to understand more fully how to use the data most effectively.

5. Scaling up

Local energy cannot remain a niche activity *and* deliver a fundamental change to the energy system. There may be a need to broaden conceptions of 'local' energy to allow dispersed communities of interest to cooperate in decentralised energy projects.

In the process of scaling up, however, it is important to consider the extent to which the ideals and intended outcomes of local energy are retained, particularly the desire for a more just and democratic energy system.

AGENDA

Welcome

Andy Kerr & **Claire Haggett**

Context and aims of the day

Session One: Taking Stock

Simon Roberts
Centre for Sustainable Energy

Towards a smart energy city: mapping a path for Bristol

Dave Hawkey
University of Edinburgh

District heating in the UK: too local?

Alex Schlicke
Scene

Heat from Sound

Session Two: Meeting Objectives

Grant Allan
University of Strathclyde

Economic impacts of local energy

Bregje van Veelen
University of Edinburgh

Community energy: negotiating energy democracy in practice

Session Three: Moving Forward

Chris Morris
Local Energy Scotland

Policy and institutional support

Beth Robertson
University of Strathclyde

A transition to a civic energy future

Dawn Muspratt
Our Power

Our Power

Session Four: Synthesis

Stuart Galloway
University of Strathclyde

The importance of innovation

Mhairi Aitken
University of Edinburgh

The role of social science

Ragne Low
ClimateXChange

Informing policy

INTRODUCTION

Decentralisation of the energy system appears to hold the promise of a more just energy system: a low carbon system that generates local benefits and serves local needs. As a result, for local and national government, in the UK and beyond, local energy is often framed as a holistic solution to several pressing policy challenges: reducing carbon emissions, matching energy supply and demand, engaging and empowering communities, tackling fuel poverty, and reviving local economies.

Local energy in the UK has developed upon shifting sands, with recent changes to UK Government support casting shadows of doubt over the viability of the traditional community-led approach. In many cases, community-owned renewable energy generation projects no longer present the same opportunity as they once did. Reduced feed-in tariff rates are now too low for many established models of community energy to be financially viable, and, where they are viable, deployment caps and grid constraints limit the scale and rate of installation.

Despite these challenges, strong support for local energy remains. The forthcoming Scottish Government energy strategy will have local energy as a central pillar, and the SG is providing significant investment through the Local Energy Challenge Fund (LECF) and Community And Renewable Energy Scheme (CARES). Similarly, the Welsh Government has made local energy a priority within Welsh energy policy, and has recently set up the Local Energy Support Service. In England, the former Department for Energy and Climate Change established Rural and Urban Community Energy Funds to provide finance for local projects.

This is, therefore, a time of flux and change, but also opportunity, for local energy across the UK. Can decentralisation provide the fairer, smarter, greener energy systems it promises?

This event brought together researchers, policymakers, and practitioners with two main aims:

- To take stock of what we know now:
  - Gather examples of what's currently happening in practice, synthesise the key emerging lessons, and consider how action is supported by policy.
- To identify what we need to do:
  - Identify gaps in research base and opportunities for policy support, and consider how to ensure research and policy are moving in the same direction.

The following report provides a summary of the presentations and discussions that took place on the day. All the speakers' slides are available for download from the ClimateXChange website: http://www.climatexchange.org.uk/reducing-emissions/local-energy-systems-uk-taking-stock-and-looking-forward/

SESSION ONE: TAKING STOCK

Speaker 1 Simon Roberts OBE, Centre for Sustainable Energy

Towards a smart energy city: mapping a path for Bristol

There is a gulf to be bridged between the practice and aspiration of local energy systems.

The **Bristol Smart Energy City Collaboration** is a simple (but challenging) process that could be replicated at many scales to reach the other side of the gulf.

Three core attitudes are embedded within the project:

- **Embrace uncertainty** (and don't assume there is an answer out there);
- **Look at the issue holistically** – it's not just a technical challenge, it's cultural;
- **Take the first steps** before deciding the whole route.

Five key conditions for local energy systems:

- **Energy** system potential (e.g. opportunities to balance demand and supply locally);
- **People** need to be willing and engaged, so they participate;
- **Regulations** need to enable access with market rules rewarding system value created;
- The **commercial** case needs to stack up so it's worth someone doing it;
- The **data and IT** needs to be available and utilisable.

Is the city scale the *right* scale?

It presents opportunities for: active network management; social norming and cultural change; tackling fuel poverty and localised energy issues. Plus, there are likely to be particular local, place-based strengths within cities.

But there are also challenges at this scale, most significantly: i) battling the incumbent, centralised energy system and its market and regulations, and ii) establishing a locus for action – who speaks for the city?

The next steps for the collaboration...

1. Keep going – sustain the collaboration rather than force 'structure' at this stage.
2. Include all active parties and focus on projects and initiatives.
3. Share learning and develop joint funding proposals.

Speaker 2 Dr David Hawkey, University of Edinburgh

District heating in the UK: too local?

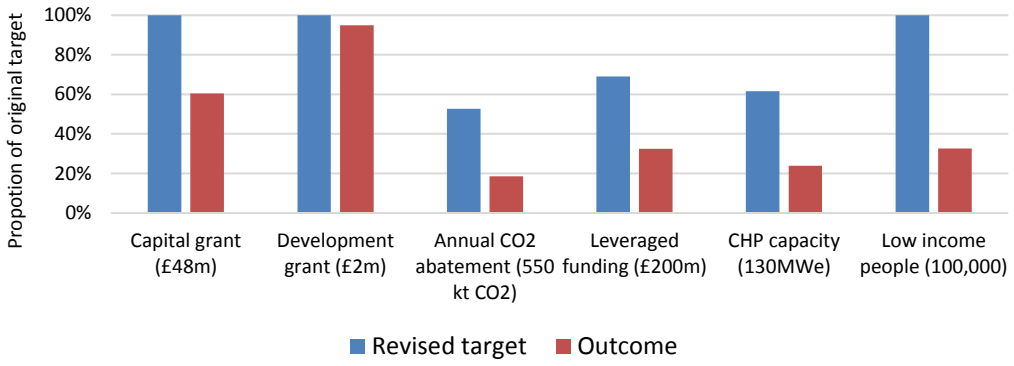
To unlock the opportunities of local heat systems, they should be embedded within multi-scalar, integrated energy networks – some local, some not.

There has been a resurgence of interest in district heating recently. It's not the first time the UK has considered district heating, but interest has never managed to translate into anything substantial.

Community Energy Programme

A 'successful failure'

Established in 2001, heavily subscribed, extended in 2004, but abruptly cancelled in 2006. The programme facilitated many other successful projects, but failed to meet its own objectives:



Why didn't it meet its objectives?

- Larger schemes failed to develop;
- Smaller schemes deemed to have poor economies of scale; difficult to coordinate lots of small projects and organisations into single systems.

District heating networks are more likely to be successful when...

- They are a solution to a particular, collective problem.
- Someone takes responsibility for coordinating action and actors.

In the UK, user-specific objectives dominate with voluntary models of coordination. For district heating to work, something is needed to bind actors together, but the means of collaboration are currently elusive:

- No actor has very significant power to bring people together.
- Local Authorities are reluctant to engage in case it doesn't work out financially.

A live debate on district heating is ongoing within Scottish Government.

Speaker 3 Alex Schlicke, Scene Consulting

Heat from Sound… and other unusual interventions in creating a local energy system on a remote rural island

On the island of on Iona, Scene are helping local people come together to make energy work for them, rather than the other way round.

Opportunities

- Wind speeds > 9m/s
- Irradiation levels for Solar PV > 10%
- Local 760 Ha community forest (on Mull) for biomass
- History of renewables (30 year old solar thermal, 40 year old seawater-source heat pump)

Constraints

- Off the gas grid;
- Cultural heritage designations and issues of breaking ground/setting of monuments;
- Natural heritage protection – particularly the corncrake;
- Economy is based on tourism, so the planning authority is naturally conservative against new development;
- 50MW grid constraint.

Drivers of local energy system approach

- Grid constraints: Without this constraint, the community could achieve net zero carbon through installing large-scale renewable energy infrastructure and using the grid as a balancing mechanism. Need to match local supply and demand.
- Cut in subsidies: No longer able to generate a significant income to use to tackle fuel poverty or provide other local economic benefits. Need to use locally supplied energy to offset the high price of energy from existing sources.
- Security of supply: Current dependence on bottled gas, coal, and heating oil being delivered by road.

The concept

- A package of solutions that connects different elements of the local energy system via a virtual ICT network, maximising generation, use and storage, while minimising negative impacts.
- Smart technology allows the use of existing systems rather than ripping it out and starting again. The virtual network will apply smart devices to existing assets.
- Starting with smaller, most reliable interventions, such as energy efficiency measures, which are low risk and high consensus.

Discussion

The role of the arts in engaging the public

It is often said that householders are not interested in consuming *energy*, but interested in consuming *energy services*. However, once attempts are made to start engaging with people on energy issues, they are interested in the systems and the impact on the world around them.

There is a role for creativity and art in encouraging wider engagement and interest; it starts a different type of conversation than a technical discussion.

There are lots of examples of public art activity to stimulate conversation about atmosphere and climate (rather than just energy).

Creative Carbon Scotland work with the LAGI project (see box) and are interested in working with artists and artisans.

Would an Energy Masterplan be useful for local energy systems?

Useful to have a picture of the system:

- The current status of the system;
- Where the opportunities are, and where they could be;
- Who's going to do what;
- Where the funding will come from.

The benefits and objectives of local energy might require coordination of actors and initiatives around a particular shared plan.

However, master-planning processes often focus on flows of KW hours and engineering needs (and end up with marginal abatement cost curves), rather than a road mapping approach which identifies what needs to change and a set of processes and procedures that will get you to the final vision point.

A masterplan would need to make allowance for sets of different circumstances in different locations, such as, local capacities and the different resources available.

There is a danger, that too much time and attention will be focused on planning, and not enough on getting on and doing.

SESSION TWO: MEETING OBJECTIVES

Speaker 4 Dr Grant Allan, University of Strathclyde

Economic impacts of local energy

All energy has a local dimension to it; all energy will impact on the local economy, and draw resources from it. So, what is distinctive about 'local energy'?

- Energy installations for a place rather than at a place – the location is central to the intervention.
- Planned from the bottom up; rather than starting with broad macro objectives and applying them to particular locations:
  - Starts with a local energy issue, which might be demand or supply-led;
  - Considers local resources, capacities and needs first, and looks at how local energy complements the broader energy and economic ambitions in policy;
  - Attempts to enhance people's understanding of energy and their demand.

Can we quantify and demonstrate the economic benefits of local energy projects?

Need to answer a few questions first:

1. What impacts are we counting? (Only local or broader spatial scale?)
2. What/who is 'local'?
3. How do we measure economic value at spatial as well as regional level?

Interim findings from research into Local Energy Challenge Fund (LECF) projects

- Projects are the response to an identified need in an identified geography; the geography came with the issue so the challenge comes in finding a solution to this need in this place.
- Understandings of local vary across projects:
  - Commercial viability of the future path of the project defined 'local' in one project;
  - Many projects identified local residents as primary beneficiaries, often with cost-reduction for consumers and improving access to energy identified as core function.
- Dedicated funding was vital:
  - They are often innovative projects with high level of complexity and perhaps unproven technical potential where other funding sources unlikely to be available.
- To assess the added local value, it is essential to quantify baselines.
- Impacts occur across different timescales: short-term vs long-term value. Longer term impacts are often less directly connected to the projects:
  - How far should we go in attempting to capture long-term impact – should we measure how the money saved on bills is spent?
- Local business for local businesses; for many projects, local business are involved in delivery, even though this wasn't a requirement of the project:
  - These are trusted individuals or firms who can deliver the products and services required and within project timescales.

Key lessons learned to date

- Importance of network capital for maximising local economic value;
- Project managers with knowledge of (or access to) technical, legal, processual, contractual and financial skills are key to delivering projects on time and within budget;
- Projects are a learning process; as projects are innovative and will involve diverse stakeholders and partnership working, embracing opportunities for learning will maximise chances of success;
- Plans for evaluation and legacy should embedded in project from the beginning.

Speaker 5 Bregje van Veelen, University of Edinburgh

Community Energy: negotiating energy democracy in practice

A range of different actors in different countries at different scales are now advocating for energy democracy. So, what does a democratic energy system look like?

'Energy democracy' can mean different things to different people, but generally suggests a move to focusing on the role of *people* in energy transitions:

- Questioning and disrupting the social and economic relations that are embedded in the current energy system;
- Unlocking the potential for social and economic transformation as well as energy transformation.

Three key aspects of energy democracy:

- Greater public participation and inclusion;
- Greater decision-making influence;
- Greater accountability (understanding who controls energy and who benefits from it).

Local and community energy is often considered a potential means by which to achieve energy democracy:

- Energy can be an asset that benefits the many, not the few;
- Localised collective action is considered best for resolving competing claims of justice and delivering shared values and outcomes.

In practice, there is no community where everyone agrees on everything. Therefore, the local governance processes in place, and the ways in which communities negotiate differences and make decisions, are vital for achieving democratic outcomes.

1. **Inclusion and engagement**
   - A core group of local leaders is often key to getting projects off the ground, but what happens if they are not representative of the wider community?
   - Broader inclusion and diversity often only become a priority for groups once projects have been developed (rather than during the development process), particularly when considering how to spend revenues;

- Different communities consider diversity in different ways (e.g. age, gender, geography) and have different reasons for thinking that diversity is important (e.g. normative, instrumental, substantive);
- Community groups often rely on volunteers, which makes the boundary between the personal and the professional quite blurry: individuals can be forced into an almost constant community engagement role through their relationships and local networks.

2. **Decision-making processes**
   - Community projects have the opportunity to give individuals a bigger say in decisions;
   - Community groups will usually have formal decision-making processes in place which are specifically set up to be inclusive and there are few examples of formal exclusions;
   - Despite this, barriers that can prevent people from having opinions heard still remain (e.g. different levels of experience, education, and confidence amongst individuals).
3. **Accountability**
   - As with decision-making, community energy groups almost always have structures and processes in place to ensure accountability;
   - In practice, these processes are time consuming and resource intensive, and – as community groups are usually under significant time and resource pressures – these processes are often circumvented (for example, issues being handled by individuals rather than going to the Board);

Communities enact democratic governance in different ways according to the local context and what works for them. 'Ideal' processes may not always be compatible with time and resource constraints. There is currently limited evidence that the processes in place will always deliver desired outcomes, or that communities have the capacity to provide the democratic functions that are expected of them.

There remain questions about how communities who experience governance difficulties can be supported, without prescribing specific solutions.

Many of these issues are inherent to community activity generally, rather than specific to local energy. However, the challenges are arguably exacerbated by some characteristics of local energy projects, particularly in terms of income generation, where deciding how to spend the money often brings issues of fairness and accountability more sharply into focus.

Discussion

What skills are required for the governance of local energy schemes?

Local energy solutions might involve a degree of technical complexity and require a level of expertise that is not necessarily available in local communities.

There is potential for a good project manager to bridge the gap; not just in terms of the complexity of projects, but also the language used. Project managers can help to 'upskill' board members.

Community groups pursuing local energy projects often have previous experience of delivering other local projects, where their skill level has been raised.

It is useful to engage a range of different stakeholders with different forms of knowledge.

There are opportunities to learn from both successful and unsuccessful projects (sharing what goes right *and* what goes wrong):

- Understanding why something *didn't* work, and what went wrong, can be just as important for learning;
- Can help to develop a clearer idea of what a resilient local energy system looks like.

How can project leaders engage meaningfully with communities?

Although challenging, building long-term relationships between stakeholders, builds trust and more of an acceptance of leaders and confidence in their decision-making.

There is a focus on geographical scale and 'local is best', but there is value in looking in more detail at the processes of relationship building and engagement at the local scale:

- How do you engage people within energy decision making beyond the decision to install a turbine in a village;
- How can you involve people in a way that reshapes their relationship with energy?

Local energy can't and won't be successful if it is only seen as technical energy challenge that has to be "fixed"; the social dimension is critical.

How do we move local energy projects out of the 'niche' and into the 'regime'?

This cannot stay a niche activity *and* deliver the change to the energy system – and the possible economic impacts at local level - that is desired and potentially available.

Is there is a need to move away from purist ideas of 'community energy'?

- This has historically been 100% (geographical) community owned projects;
- The move to 'local energy systems' seems to be creating more space for different models and forms of community engagement, such as shared ownership projects;
- This might help to scale up local energy **but** to what extent can we expect the original ideals of community energy to be retained as it is scaled up and expanded?

In other countries, there is less of a focus on geography, and energy cooperatives are often nationwide rather than local, forming a community of interest rather than place; this may be an option for scaling up decentralised energy.

It feels like we are at a tipping point; small-scale community energy projects are giving way to larger and more complex projects, which could benefit deprived, disempowered urban communities as well as resilient, cohesive, remote rural communities.

We need to make sure that we capture the experiences of all the emergent projects and use that for ongoing improvement of practice and policy.

There is also a crucial role for (enlightened) laws and regulations in accelerating and increasing decentralisation.

SESSION THREE: MOVING FORWARD

Speaker 6 Chris Morris, Local Energy Scotland

Policy and Institutional Support

Scottish Energy Policy

Traditionally this has been very focused on electricity, but the new Scottish Government Energy Strategy appears to be taking a more exciting approach, driven by climate change targets. There are three key dimensions to the new approach:

- Stable transition to low carbon;
- Supply and demand across the whole energy system (not just electricity);
- Decentralised (with a local stake).

Plus, energy efficiency is a 'National Infrastructure Priority'.

New stretching local energy targets:

- Community/locally owned: 1GW by 2020, 2GW by 2030;
- 50% of new projects to have shared ownership by 2020.

UK and Scottish energy policy is diverging in terms of support for local energy

- Good support in place at Scottish level;
- UK-level subsidy cuts are driving innovation: pushing towards local energy systems rather than focused on income generated from subsidies.

Support programmes

1. Community And Renewable Energy Scheme (CARES) / Local Energy Challenge Fund (LECF)
   - Purpose of CARES is to maximise the local benefits of RE;
   - Wide range of different projects;
   - Many have traditionally been made viable by FiT or ROC payments, but this is no longer such a strong proposition since reduction of subsidies.
2. Low Carbon Infrastructure Transition Programme (LCITP)
3. Heat Network Partnership
4. District heating loan
5. Home Energy Scotland and Resource Efficient Scotland
6. Scotland's Energy Efficiency Programme (SEEP)

Opportunities

- The current process of 'repowering' the first tranche of onshore windfarms presents a new opportunity for community involvement;
- Grid constraints – prompting innovation in how to use energy locally;
- Energy Masterplans: not yet clearly defined so there is an opportunity to shape what these look like.

Future requirements

- Ability to keep adapting:
  - Still uncertainty about the business models that will prove to be the most appropriate for developing local energy systems;
  - Lots of innovation and interest – not always about complex technological solutions, also about news ways of engaging people;
  - Ongoing research to take stock of emerging models.
- Understanding changing motivations:
  - Motivations for community energy has previously been generating an income – the motivation for a local energy projects might be quite different.
  - Need to understand these new motivations and adapt support accordingly.
- Focus on heat, transport, and urban projects;
- Creative funding solutions;
- Effective, productive multi-stakeholder partnerships:
  - LECF projects that have been successful have deep and diverse collaborations;
  - Integrating different organisations and individuals can be difficult due to cultural barriers;
  - Local Authorities have a key enabling role in facilitating local energy partnerships.

Speaker 7 Elizabeth Robertson, University of Strathclyde

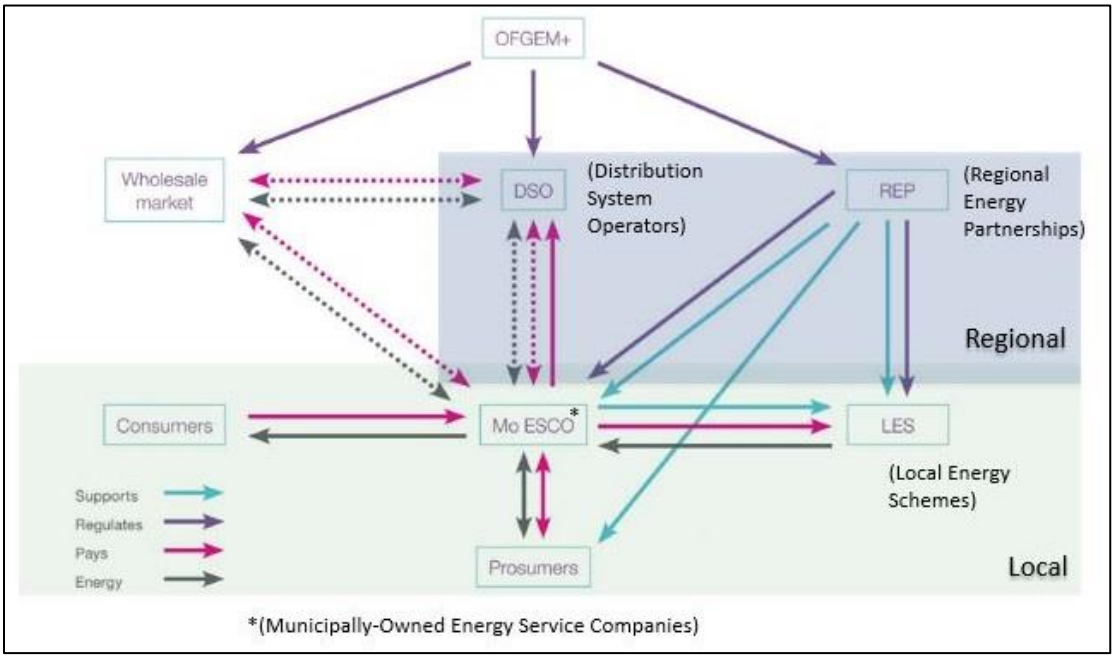
Technological and infrastructural requirements

Realising Transition Pathways was a research project delivered by a consortium of nine UK universities.

Took a holistic approach to energy transition: integrated understanding of technology, governance, economics, and public acceptability to create three energy transition pathways.

The Thousand Flowers Pathway:

- Characterised by a greatly expanded role for civil society in delivering distributed, low-carbon generation;
- Local generation and energy efficiency drives the pathway; this requires local and regional support and devolution of decision making processes;
- Reduces demand on very large financing, and opens up opportunities for alternative financing and new supplier relationships;
- CHP is a large part of the energy mix; this requires new clean sources of 'wet' biomass alongside woody biomass (and biomass gasification will be important).



A distributed generation system will not be a series of locally isolated energy systems:

- Even with high levels of local generation and substantial demand reduction, distributed systems will not lead to 'energy independence';
- A decentralised system will required ***higher*** levels of regional, national, and international interconnection to enable the system to be balanced;
- As well as increased interconnection in the physical electricity system, there will need to be greater integration between dispersed stakeholders, and new institutions, to enable the effective governance and regulation of the system.

Relies on strong demand reduction and demand side participation and management:

- Pushing energy efficiency towards its limits will ensure better system use, less need for grid reinforcement and minimise system costs;
- Price incentives will lead users to shift demand to utilise cheap excess renewable generation using smart technology – this will allow for easier system balancing even with high renewable penetration;

Speaker 8 Dawn Muspratt, Our Power

Our Power

Lower income households suffer from a systemic market failure in the energy sector, which leads to fuel poverty.

Our Power is a community benefit society that aims to reduce levels of fuel poverty by intervening directly in the energy market.

About Our Power

- Work with Local Authorities and Housing Associations to help vulnerable (pre-payment) customers; landlords become members of Our Power.
- Entered the market in January 2016 with the lowest pre-payment tariff in Scotland (only offer one tariff for all customers).
  - Transparent and fair pricing;
  - Neighbours on the same tariff;
  - Aim to have no change in tariffs within 12 months.
- Smart meters (that allow pre-payment) are installed for all customers;
  - When a (social housing) property becomes vacant the meter is installed so new tenant has new meter and supplier (although they can move away if they want);
  - Interventions are only installed if they have been identified as having a direct cost saving for the customer; a lot of companies have installed technologies that don't work for customers.

Opportunities and challenges

- There is potential in the energy system, particularly demand side (using smart meters); but, people need to be willing and engaged.
- Current energy industry is incredibly inflexible and unprepared for change.
- What do we mean by 'local'? Can we replicate the opportunities of local energy projects on a wider scale?
- In the transition to local energy systems, how do we ensure that those who are historically left behind are front of the queue?

Discussion

How do you reconcile business accountability with social objectives (for example, what do you do if a vulnerable customer doesn't pay their energy bill)?

The reality is that people who *won't* pay are a tiny minority; the vast majority are people who *can't* pay, which is a very different discussion.

The big energy companies are traditionally very late in collecting payment so big bills can build up. Smart meters enable early intervention and prevent customers being faced with big bills because of non-payment over a period of time.

What is the role for Local Authorities in a decentralised system, within current budget constraints?

Lots of LA's are doing small interesting things, but there is still a gap in linking this up with what is happening at the community scale; need to reassess local governance structures and how we look at energy as a community

There is a drive towards local devolution at the UK level (within BEIS), **but** the responsibility lies with LA's to take the initiative and LA budgets are being squeezed so tight that it is extremely challenging.

Local Authorities often have potential to use public assets more effectively. There are a lot of opportunities for collaborations across organisational boundaries.

How is the energy market expected to change?

In all the 'Realising Transition Pathways' scenarios, energy systems costs increase:

- As the system changes, costs will need to be recouped.
- Even though demand may reduce, that will require technological support, which brings a cost.
- The Thousand Flowers pathway showed the lowest increase compared with market led or government led scenarios.

The less energy customers use, the smaller the energy companies' profit, so there is no incentive for them to support energy saving.

Price for energy is likely to move away from a per KW/h rate to some kind of level of comfort over time.

SESSION FOUR: SYNTHESIS

Dr Stuart Galloway University of Strathclyde

Importance of innovation

Significant innovation still needed to deliver the technology and engineering solutions, but today we have heard more about other areas where innovation is also required:

1. Engagement
   - The first session illustrated the importance and challenges of public engagement:
     - Alex Schlicke provided an example of a 'six hats' workshop as a means of engaging with the community;
     - Simon Roberts discussed the challenge of engagement and the observation that the 'whole of Bristol' might be too large to cope with;
     - Dave Hawkey identified some the opportunities for improved collaborations between different city stakeholders.
2. Regulation
   - Sometimes, the things that hamper local energy projects are how things are done now; there is little to no flexibility in the rules to allow these innovations to take place.
   - Must allow for some flexibility whilst respecting the need to mitigate risks: electricity is dangerous and, as a result, safety is rightly at the front of industry thinking; energy is also a national infrastructure that society relies upon.
3. Data and ICT
   - Smart metering is coming in and everyone agrees that it is useful for billing, but there is still uncertainty about what you do with the data in terms of learning and/or innovation;
   - The electricity sector is not fully prepared for the new information that is becoming available – they don't fully use the data that they already collect.
4. Commercial and legal
   - The least amount of innovation has taken place in the commercial and legal side of the energy system;
   - The legalities of collaboration are always challenging, even for established processes;
   - There is a potential gap for standardised tools.

Dr Mhairi Aitken University of Edinburgh

Role of social science

Community v local

- Throughout the day, 'local' and 'community' have been used interchangeably; they *can* mean the same thing, but not always.

- 'Local' energy is no less challenging than' community' energy:
  - Who or what is 'local'?
  - Why are we focusing on 'local' rather than regional or national energy systems?

Empowerment v disempowerment

- There are various ways for individuals to engage in local energy projects – in the planning process, as beneficiaries, as owners.
- How can we ensure the participation leads to empowerment?
- Ownership also places burdens on individuals – is there a risk that some forms of engagement may be *disempowering* for some people?

Rural v urban

- In the past, the opportunities for community energy in Scotland have been also exclusively for rural communities;
- As local energy moves beyond individual turbines to more holistic energy systems, there seems to be more opportunities for urban projects;
- The difficulty of defining 'the community' or 'the local' may be even harder in urban settings.

Leadership

- There are increased opportunities for Local Authorities to take the lead on partnership projects, but what are the implications for the outcomes of projects; is a project led by the Local Authority a 'community-led' energy project?
- In local partnership projects, is there a risk of the community being squeezed out? Is there a risk that 'local' becomes more about a location than the people?

Ragne Low ClimateXChange

Informing policy

Local energy is at a juncture point, moving from a conceptualisation of individual projects for individual communities towards something that is more complex with multiple partners.

This means that it the questions are no longer only about defining who the community is and how it operates internally, but also about how communities engage with other actors and institutions. There is a need to think about how local activities fit into regional and national activities and outcomes.

Some under-researched questions remain:

1. Are we focusing on understanding and addressing the new barriers that new forms of local energy are now facing, or are we still dwelling on older barriers?
2. Which rules need to change?
   - Where is regulation required, and where are 'softer' measures needed?
3. Where and how to organisational architectures and cultures need to change?

- How can different actors and institutions be better supported to work together in partnership?
- Are there organisational and decision-making structures that we know work?

4. How can citizens be better and more actively involved (and ought they to be)?
5. What is the best approach to monitoring and evaluation?
    - There are a large number of demonstrator and pilot projects underway – what is the role for research in evaluating that activity and in supporting learning and dissemination of key lessons?
    - Is research doing enough to keep up with real world demonstration?
    - Do we know enough about how local energy solutions compare to the 'counterfactual' of the incumbent, more centralised system?

Discussion

How can we develop the 'rhizomes' of a decentralised system?

Practical examples, supported through Scottish Government funding, will generate a sense that it can be done. They may not be perfect projects, but they will help to develop templates project by project.

There needs to be a culture change:

- Starts with understanding that change is possible; but also a reconsideration of our relationships with energy;
- This requires public conversations about energy use: LA's reflecting on energy issues, citizens adjusting their views of energy.

It's also about subverting conventional models of centralised generation to meet demand, and experimenting with an interconnected system of loops and balances:

- Requires active network management – thinking about the user and the opportunities for demand management;
- Connecting into integrated systems creates a more robust system without adding more and more generation;
- It's not a system of unidirectional supply from us to you; consumer can give service back by different time use and by supplying energy back into the network.

The key dimensions need to be written into the Scottish Energy Strategy to provide a clear political and economic directive.

There is a responsibility on everyone to better understand and demonstrate the value of local energy systems – and to communicate it to policy makers; the world is run by the people who turn up!