Manchester Carbon Literacy Evaluation Report

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Contents

1 Introduction

1.1 What is Manchester Carbon Literacy?

Manchester was the world's first industrial city. Today, Manchester is the first city to undertake to empower all its residents, workers and students with carbon literacy. Carbon literacy is an understanding of the carbon impacts of our actions - of climate change and our individual and collective contribution to it. It is the vital, underpinning knowledge required to create the behavioural shift we need in how we live, work and study.

Manchester: A Certain Future, the city's climate change action plan, pledges Manchester to a 41% cut in CO2 emissions by 2020 and the creation of a 'low carbon culture'. The Manchester Carbon Literacy (MCL) Project will work with communities, workplaces and educational establishments to help achieve this goal.

> *Manchester Carbon Literacy will contribute to the creation of low carbon culture across the city*

A working group was convened over two years to develop the Manchester Carbon Literacy Standard for MCL training. Carbon literacy training will be delivered by organisations and initiatives independently, right across the city, supported by the MCL Standard, MCL resources, and the growing MCL network. The MCL Project aims to achieve its bold target of making one day's MCL training available to everyone who lives, works or studies in Manchester within three years, through a cascading programme of peer-to-peer learning.

By the end of their learning, MCL Project learners will take *action* to:

- Create at least one significant action personally to reduce their personal carbon footprint
- Create at least one significant action involving other people to reduce the collective footprint of their workplace, community or place of education.

1.2 The Evaluation Project

In October 2011 Cooler Projects CIC, funded by the Manchester City Council and private sector sponsors Westford Mill, began work on a three-year strategy to implement the MCL Project. In the first stage organisations have been recruited across MCL's three audiences – workplace, education and community – to conduct pilot projects. The purpose of the pilots was to assess the effectiveness of the MCL Standard, as well as to explore issues such as developing MCL accreditation and how best to communicate the identity of MCL training to diverse audiences across the city.

Cooler asked the University of Manchester for assistance in evaluating the effectiveness of the MCL model through an analysis of its approach and its implementation in pilot projects. This report is the final output of that process.

Firstly, an Evaluation Framework was developed, both assessing the MCL approach against academic research into behaviour change and offering a research design for pilot

evaluation. Secondly, between June and October 2012 the authors of this report conducted participant observation of training and 13 interviews. Interviewees were:

- Two managers and two trainers from Manchester City Council (MCC)
- Two managers and five trainee trainers from Manchester Adult Education Service (MAES)
- A member of Manchester Environmental Education Network (an organisation that provided resources to staff of both MCC and MAES)
- A member of Cooler Projects CIC

The Evaluation Project has provided Cooler with:

- evaluation of the experiences of trainers and learners from three project partner organisations
- a case study of one pilot project (MAES), with specific focus on whether the delivery of the training matched Cooler's objectives
- an evaluation framework that has been tested on and refined through the case study

1.2.1 A Participatory Project

A fundamental understanding of this evaluation project has been that evaluation should be a participatory process. A summary of findings was presented to a meeting of project participants and other stakeholders in order to receive feedback, test the evaluation framework, and offer refinements.

Evaluation should be a participatory process

Trainers in the MAES pilot project reported that this was the first time they had received such feedback on training and found the process inspiring. Participants of that meeting found strong resonances with, and affirmation of, the summary findings. Their input nuanced those findings and this final report integrates feedback and discussion from that meeting.

1.2.2 Evaluation Project Funding

The project was made possible by funding through an Eco Innovation Voucher provided by the HEIF Environmental Sustainability Knowledge Hub Project, funded through the higher education innovation funding (HEIF) awarded to the University of Manchester. The scheme provided 30 days of researcher time.

The Eco Innovation Voucher scheme provides small and medium enterprises (SMEs) including social enterprises working on environmental sustainability within the UK, but primarily in the Greater Manchester area, with academic input that they would otherwise not have access to, with the overall goal to stimulate future collaborative research partnerships.

2 Executive Summary

This report summarises the findings of the Manchester Carbon Literacy Evaluation Project. It addresses two central questions.

Firstly, to what extent do the different MCL stakeholders share an understanding of the project and the kind of change it is trying to achieve?

Secondly, to what extent has the MAES pilot project succeeded in implementing the goals of MCL? This was evaluated through participant observation of the training and through the interviews.

2.1 Five Key Messages

1. MCL's decentralised leadership model is very well aligned with the 'cascade' approach and the project's movement-building aspirations. But partners must feel empowered to act when appropriate and lines of ownership and responsibility must be clear.

2. Branding and identity should be adaptable to the contexts of different partners. MCL project coordinators should provide support to partner organisations to market the training.

3. The process of tailoring training is essential but challenging – it must both respond to the needs of diverse audiences and align with the MCL Standard. It should be recognised how much work such tailoring requires. This work should be supported through networking and sharing resources amongst partners.

4. Engaged trainers are essential. Engaged trainers can be developed and sustained by networks providing mutual support and through organisational cultures that support MCL 'champions'.

5. If the newly carbon literate are to be empowered, rather than disempowered, there must be opportunities for action. Carbon literacy doesn't mean just individual behaviour change. It means shared aspirations for collective, organisational and infrastructural change.

2.2 Key Findings

2.2.1 Understanding & Communicating MCL

Respondents working at the management or train-the-trainer level shared a common understanding of the core elements of the MCL Project. Some trainee trainers shared this understanding. Others focused on how MCL applied to the particular training they might do. Some newly trained trainers were uncertain about their own role and how the project would develop.

Understanding where ownership of MCL lay varied according to depth of involvement, with some assuming MCL was a City Council project.

The 'Manchester Carbon Literacy' label evoked differing responses. For some 'carbon literacy' was a compelling term. It has resonance among educators and activists. However some trainers felt the term would be distinctly off-putting to their learners.

2.2.2 Engaging with MCL

Three key factors led to successful organisational engagement at MAES. Firstly, the MCL project aligned with OFSTED's adoption of 'Education for Sustainable Development' as a goal for the adult education sector. Secondly, MCL aligned with MAES' organisational vision and mission. Lastly, MCL resonated with personally committed staff – not necessarily just committed environmentalists, but those who could see the benefits of MCL for their learners, in for example understanding home energy efficiency.

> *"We can see some scope for actually delivering this ourselves, because we've already got a cohort. We've got learners across the city, particularly the kind of people who need to watch out for their money…and be a bit more healthy. It saves money and it's a healthy way of living. Why would you want to say no to that?" (Training participant)*

Crossing as it does two of MCL's audiences – education and community – as well as having its core expertise in training Cooler felt that insights from the MAES pilot were of particular value. Despite its specific organisational characteristics, the strengths, challenges and opportunities experienced at MAES are likely to be relevant to many MCL partners.

2.2.3 Implementing MCL: Challenges and Opportunities

MCL's decentralised model presents both opportunities and challenges. It is very well aligned with the cascading approach and with MCL's movement-building aspirations. But it also requires ongoing support and resources, both from the Cooler 'hub' and from building peer networks.

In many cases the model requires financing from existing sources, which means integrating MCL training into pre-existing training. MAES successfully found ways to integrate MCL into existing training and activities, such as courses in Functional Literacy and Numeracy, English as a Second Language, and Employment Readiness**.**

The strength of this lies in tailoring the training to different audiences. But this is also a challenge not to be underestimated, as trainers stressed.

> *"Developing training tailored to the needs of different groups is a very time consuming process involving weeks of work…To create something that will make the change happen you can't take a stock product. You'd get the numbers but not the change." (Trainer)*

Respondents generally understood the need to align the training with the Standard and were very satisfied with the Standard itself.

Trainee trainers also want more follow-up and expressed the need for help developing networks among themselves and among learners.

MAES is well positioned in relation to Manchester communities because of the diversity of its programmes, already embedded, for example, with community groups and social landlords. Given MCL's goal to reach every resident, worker and student, MAES has a key role to play in contributing to the cascade effect.

> *"There are two parts to any training - people's reaction as individuals and their reaction as their role in an organisation." (Trainer)*

Promoting organisational change and getting the necessary infrastructure and supports for collective action in place takes time. For newly empowered learners opportunities for carbon literacy and what Cooler call 'carbon capability' need to be aligned – or there is the real danger they will feel disempowered by lack of opportunity or support to act.

Manchester has a wealth of existing organisations, networks and initiatives to support MCL - to take one example among many, the Manchester Environmental Education Network. Learners, trainers - and this report's authors - were inspired by the extent of activity in the city. This presents fertile ground for the MCL 'cascade' approach.

2.2.4 Training Design

Trainee trainers generally gave very good reviews of their MCC trainers. The training was felt to have engaged hearts and minds, balanced general knowledge and opportunities for application, and facilitated commitment.

> *"I was inspired by the training because it was oriented towards doing something." (Training participant)*

Efforts by both trainers and trainee trainers led to the development of some excellent activities and materials. Both expressed the desire that these resources be stored and shared "to save reinventing the wheel".

The following aspects were identified as particularly effective and engaging by participants:

- participatory and interactive
- personal stories and personalising content
- emotional visuals
- dramatisation
- quizzes, puzzles and games
- positivity and optimism
- individual and collective commitment
- finding out about local initiatives – and learning from other places

The Manchester Eco-house, a 1930s terrace house kitted out with everyday resource saving technologies, was used as the training venue. This was particularly important to participants as it put low-carbon living in a normal, everyday context.

> *"Some of the carbon footprint of certain household items I was really surprised by." (Training participant)*

2.2.5 Impact – Evidence of Change

There was clear evidence of specific behaviour change in response to the training. From everyday energy-saving behaviours to household decisions, such as installing cavity wall insulation.

Participants gained extensive understanding about the environmental impact of their everyday behaviours and developed ideas about positively modifying that behaviour. Participants also gained knowledge about the availability of different technologies, such as energy monitors. This was often in reference to the Eco-House venue.

There were also several examples of participants taking action as citizens, such as writing to the City Council about recycling provision.

> *"You don't think about it while you're making pasta that you've got to put a lid on it. Now I do." (Training participant)*

Knowledge should never be assumed. Even keen environmentalists learnt from the training - behaviours which may seem obvious are sometimes the ones that need highlighting.

> *"I want to talk to my housing association about putting up a solar panel on my roof, as it's an ideal location. It's south facing." (Training participant)*

There were several examples of the 'cascade effect' - where participants discussed the training or MCL with family, friends or colleagues.

> *"Most people are positive. Some people are sort of, they pull a face…But I suppose it's just, you know, you have to keep reminding people, encouraging them." (Training participant)*

Most notably, the training affected beliefs about what could be achieved both individually and collectively. In particular, the training induced a strong sense of positivity and optimism regarding each individual's ability to lower their carbon footprint.

2.3 Key Recommendations

2.3.1 Understanding & Communicating MCL

Shared ownership of the MCL project should be clarified to ensure effective implementation.

The project's brand or identity (i.e. Manchester Carbon Literacy) must be dealt with sensitively. A creative solution between maintaining a core identity and tailoring the identity to target audiences needs to be achieved.

2.3.2 Engaging with MCL

MCL should look to exploit its open and adaptive model by seeking out organisations with which there are existing resonances. The passion and motivation of trainers is key to MCL's success. Where individuals are highly motivated by their existing organisational mission MCL can 'piggy-back' on, and further enable, that passion. The MAES example demonstrates that it is not only passion for environment issues that counts – trainers were equally motivated by the social, financial and personal development benefits that MCL training brought.

2.3.3 Implementing MCL

Networking, mutual support and mechanisms for knowledge exchange would help to develop and maintain the necessary level of engagement among trainers. Knowledge learnt and information gained should be formalised and shared after the training. A resource 'hub' would save trainers a lot of work and avoid different organisations reinventing the wheel.

Delivery organisations are likely to need assistance with marketing their MCL training.

Carbon literate learners need support to stay motivated for the long haul of organisational and infrastructural change. A network of other committed individuals could provide that.

2.3.4 Training Design

Splitting one day training into two half days. This format was very successful in the MAES pilot. Firstly, participants enjoyed the 'homework' (such as researching presentations) which increased their participation and sense of ownership, and gave them time to absorb and consolidate the information. Secondly, it allowed trainers to further adapt to learners' needs.

Other suggestions were: four 2.5 hrs sessions; longer training; and more follow up or offer of advanced training.

Don't assume a knowledge base. Trainee trainers want to be really sure of the 'ABC' of carbon literacy in order to pass this on confidently to learners.

2.3.5. Impact – Evidence of Change

Some weeks following the MAES training, participants received postcards to remind them of their commitments. Postcards served as a positive reminder of intentions that would otherwise have been forgotten. 'Follow-ups' and reminders are essential to ensure that behaviour change is achieved.

3. Shared Understanding

The first step in the evaluation process was to develop, with Cooler Projects CIC staff, a model of the theory of change underlying MCL. Such models help articulate the overall strategy and expected results of a project, including underlying assumptions and potential risks.

They also enable evaluators to assess whether project participants share those understandings. Where understandings are not shared miscommunication can arise. The theory of change model is presented on page 40.

> *"The MCL programme isn't actually setting out to create transformation. Actually what it's doing is trying to create a little bit of fertile soil in which transformation is more likely to take place. That's how I would describe it." (Manager, MCC)*

> *"You've got to make people understand why it's happening, what it's for. Why are we switching the monitor off? Why are we recycling? A lot of people don't see the whole picture…But if they understand why they're doing it, what the reasons are behind it, I think more people would be on board." (MAES trainer and training participant)*

4. Understanding & Communicating MCL

Respondents were asked about their understanding of the MCL project and how they thought the project's existing identity or branding would be received by the wider public in Manchester.

> *"The vision behind MCL is that in order to change the culture, you need to have a degree of literacy, right across the population. Everybody has to have it. You know, in the same way that everyone can add up, and everyone can write." (Manager, MCC)*

4.1 Understanding Core Elements

Respondents working at the management or train-the-trainer level shared a common understanding of the core elements of the MCL Project.

> *Deliver one day of training on carbon literacy to everyone who lives, works or studies in Manchester through a cascading mechanism of peer-to-peer learning*.

Some trainee trainers shared this understanding. Others focused on how MCL applied to the particular training that carbon literacy training would be integrated with, given the delivery model of piggy-backing on existing training programmes.

"And the idea is that people like ourselves are going to disseminate that information out to the public through our centres and courses that we run." (Trainer)

4.2 Whose programme is it?

Understanding where ownership of MCL lay varied according to depth of involvement, with some assuming MCL was a City Council project, whilst those who had involvement with *Manchester: A Certain Future* understood the that ownership lies with the city itself.

Some newly trained trainers were uncertain about their own role and how the project would develop.

It will be important for partners to take full ownership of MCL and therefore ensure effective implementation. It also makes the programme more compelling for new forms of governance in cities, where citizens and diverse organisations are active partners in making the city work rather than clients looking to local authorities to provide services.

4.3 Branding

The 'Manchester Carbon Literacy' label evoked differing responses. For some 'carbon literacy' was a compelling term. It has resonance among educators and activists. Manchester itself has a particular history of promoting literacy and therefore becoming the world's first carbon literate city is a driving force for some. For one respondent, 'Carbon Literacy' "does exactly what it says on the tin". However some trainers felt the term would be off distinctly putting to their learners.

Among trainers there was a perception that the term 'Carbon Literacy' is not consistent with the actual training itself – while the term sounds 'academic', the training itself is accessible and engaging.

"When I read the phrase 'carbon literacy' the first idea I had before I did the course, I thought it meant something different to what I know now. I have a different idea of what it is now than what I thought before." (Training participant)

Trainers noted that connotations with 'literacy' as an academic subject may alienate those not particularly confident in their literacy skills, who might be apprehensive about becoming involved. While the label has meaning for those who are familiar with it, on first exposure, 'Carbon Literacy' does not resonate well with the mainstream. Negative associations related specifically to the term 'literacy' itself.

"Carbon literacy, what's that? On more than one occasion people that are interested in environmental issues would say 'what's that? What's it about? And you had to explain it in detail." (Training participant)

4.4 Recommendations

The project's brand or identity (i.e. Manchester Carbon Literacy) must be dealt with sensitively. A creative solution between maintaining a core identity and tailoring the identity to target audiences needs to be achieved.

> *"Retaining the diversity but going for a common brand. That's another aspect…that it is a brand. It's actually: We're trying to make the whole city carbon literate, that's what we're trying to do…We've got one definition but it's being delivered in a whole lot of different ways by different organisations, who are all saying, 'Oh yeah, we want people showing off about it.' We want employers to say: 'All our employees are carbon literate, or better, they're Manchester Carbon Literate'."* *(Manager, MCC)*

Shared ownership of the MCL project should be clarified to ensure effective implementation

5. Engaging with MCL

Three key factors led to successful organisational engagement at MAES. Firstly, the MCL project aligned with OFSTED's adoption of 'Education for Sustainable Development' as a goal for the adult education sector. Secondly, MCL aligned with MAES' organisational vision and mission. Lastly, MCL resonated with personally committed staff – not necessarily just committed environmentalists, but those who could see the financial and social benefits of MCL for their learners, for example in understanding home energy efficiency.

> *"We can see some scope for actually delivering this ourselves, because we've already got a cohort. We've got learners across the city, particularly the kind of people who need to watch out for their money…and be a bit more healthy. It saves money and it's a healthy way of living. Why would you want to say no to that?"* *(Training participant)*

Crossing as it does two of MCL's audiences – education and community – as well as having its core expertise in training Cooler felt that insights from the MAES pilot were of particular value. Despite its specific organisational characteristics, the strengths, challenges and opportunities experienced at MAES are likely to be relevant to many MCL partners.

5.1 Organisational Engagement

Much of the momentum within MAES came from personally committed staff. Furthermore, a significant amount of distributed leadership around MCL has been developing within MAES. This has created space for people to act according to their own interests and energies, and become 'green champions' (existing recognised roles). This creates opportunities for engaged staff members 'to take other people with them'.

The role of middle managers is crucial here, in identifying people who aren't necessarily experts, but are committed, and then supporting them to develop capacity and take leadership. The importance of leadership at senior levels was also noted - both in terms of personal engagement and in responding to pressures on organisations to consider issues of sustainability, such as MAES' response to OFSTED requirements.

There is a clear understanding within MAES that committing to MCL is as much about making changes within the organisation itself as delivering the relevant training. This includes: embedding MCL at the executive level; integrating it into discrete courses; and informing every learner about carbon literacy during induction.

> *"One of the motivators for MAES staff is the social side of sustainability. Working in MAES you see the 'environmental wastage'. People living in substandard housing in substandard communities. The landscape around people makes them feel substandard."*

While many staff at MAES are more or less environmentally committed, MCL deeply resonated with MAES' social engagement. One respondent mentioned that as she travelled to work on a winter's day she observed snow on the roofs on houses in Didsbury but as she got nearer the city centre towards less affluent communities, the snow gradually disappeared because houses don't have proper insulation.

> *"There are two parts to any training - people's reaction as individuals and their reaction as their role in an organisation." (Trainer)*

5.2 Individual Engagement

The motivation for MCL amongst individuals at MAES is underscored by the fact there is a waiting list for the next trainer training sessions.

The strongest motivator driving engagement with MCL is the unique characteristics of individual MAES staff. All MCL learners within MAES volunteered themselves, and had existing interests to green issues. Another strong motivation is the opportunity afforded by MCL training to share knowledge and raise awareness or educate others about green issues. But several participants also mentioned their motivation to help their learners improve their quality of life, identifying the social and financial benefits of teaching MCL as equally, if not more important than the environmental benefits.

The importance of individual characteristics should not be underestimated - these factors are crucial in successful delivery of MCL. This finding has implications for sourcing and recruiting appropriate people to deliver MCL. Passion to educate and interest in the subject should be viewed as fundamental criteria for determining potential trainers.

One respondent described how having trainers who are "trusted advocates" is essential in persuading learners to make a similar commitment. Advocates engage learners with their sense of

enthusiasm, with examples from their own lives and by showing they are walking the talk. They inspire learners to make their own commitments.

> *"What I'm hoping to achieve is to educate people in the wider community in Manchester and make a difference." (Training participant)*

Green Champions within MAES have a particularly strong presence and seek to inspire and encourage colleagues to become involved in green activities. As one example, they produced maps and videos showing safe cycle routes which resulted in a car-free cycle to work day. These initiatives illustrate how the organisational culture within MAES fosters the development of leadership, and empowers strong individuals to share their enthusiasm regarding green issues.

> *"The environmental teaching is something that I really enjoyed, working with new material and being able to teach that." (Training participant)*

Participants looked forward to teaching carbon literacy, whether this involved embedding it in their existing courses, or teaching MCL as a self-contained module. Being able to work with new teaching materials was viewed as an advantage of MCL and participants with previous experience of teaching green issues found that they enjoyed it.

5.3 Recommendations

MCL should look to exploit its open and adaptive model by seeking out organisations with which there are existing resonances. The passion and motivation of trainers is key to MCL's success. Where individuals are highly motivated by their existing organisational mission MCL can 'piggy-back' on, and further enable, that passion. The MAES example demonstrates that it is not only passion for environment issues that counts – trainers were equally motivated by the social, financial and personal development benefits that MCL training brought.

6. Implementing MCL: Challenges and Opportunities

6.1 Managing MCL

MCL's decentralised model presents both opportunities and challenges. It is very well aligned with the cascading approach and with MCL's movement-building aspirations. But it also requires ongoing support and resources, both from the Cooler 'hub' and from building peer networks.

However, the lack of clarity about ownership, i.e. *"Whose programme is it?"* could create some management dilemmas and stall progress. This needs to be clarified so that that people feel empowered to take decisions and move forward.

In many cases, the model requires financing from existing sources, which means integrating MCL training into pre-existing training. MAES successfully found ways to integrate MCL into existing

training and activities, such as courses in Functional Literacy and Numeracy, English Second Language, and Employment Readiness**.**

> *"We do a lot of what we call 'embedded learning'. On my finance course there's a lot of embedded numeracy and embedded literacy. So I hope to embed environmental issues as part of the course." (Training participant)*

6.2 Delivering MCL – Strengths, Challenges, Opportunities

The strength of the approach lies in tailoring the training to different audiences. But this is also a challenge not to be underestimated, as trainers stressed.

> *"Developing training tailored to the needs of different groups is a very time consuming process involving weeks of work…To create something that will make the change happen you can't take a stock product. You'd get the numbers but not the change." (Trainer)*

Respondents generally understood the need to align the training with the Standard and were very satisfied with the Standard itself. However, trainee trainers want more follow-up and expressed the need for help developing networks among learners.

MAES is well positioned in relation to Manchester communities because of the diversity of its programmes, already embedded, for example, with community groups and social landlords. Given MCL's goal to reach every resident, worker and student, MAES has a key role to play in contributing to the cascade effect.

Promoting organisational change and getting the necessary infrastructure and supports for collective action in place takes time. For newly empowered learners opportunities for carbon literacy and what Cooler call 'carbon capability' need to be aligned – or there is the real danger they will feel disempowered by lack of opportunity or support to act.

Manchester has a wealth of existing organisations, networks and initiatives to support MCL - to take one example among many, the Manchester Environment Education Network. Learners, trainers - and this report's authors - were inspired by the extent of activity in the city. This presents fertile ground for the MCL 'cascade' approach.

One (non-MAES) respondent was concerned that there was not enough of a critical mass of potential trainers who were 'already there'. Another said that it didn't matter where they were on their journey as long as the commitment was there.

While trainers need to be engaged and engaging, it was also mentioned that care must be taken not to alienate 'non-greens'. The training offered to MAES staff received favourable reviews with respect to this balance.

It was noted that there is a huge difference between conscripted learners and volunteer learners. This is worth remembering as MCL rolls out.

6.3 Recommendations

Networking, mutual support and mechanisms for knowledge exchange would help to develop and maintain the necessary level of engagement among trainers. Knowledge learnt and information gained should be formalised and shared after the training. A resource 'hub' would save trainers a lot of work and avoid labour repetition among different organisations.

Delivery organisations are likely to need assistance with marketing their MCL training.

Carbon literate learners need support to stay motivated for the long haul of organisational and infrastructural change. A network of other committed individuals could provide that.

Ongoing networking and exchange among both trainers and partner organizations can help promote organisational and infrastructural change.

7. Training Design

MCL participants generally gave very good reviews of their MCC trainers. The training was felt to have engaged hearts and minds, balanced general knowledge and opportunities for application, and facilitated commitment. While maximising participant contribution, trainers were also ready to fill in knowledge gaps or add details.

> *"I was inspired by the training because it was oriented towards doing something." (Training participant)*

Efforts by both trainers and participant led to the development of some excellent activities and materials. Both expressed the desire that these resources be stored and shared "to save reinventing the wheel".

Trainers are able to integrate MCL to a range of activities—and think of creative ways to attract learners.

7.1 Effective and Engaging Training Design

The following aspects were identified as particularly effective and engaging by participants:

- participatory and interactive

  "I really liked the idea and the topics they gave us for presentations because we actually educated ourselves and each other through that process" (Training participant)

- personal stories and personalising content

Personal stories told by trainers or learners helped to engage learners –trainers and participants talked about changes they had made in their own lives.

- multi-sensory reinforcement of message

There were frequent examples of visual reinforcement such as using image flashcards and showing sustainable products. Emotional visuals were also noted by many.

> *"I was most struck by the photos of the floating pile of plastic at sea – really seeing the consequence of actions and getting really frustrated excessive packaging." (Training participant)*

- dramatisation

The group charged with making a presentation about waste management did a little skit. One person walks away with a plastic item. Another shouts: "Stop! Where's that going? Hopefully into the recycling… not into the canal out there and then to the sea!"

- quizzes, puzzles and games

Many people commented on the quizzes about, for example, how much energy was used or the carbon footprint of food.

- positivity and optimism

> *"I didn't leave panicking that the world was going to end. I took home a real positive sense that everyone who was on the training realised that this was a message in a new way…It was people saying that we can begin to change, and I liked that." (Training participant)*

- individual and collective commitment

Participants were asked to commit to individuals SMART goals and write them on postcards with their own address, which would be sent to them in a few months. They then went round the group with each person saying what they were going to do out loud.

Participants were then asked to develop a group Action Plan; they moved into groups with people who worked in the same sector or area. They came up with range of ideas to meet the needs of a variety of learners and for integration into different courses.

- finding out about local initiatives

Manchester has a wealth of existing organisations, networks and initiatives – many were inspired by the extent of activity in the city.

- learning from other places

Participants were also inspired by learning about existing initiatives elsewhere. For example, in the Incredible Edible Todmorden scheme, local businesses, schools, farmers and the whole community are involved in growing food. It was acknowledged that as a small town Todmorden presented a very different context, but participants discussed how elements of the scheme could – and do – work in Manchester.

- Importance of Eco-House venue

The Manchester Eco-house, a 1930s terrace house kitted out with everyday resource saving technologies, was used as the training venue. This was particularly important to participants as it put low-carbon living in a normal, everyday context.

> *"Some of the carbon footprint of certain household items I was really surprised by." (Training participant)*

7.2 Recommendations

Splitting one day training into two half days. This format was very successful in the MAES pilot. Firstly, participants enjoyed the 'homework' (such as researching presentations) which increased their participation and sense of ownership, and gave them time to absorb and consolidate the information. Secondly, it allowed trainers to further adapt to learners' needs.

Other suggestions were: four 2.5 hrs sessions; longer training; and more follow up or offer of advanced training.

Don't assume a knowledge base. Trainee trainers want to be really sure of the 'ABC' of carbon literacy in order to pass this on confidently to learners.

8. Impact – Evidence of Change

There was clear evidence of specific behaviour change in response to the training. These ranged from everyday behaviours such as energy saving, waste reduction and composting to household decisions, such as installing cavity wall insulation.

> *"You don't think about it while you're making pasta that you've got to put a lid on it. Now I do." (Training participant)*

Participants gained extensive understanding about the environmental impact of their everyday behaviours and developed ideas about positively modifying that behaviour. Participants also gained knowledge about the availability of different technologies, such as energy monitors. This was often in reference to the Eco House venue.

There were also several examples of the wider impact of the training in terms of empowering people to become more vocal and actively seek out change, for example participants taking action as citizens, such as writing to the City Council about recycling provision.

Participants gained extensive knowledge about the environmental consequences of their everyday actions and behaviours. Knowledge should never be assumed. Even keen environmentalists learnt from the training. Behaviours which may seem obvious are sometimes the ones that need highlighting.

"I want to talk to my housing association about putting up a solar panel on my roof as it's an ideal location, its south facing." (Training participant)

There were several examples of the 'cascade effect', where participants discussed the training or other aspects of MCL with family, friends of colleagues. With an appropriate level of support, this method may prove an effective way to market MCL.

"Most people are positive. Some people are sort of, they pull a face…But I suppose it's just, you know, you have to keep reminding people, encouraging them." (Training participant)

8.1 Sense of Empowerment

Most notably, the training affected beliefs about what could be achieved both individually and collectively. In particular, the training induced a strong sense of positivity and optimism regarding each individual's ability to lower their carbon footprint.

This sense of empowerment is consistent with many psychological models of behaviour change, which identify the belief that change is possible as fundamental to producing behaviour change. Evidence from interviewing participants suggests that they came to see that making small differences to their daily practices and routines can have a measurable impact on reducing their carbon consumption. Participants felt empowered to change their behaviour as a consequence of the training.

"I think I have become much less bitter. Yeah, I used to think that I was the only one who cared what was going on… But seeing a load of people get together and an active plan for Manchester moving forward, I thought yeah that's good, I'm not the only one. I'm not saying that it's going to happen tomorrow but over the next few years I definitely think that we're going to have an impact. That's nice." (Training participant)

One person describes a sense of hopelessness prior to the training regarding the limited ability of their own actions in producing change. However, the training targeted these negative beliefs, instilling a more positive sense that *together*, something can be achieved. The phrases "I'm not the only one" and "we're going to have an impact" are crucial here, and illustrate the importance of beliefs in others' commitment as fundamental to encouraging behaviour change at the individual level. Psychological models suggest belief in collective commitment is an important determinant of individual behaviour in collective efforts.

8.2 Recommendations

Some weeks following the MAES training, participants received postcards to remind them of their commitments. Postcards served as a positive reminder of intentions that would otherwise have been forgotten. 'Follow-ups' and reminders are essential to ensure that behaviour change is achieved. All partner organisations should share information about evaluation to explore possibilities of using similar approaches and metrics across organisations.

Appendix 1: Interviewees

We would like to thank all who generously gave their time to the evaluation project. Interviewees and their organisations are listed below.

Cooler Projects CIC
Phil Korbel

Manchester Environmental Education Network
Raichael Locke

Manchester Adult Education Service
Kath Castle
James Fawley
Sue Maw
Diane O'Brien,
Mary-Rose Puttick
Charlotte Warden
Sue Womersley

Manchester City Council
Louise Barton
Michelle Berry
Richard Sharland
Shona Thomas

We would also like to thank Sally Randles, as the principle investigator of this project, and Dan Welch, for his help with editing and proofing the final versions of these reports.

Appendix 2: Literature Review

1. Introduction: Climate change and UK Targets

Climate change presents a high risk of global damage to environmental, social and economic systems (Stern 2006). Impacts of Climate change projected for mid- to late- 21st century include more frequent and severe flooding due to rising sea levels and increased rain fall in some areas. Additional impacts are an increase in droughts and heat waves, and significant biodiversity loss due to a change in habitat conditions (Intergovernmental Panel on Climate Change [IPCC] 2007). Climate change requires mitigating action to reduce global GHG emissions and to minimise their effects on the environment. The UK government have committed to a target of reducing GHG emissions by at least 80% by 2050 relative to levels in 1990 (Her Majesty's Government [HN Government] 2009). In helping to achieve this national level target, Manchester City Council has pledged to reduce emissions by 41% by 2020 compared to baseline levels (*Manchester-A Certain Future*, 2009). In analysing the potential pathways to achieving emission reduction targets, the government has identified that it is essential to have "the consent and participation of citizens given the scale and pace of change required" (HM Government 2009).

Approximately one third of GHG emissions in the UK are attributed to private transport and domestic usages (Department for Environment, Food and Rural Affairs [DEFRA] 2007). However, taking a life-cycle perspective on energy systems, the public are active participants in 100% of greenhouse gas emissions[1]. The public currently have a high degree of control over the quantity of energy they use; they are active participants rather than passive users of energy. Thus, the public have a key role to play in the reduction of GHG emissions, not just as direct emitters, but as low-carbon product consumers, low-carbon employees and low-carbon citizens (e.g. voting for green policies) (Whitmarsh *et al* 2010).

Surveys indicate that the vast majority of the public have knowledge of climate change and global warming, and approximately 55% of the UK public would like to do more to help the environment (Thornton 2009). However, recent energy consumption trends show a slight rise in 2010 2nd quarter compared to that same time period in 2009 (Department of Energy and Climate Change 2010), indicating that awareness of climate change alone is not producing a 'low-carbon public'.

1.1 Defining public engagement and participation

In analysing public engagement and participation in the context of climate change, it is important to clearly define our understanding of the terms engagement, participation, and the public. Papers have previously distinguished between engagement and participation in order to define engagement in climate change and to analyse specific barriers affecting it (Lorenzoni *et al* 2007). Public

[1] Note this does not take imported or exported production into consideration, where products are manufactured in one country and used in another

engagement is defined here as the state of connection the public has with an issue, in this case climate change. Separating the participation process from engagement, public participation is defined as the level of involvement the public has in the process of policy-making at all levels of governance.

1.2 Why is Engagement Required in the Context of Climate Change?

This review frames its discussion on the assumption that climate change is a significant global threat, and that public behaviour must change in terms of their contribution to GHG emissions. Although this review advocates the requirement of participation and engagement, it is assumed that participation isn't needed to prioritise climate change on the world agenda, but rather to assist in developing the best ways to achieve behavioural changes.

As previously described, public behavioural change is required to mitigate against climate change. Behavioural change from the status quo can be motivated by a number of factors, including:

- A change in regulation. For example, it could be made illegal to sell lower-efficiency light bulbs.
- Economically incentivising beneficial behaviour e.g. tax or subsidies.
- Voluntary change, based on an engaged public.

Of these factors, only voluntary change requires that the public are engaged with Climate change. It has been argued that using only a policy-induced behavioural change, either regulation or economic incentive, risks being ineffective or even rejected due to a lack of public understanding in the long term (Lorenzoni *et al* 2007). As described in the introduction, the UK government prefer voluntary action above alternative options. It could be argued that this minimal intervention approach has least risk of harming Government re-election aims. Due to the complexities of climate change, it is likely that a mix of all three motivations, regulation, incentivising and voluntary change, will be required in order to achieve GHG emission reduction targets.

2. Why Participation is required?

In recent years, there has been growing recognition in scientific, governmental and business organisations of the important role of public opinion, in ethical and practical aspects of policy making (Rowe 2000). The ethical aspect of public participation refers to the idea of human rights, basic democratic principals, and procedural justice. These are rooted in the well-developed and universally recognised concepts of 'general will' introduced by Rousseau (1968); 'civil society', developed by philosophers including Hegel (1991), Hobbes (1996), Locke (2005), and 'public sphere' presented by Habermas (1989). A common component of all these theories is the characterisation of the public as a mediator between a highly individualised society and a state.

The practical aspects of public participation in the decision-making process refer to the improvement of policy using local experience and expertise, and the ratification of policies through

involvement. The public acts as a co-designer of a project and adds traditional knowledge and retrospective first-hand experience. There is collaboration of public and expert experience in an interactive process. Participation makes people more interested in the success of an endeavour and facilitates important behavioural changes (Brand 2005). Practicalities of public participation also include a type of warranty for policy makers, since the implementation of unpopular decisions may cause public protest and political or economical crises (Featherstone *et al* 2009).

3. How do you achieve engagement?

This section provides a model of the relationship between public engagement and participation, incorporating other previously defined models, such as the Deficit and Deliberative Model of engagement and participation, as well as the Cognitive/ Affective/ Behavioural (CAB) Model of engagement.

As previously mentioned, this paper defines public engagement as the state of connection the public has with an issue, and public participation as the level of involvement the public has in the process of policy-making. This paper seeks to further define the relationship between engagement and participation. This defined relationship will create a greater holistic understanding of engagement, in order to achieve a greater level of engagement in the context of climate change.

Figure 2 is an illustration of the relationship between public engagement and public participation. The government and other stakeholders attempt to engage with the individual through informing and enabling. Informing in this context refers to giving the individual the relevant knowledge required to act on the issue. Enabling in this context encompasses giving the necessary 'tools' and opportunities to enable the individual to act on the issue.

However, only limited engagement is achieved through this process alone. In the next stage, the engaged citizen participates with government and stakeholders in policy-making. This participation enables government and stakeholders to facilitate greater public engagement with climate change. The participating public teaches and feeds back to the government about how to improve their 'informing' and 'enabling' process. This generates iteration between engagement and participation, whereby better engagement creates greater participation, and vice versa: a positive feedback loop.

In order to achieve effective public engagement with climate change mitigation, this diagram illustrates engagement is required to allow participation, but participation is required to further improve engagement.

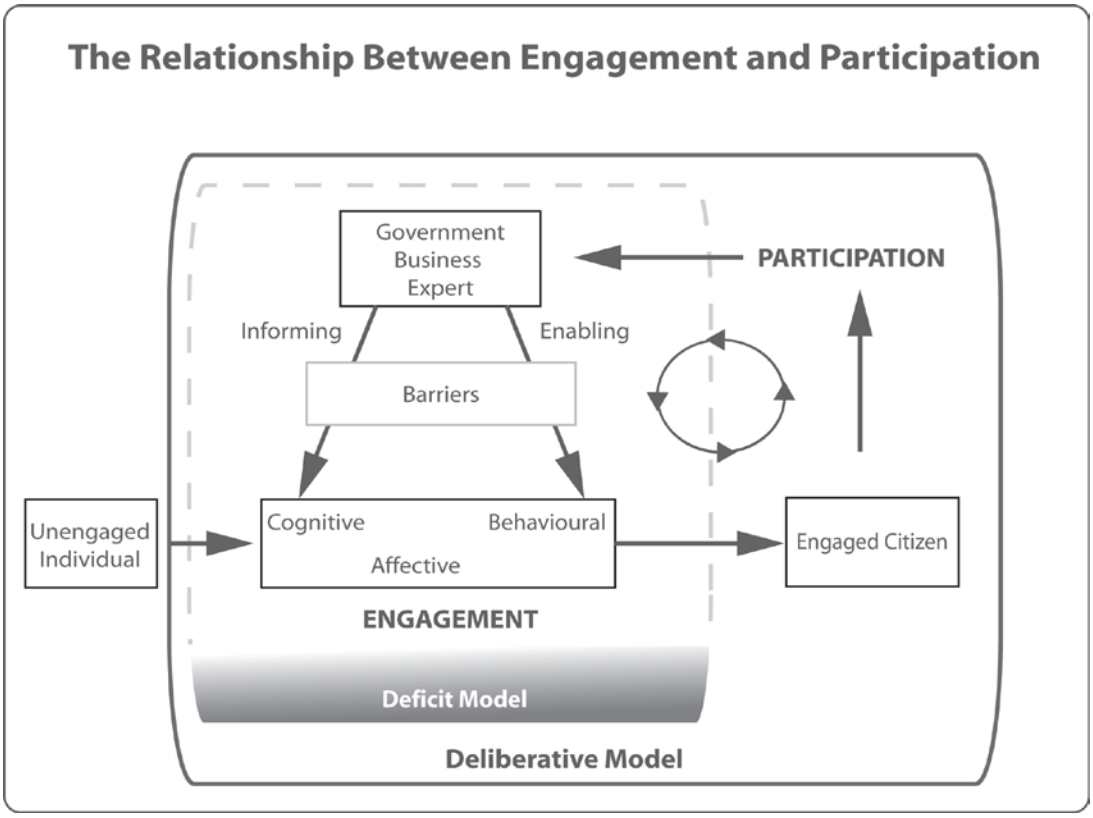


Figure 2. A representation of the relationship between public engagement and participation.

The central area of Figure 2 (within the central dotted line) represents the Deficit Model style of engagement: Information and opportunities are given to the public, who are expected to act accordingly. This is essentially a one-way communication that assumes members of the public will 'rationally' react to this intake of information. The larger boxed area in Figure 2 represents the Deliberative Model style of engagement. This involves deliberation between the public and government/ stakeholders, a discourse where opinions on subjective or uncertain information are expressed and heard.

Engagement is proposed to comprise of three states; cognitive; affective and behavioural (CAB Model, Lorenzoni *et al* 2007). Accordingly, this means that acting upon climate change requires that an individual possesses sufficient knowledge about climate change , cares enough about Climate change to act and feels motivated enough to take action.

In the context of climate change, the model of public engagement is as followed:

Cognitive: This includes general knowledge of what climate change is, why it is an issue to humanity, and what the individual and the public can do to mitigate against it;

Affective: This involves how much the individual and public care about climate change and how it is prioritised against other factors that affect decision-making where there is an environmental choice involved;

Behavioural: This is about how easy it is to change behaviours to include knowledge/ emotion connected to climate change, and how easy it is perceived to be able to carry out these behaviours.

The relationship between these three aspects of engagement is not linearly progressive. It is not simply the case that an individual gains knowledge of climate change, enabling them to subsequently associate emotion with the issue, which gives them the agency to act. As previously described, this view of engagement is the deficit model (Owens 2000). Any interventions which seek to engage the public with an issue with the ultimate goal of commonly recognised that the model does not sufficiently warrant behavioural change. Rather than a linear process, it is likely that there are co-dependencies between cognitive, affective and behavioural aspects. Bem's Self-Perception Theory (Bem, 1967), for example, contradicts the common assumption that our attitudes are the primary drivers of behaviour. Conversely, Bem (1967) suggests that we infer our attitudes through observations of our own behaviours, and that these in turn influence subsequent behaviours. From this perspective, changing behavioural patterns should be targeted using action-orientated interventions, rather than focusing exclusively on attitude change. The CAB model is a simplistic model of what comprises engagement, but gives an insight into the hurdles that must be overcome in attempting to engage with the public. Unlike the deficit model, the CAB model helps to frame barriers affecting engagement, including individual, social, technical, habitual, and cultural related barriers.

4. Barriers

Research suggests that a high proportion of the public demonstrate awareness of climate change as a social issue (DEFRA 2002; Thornton 2009), although their knowledge about specific details and causality may be limited (Lorenzoni and Poortinga 2006; DEFRA 2002; Thornton 2009). Moreover, people report that they care about the issue (Poortinga and Pidgeon 2003). However, public mitigation towards climate change has been moderate at best, with carbon dioxide emissions continuing to rise in recent years (DEFRA 2006). Following the model's rationale that engagement with climate change is a product of cognitive, affective, and behavioural variables, it appears that engagement at the behavioural level has been largely absent. Commonly known as the attitude-behaviour, or value-action gap, this phenomenon occurs when attitudes are expressed in favour of performing a behaviour, yet the actual behavioural response is low. To foster engagement toward climate change, behavioural barriers therefore need to be addressed.

We will now examine a range of barriers emerging from social science disciplines such as psychology, sociology and behavioural economics, all of which may prevent individuals from engaging in a more sustainable lifestyle. The section is divided into the following topics; Efficacy Beliefs; Values and Priorities; Risk Perception; and Normative Beliefs and Habit. We do not advocate that these barriers are independent of one another. Indeed, there is undoubtedly a degree of co-variance across the

different topics. By dividing the topics as such, we aim to show that varying influences may contribute to the maintenance of environmentally harmful practices and such influences need to be considered to promote engagement with climate change mitigation.

4.1 Efficacy beliefs

Models of social-cognition can be useful in explaining the attitude-behavioural gap by identifying the barriers some individuals may face toward adopting lower carbon practices. Bandura's Social Cognitive Theory (Bandura 1989, 1999) seeks to explain barriers to behaviour at an individual level. While Social Cognitive Theory acknowledges that individuals are part of their environment, humans are viewed as active agents in creating their environment, rather than being merely products of it. Fundamental to human agency is that behavioural intentions are directly influenced by perceived efficacy of producing a desired outcome (Bandura 1997). Efficacy beliefs are implicated both in how much effort an individual exerts towards a given behaviour, and the outcome they expect their efforts to produce (Bandura 2000). For carbon reduction interventions to be effective, people need to believe that engaging in behavioural changes will sufficiently reduce their carbon footprint and these individual efforts will sufficiently contribute to the prevention of climate change. Research suggests, however, that personal efficacy beliefs toward climate change are relatively low. A 2004 BBC pole for example indicated that just over half of the population believed that changing their behaviour would have a positive impact on the environment. Echoing this, a more recent large scale survey research (Thornton 2009) found that less than half the population believed that their everyday behaviours and lifestyle contributed to climate change. In a recent meta-analysis of psycho-social determinants of pro-environmental behaviour (Bamberg and Moser 2007), perceived behavioural control was identified as a significant mediator of intention to change behaviour. This is consistent with Geller's (1995) view that self-efficacy should facilitate pro-environmental practices. Self-efficacy has also been implicated in predicting recycling behaviours and waste prevention (Chan 1998; Gamba and Oskamp 1994). Hopper and Nielsen (1991) found that individuals were more likely to engage in waste prevention practices if they believed their actions would positively contribute to waste prevention. In combination, this research suggests that for climate change mitigation behaviour to become widespread, individuals need to be convinced that pro-environmental behaviour will prevent environmental deterioration (Straughan and Roberts 1999).

One explanation for low personal efficacy toward climate change is that individuals may believe their efforts will be undermined by external factors. Large-scale survey research (Lorenzoni *et al* 2007) identified individual and social barriers perceived toward engaging with Climate change. Prominent within the research was that lack of action may emerge from external barriers, thus hindering ones own intended behaviour. For example, where individuals perceive that governments do not take responsibility and act upon climate change, they may chose to remain inactive as well. In particular the aversion of the US government in taking responsibility and their reasoning for not ratifying the Kyoto Protocol can be seen in this light. The ongoing debate on China's development path and its exemption from reduction targets for GHG emissions have caused the public to question whether reducing emission individually (or nationally) makes sense, as any benefits will be compensated for by emissions of the growing industry in China (and other developing countries). Lack of action by

business and industry is also criticised – in particular as these are seen to be the main contributors of climate change (Lorenzoni *et al* 2007).

Where personal efficacy affects individual behaviour, its roots can be found in societal issues, merging the distinction between an individual and their environment. Traditionally, efficacy beliefs within Social Cognitive Theory were applied at the individual level and referred to as 'personal efficacy' (Bandura 2000). The recent addition of 'Collective Agency' however, acknowledges that individuals cannot always have direct control over their behaviour. According to Bandura, (2000, p.75) 'People's shared beliefs in their collective efficacy influence the types of futures they seek to achieve through collective action, how well they use their resources, how much effort they put into their group endeavour'. This theoretical stance is particularly relevant with respect to climate change. Climate change is a social problem (Whitmarsh 2008) and to combat climate change, a collective effort is required. Low personal efficacy may be attributed to the absence of collective efficacy, explaining public failure to engage in climate sensitive behaviours at an individual level.

4.2 Values and Priorities

Whilst beliefs toward personal and collective efficacy present a hindrance to engagement with climate change at a behavioural level, they are not exclusive of other barriers. Even if people did believe that making lifestyle changes would contribute to a greener society, addressing climate change may not be of personal importance. Thus the issue is one of priorities. With relation to the CAB model, whilst individuals report that they care about climate change (affective response), this relationship will always be mediated by other ongoing priorities and threats. Research consistently points to climate change as a distance issue, i.e. the threat is not immediate (Lorenzoni and Pidgeon 2006; Lorenzoni *et al* 2007). It is often suggested that domestic and social issues, such as family or work commitments, present a more immediate priority than climate change (Whitmarsh 2005; Poortinga and Pidgeon 2003).

Additionally, climate change has to compete with other environmental issues, including traffic and pollution. Such problems impact the lives of individuals on a daily level, and are therefore perceived as a more substantial threat. Lorenzoni *et al* (2007) found that climate change was ranked seventh out of 13 environmental issues for concern, with less than 20% of respondents displaying explicit concern for climate change. This suggests that there exists a trade-off between climate change and other environmental problems. Adding to this deficit is the fact that the UK government emphasises a voluntary approach to climate change mitigation. Failure to reduce energy consumption does not result in a penalty, implying that barriers may result from the lack of enabling initiatives (Lorenzoni *et al* 2007). Considering these factors in combination, it is perhaps unsurprising that climate change mitigation has been so low.

4.3 Risk Perception

In addition to the other environmental concerns that may take priority, those who do see Climate change as an urgent problem face a difficult task in modifying their behaviour due to the level of

uncertainty surrounding the scientific predictions of climate change and therefore the risk that it poses. This uncertainty complicates the cognitive and affective aspects of engagement which thus has implications for behavioural responses.

The issue of climate change is uncertain since the exact effects and magnitudes of the problem are unknown. Despite this uncertainty, climate change is widely believed to pose a risk to individuals and society through the change of temperatures and increased frequency of climate related natural disasters (IPCC 2007). It is commonly assumed that individuals respond to daily risks that they perceive around them, for self-preservation and in order to achieve their optimal outcome. This, however, hinges on the individual's perception of the risk, rather than the basic economic or financial characterization of risk as an outcome and the probability of that outcome occurring (e.g. as in expected utility theory).

How individuals perceive risks is not necessarily as straightforward as the above definition. People do not always view probabilities in an objective way, with the common subjective inflation of small probabilities (e.g. buying house insurance against fire damage or playing the lottery). Work in decision theory has led to models such as Rank—Dependent Expected Utility (Quiggin 1982; Schmeidler 1989) and Cumulative Prospect Theory (Tversky and Kahneman 1992) to help explain these divergences in probability perspectives from expected utility theory.

Individuals are heterogeneous, not having the same backgrounds or knowledge, which will produce different perceptions and understanding towards risks. As well as personal criteria such as knowledge, beliefs and outlook, Pidgeon *et al* (1992) add that wider issues such as social and cultural values may also effect the perception of risk. These social variables will also contribute to informing individual preferences towards outcomes. These are important additions if a government aims to engage with the public on climate change. If they can help improve the social setting/values in which the public views climate change risk, this might then impact on carbon reduction behaviours.

Another issue in relation to risk perception is that there is the occasionally assumed discrepancy between how 'lay' members of the general public view risk and how 'experts' with a greater knowledge of the possibilities may assess risk. Lay risk assessments differ from experts in that the level of underlying knowledge towards a given situation is notably lower. This can lead to several instances where behaviour towards risk may seem comparatively illogical (Plough and Krimskey 1987). For example many individuals smoke, drive without seat belts, cycle without a helmet or binge drink, all of which pose a health risk. Conversely, there has been large anxiety towards the risk of terrorism and crime. This divergence may stem from differences in risk perception, which, as noted earlier, may be rooted in wider social values and beliefs. This divergence poses a potential barrier for engagement on subjects such as climate change.

4.5 Normative beliefs and habit

Responding to climate change is further confounded by the fact that mitigation requires changing behaviours which are habitual. Whilst previous discussion has focused on behaviour being a product

of rational process, many instances of environmentally harmful practices are performed without conscious awareness of the environmental implications. Many models emphasise the role of past behaviour as a determinant of future behaviour (Rachlin 1989). Moreover, a behaviour that is repeated over time becomes habitual. Its underlying processes are thus guided by autonomous cognitive functioning rather than a rational-decision making process (Aarts *et al* 2006). Stern (2000) identifies four factors believed to mediate environmental behaviour, one of which is habit. Bamberg and Schmidt's (2003) research on energy consumption identified habit as a prevalent factor in determining car use. Aviation and travel behaviour are large contributors to carbon emissions, yet many people do not explicitly consider this when organising a holiday. Greater importance is placed on factors such as cost, minimal travel time and weather (Hare *et al* 2010). We suggest that the role of habit and past behaviour may be implicated in the maintenance and prevalence of environmentally harmful practices. In particular, domestic energy consumption and travel behaviours may be driven by behaviour guided by automatic, non-deliberative processes of which an individual lacks conscious control. This presents a large problem to those who wish to address such barriers. After all, how do you inform behavioural change for behaviours that are performed largely autonomously?

Finally, linking with the concept of habitual behaviours, an overwhelming topic that has emerged from the literature concerns normative aspects of western social infrastructure (Lorenzoni *et al* 2007; Whitmarsh *et al* 2010). The extent of behavioural change required to combat climate change can be considered overwhelming for a society where regular long-haul holidays, multiple cars and limitless consumption are the norm. For many, a lifestyle outside of this norm may be considered difficult to comprehend, particularly given that an individual's consumption and their social identity are intricately linked (Beattie 2010). Hargreaves (2011) has proposed the application of social practice theory to understand the extent of the challenge (no less than reorganising normal everyday life) and develop appropriate strategies.

5. Summary and conclusions

There exists widespread acknowledgement that public engagement is needed to achieve climate change targets. The UK public at large is aware of climate change and there is evidence to suggest a desire to act. In order to further engage the public with climate change, the public must be enabled with the 'tools' to change behaviours by overcoming the barriers to engagement. Through a psychological perspective, the CAB Model is used as a framework to analyse a variety of individualistic behaviours combined with those that are rooted in cultural norms. This review has shown that cognitive; affective and behavioural barriers contribute to the maintenance and prevalence of environmentally harmful behaviours. Subsequently, the complexities of these variables need to be considered when attempting to foster engagement through activities and interventions. With reference to behavioural economics, we have identified how the uncertainties of risk perception may limit the behavioural response toward Climate Change mitigation efforts.

We argue that interventions such as MCL designed to encourage carbon reduction behaviour change should avoid relying on an 'information deficit' approach to behaviour change, as this is unlikely to deliver on achieving change. Equally, interventions that focus exclusively on attitude change should

be avoided, as attitudes are often inferred from, rather than preceding, behaviour. Interventions should attempt to target the key barriers outlined above; efficacy beliefs, values and priorities, risk perception, habit and norms. Individuals should believe that behaviour changes will contribute to reducing emissions. They should also feel that the effort is collective, so interventions with a community feel should be encouraged. The importance of achieving emission reductions should be highlighted, although guilt is not recommended as a method to help prioritise carbon reduction. While 'scare-mongering' should also be avoided, in order to act individuals need to perceive that climate change and its consequences present a real risk. Breaking bad habits and forming new ones is difficult, but with the right tools achievable. Finally, 'green' should be presented as the norm, rather than niche. In doing so, behaviour will become internalised, less 'effortful, and, new habits will form.

Appendix 3: Assessing effectiveness of the Manchester Carbon Literacy (MCL) programme using implementation by the Manchester Adult Education Service (MAES) as case study

1. Research Aim

Undertake an initial analysis of the effectiveness of the MCL model and lay the groundwork for future research

2. Research questions

1. How is the MCL theory of change understood by stakeholders? Is the understanding uniform? If not, where are the discrepancies and what do they mean?
2. How is the logic model being operationalised within the MAES pilot project?
3. What are the motivations for an organisation's participation in MCL?
4. How does the MCL model of behaviour change compare to existing models of behaviour change? How does it address the barriers described in the literature review? How effectively do its multi-channel and cascading approaches work? What different types of leadership are necessary for its success?
5. How does the training (measurably) impact on knowledge, attitudes or behavioural intentions in relation to carbon reduction behaviours?
6. What are the indirect and unexpected outcomes? (such as increased self-esteem and engagement of disenfranchised groups, which can also have socioeconomic effects)
7. How is the MCL training perceived by participants and those around them?

3. Research design

The empirical research will address the above questions using a qualitative research design that includes a case study of the operation of MCL by MAES. Methods employed include content analysis of documents, questionnaires, semi-structured interviews, and participatory observation.

3.1 Case Study Approach

The research questions associated with this project are primarily 'how' questions: How is the MCL programme articulated and applied? How does it impact on values, attitudes and behaviours? Case studies are appropriate for seeking answers to these questions because of the opportunities they provide for in-depth description of social phenomenon (Yin, 2009). A case study approach is also indicated by the following characteristics of the research: the researcher has little control over events and the focus is on contemporary phenomena within a real life context (Ibid.)

3.2 Data collection techniques

Document Review

Documents related to MCL provided by Cooler and MAES will be reviewed with a focus on their alignment with the logic model and with other models for behavioural change.

Questionnaires
Questionnaires prepared by Cooler, MAES or by researchers will be analysed in the context of the research questions.

Semi-structured interviews with programme managers, trainers and trainee-trainers
These are interviews where questions are pre-determined by the researcher but open-ended. This allows participants to respond in their own ways and emphasise the things that they feel to be important. The interviewer also maintains the flexibility to pose some additional or different questions in order to pursue lines of inquiry opened up by the respondent (Longhurst, 2009). Interviews lasting up to one hour will be carried out with two Cooler stakeholders; two MAES staff; one trainer; up to five trainee trainers and four learners. *Recruitment:* Cooler staff is being consulted about appropriate organisations and individuals to contact. E-mail messages will be sent or phone calls made to potential respondents asking about their willingness to participate in an interview. If they express interest, they will be sent a participant information sheet and a consent form and an appointment will be made for the interview.

Interview structure: Each interviewee will be asked to participate in an interview lasting up to one hour (possibly accompanied by a 15-20 minute telephone call either earlier or later in the process). Before the interview begins, respondents will sign the consent form declaring that they understand the project and agree to participate in an interview and specifying how they should be recorded and cited (see below). At the beginning of the interview, they will be asked to describe the work of their organisation and/or programme and their own role and/or the context in which the received the training. Further detail regarding the interview schedule is presented in section 2.5.

Recording and follow-up: These interviews will be taped with written permission from the respondents. The researcher will also take notes and transcribe a summary of the interview soon after it takes place. Respondents will be asked if it is acceptable to identify points they make and/or quotes by their job role. They will be given the option for all their information to be made anonymous if they prefer. Programme managers will receive a report on the research findings, which will hopefully be of use to them in their work, at the end of the research project.

Participant observation
The researcher observes participants involved in activities at the site while actually taking part in these activities. Participant observation requires that the researcher becomes part of the group that is the subject of research. She should spend time with fellow participants, engage in their activities and immerse herself as much as possible in their experiences and meaning systems. Observations are generally recorded through field notes (Walsh, 2009).

One of the researchers will attend the MAES training session and efforts will also be made to observe training delivered by trainee trainers. The researcher will take notes during the training and transcribe a summary of observations soon after it takes place. Recorded observations as well as training material will be analysed with respect to their alignment with the logic model and with other models for behavioural change.

3.3 Analysis

Primary data will include interview transcripts, field notes from participant observation and documentation related to the initiatives. Secondary data will include background information about the context of the case study.

Qualitative approaches will be used to analyse this data. Phenomena and themes will be identified, coded and categorised; relationships among them, including causal mechanisms, will be explored (Blaikie, 2000).

This data will be managed using Dedoose software, which is an appropriate tool for storing and organising data from a variety of sources, and for identifying relationships among data. Use of Dedoose will help to link different levels of analysis and identify recurring words, phrases and phenomena, which can then be classified and coded. Once patterns of association among codes become apparent, they can be categorised as conditions or outcomes and sometimes both.

Participants

Participants are members of one of two organizations. The first is the Manchester Carbon Literacy project (MCL). Born against the backdrop of climate change, MCL has been developed in order to help meet the objectives of Manchester City's low carbon action plan **'Manchester- A Certain Future'** (MACF), which was drafted in 2009. This plan outlined two key objectives. The first, to achieve "41% reduction in emissions by 2020", hinges on the second, arguably more difficult aim, to "create a low carbon culture." To help meet the second objective, MACF has proposed a goal to offer every individual who lives, works or studies in Manchester the opportunity of one days Carbon Literacy training. MCL is the result. Manchester City Council funded the initial development of MCL undertaken by Cooler, a social enterprise which "works to stimulate ideas, act as an advocate and encourage and facilitate action on climate change, to deliver a low carbon future to the communities of Manchester and beyond". Cooler, the client, are now responsible for co-ordinating and implementing the project across Manchester.

The participating organisation is the Manchester Adult Education Service (MAES). MAES is a Manchester City Council initiative that provides access to learning courses across a range of subjects including personal and social development. The service also provides job seeking support and learning support for those with learning difficulties or disabilities.

Participants fall into one (or more) of the three categories outlined below. For example, many participants within our sample are learners as well as trainers of the MCL programme.

1. Organisational stakeholders
2. Trainers
3. Learners

Interview schedule

Figure 1 schematically depicts the planned interview structure. Level 1 illustrates the interview structure at the organisational level. We aim to interview two stakeholders from each organisation. The primary objective of stakeholder interviews is to determine:

a. To what extent the Theory of Change (as identified in the logic model) is uniformly understood and operationalised by different stakeholders
b. MAES' motivations for participating in MCL, how they perceive the nature of their commitment, what they expect to get from the programme and how they expect to contribute for successful implementation

It is anticipated that Level 1 data will allow the researchers to identify any discrepancies in the way that the logic model is understood by different stakeholders, as well as evaluate how the initial commitment and expectations of the participating organisation affects the long term impact of the programme

Level 2 in Figure 1 represents the interview structure for trainees and learners. As shown in the diagram, we aim to interview the initial trainer, five MAES educators ('trainers') and two learners from at least two MAES sessions, providing a total of nine interviews. Interviews conducted at the middle row (Figure 1, Level 2) present a unique opportunity to identify any changes which occur during the transition from a learner to a trainer.

The objectives of the trainer/learner interviews are to identify:

a. The impact of training on knowledge, attitudes or behavioural intentions in relation to carbon reduction behaviours
b. Whether expectations about the training differed to the reality
c. How the trainers modified their delivery of the training compared to how it was received (researcher observations will provide further evidence of any differences that arise between the transition from learner to trainer)
d. Perceptions of significant others' views of MCL participation
e. Evidence of 'spreading the message'

N.B. The interview questions that follow serve as a guide rather than a script; interviews will be open-ended and questions will be adapted based on the situation of the interviewee and on responses to previous questions.

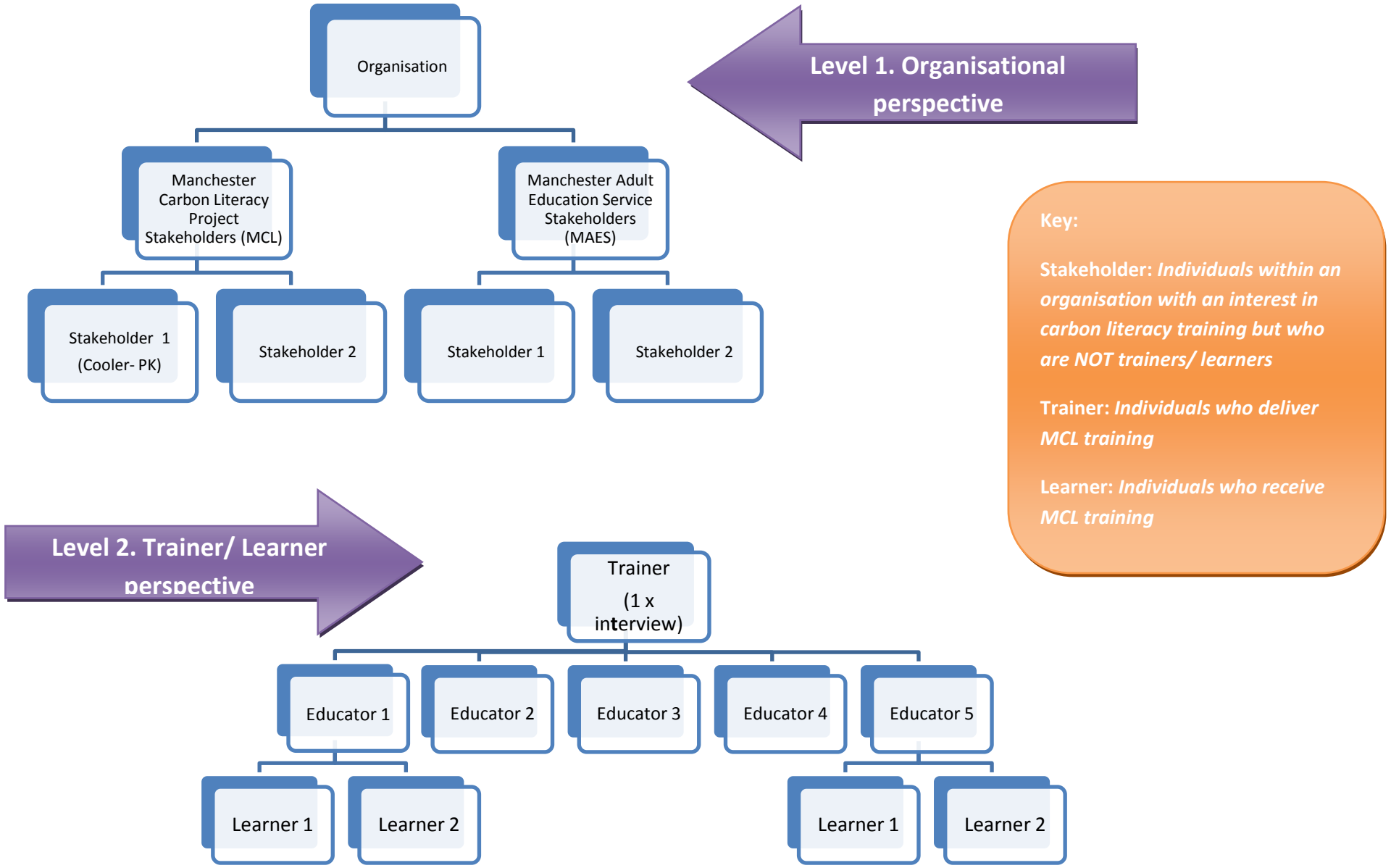
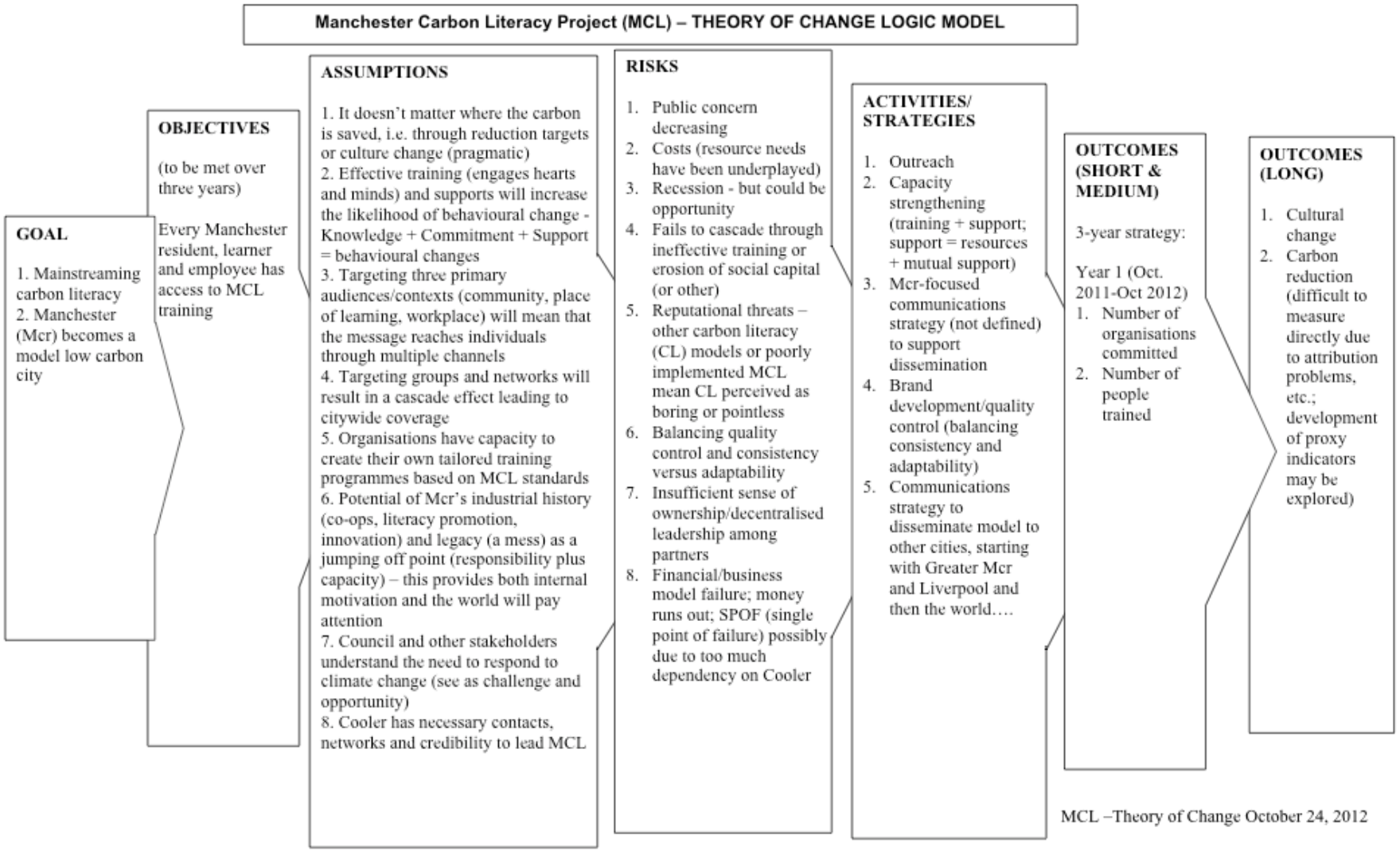


Figure 1. Interview design for stakeholders, trainers and learners involved in MCL

Level (1 or 2)	Interview question(s)	What research question does this address	Relevance to MCL objectives (identified in logic model)
1	How would you describe the Manchester Carbon Literacy programme?	RQ1	*All (understanding of logic model)*
1	What role do you think your organisation can play in achieving its goals	RQ2	*All (understanding of logic model)*
1	Why did your organisation sign up to MCL? What factors were involved?	RQ3	Sign-ups fundamental to success
1	How do you perceive the nature of your organisation's commitment?	RQ3	Sign-ups fundamental to success
1	What are the benefits to your organisation of becoming involved in MCL? Are there any?	RQ3	Sign-ups fundamental to success & cascade effect leading to citywide coverage
1	What might attract other organisations to sign up?	RQ3	Cascade effect leading to citywide coverage
1 & 2	What do/ did you expect to gain from becoming involved in MCL? Have these expectations been met?	RQ3	Quality control of MCL, nature of sign-ups
1 & 2	How has your organisation's involvement in MCL affected you personally?	RQ2	Evidence of carbon literacy
2	How has your knowledge of climate change /sustainability/ carbon reduction changed/ improved as a direct result of the training? Can you provide specific examples?	RQ4	Knowledge and support will lead to behaviour change
2	Have your attitudes towards climate change / carbon reduction/ sustainability changed as a result of the training? Can you provide specific examples?	RQ4	Effective training and support will lead to behaviour change
2	Have you formed any specific intentions to change your behaviour?	RQ4	Effective training and support will lead to behaviour change

2	Do you think other people will change their behaviour in response to the training?	RQ4	Effective training and support will lead to behaviour change
2	What actions have you taken in the last three months as a result of the training? i.e. examples of specific actions, spreading the message etc.	RQ4	Effective training and support will lead to behaviour change, spreading the message
2	Have you spoken to friends/ family/ colleagues about your involvement in MCL?	RQ5	Spreading the message
2	How do (you think) family and friends & colleagues view your participation in this programme? Would they be willing to participate themselves?	RQ5	Effective training results in cascading effect of MCL
2	What expectations, if any, did you have regarding receiving/ delivering the training?	RQ5	Risk of MCL training delivered poorly
2	How did your perceptions and expectations of receiving/ delivering the training differ to the reality	RQ5	Risk of MCL training delivered poorly
2	How does your delivery of the training differ to the training you received? Can you provide specific examples?	RQ5	Risk of MCL training delivered poorly


Manchester Carbon Literacy Project (MCL) – THEORY OF CHANGE LOGIC MODEL
GOAL
1. Mainstreaming carbon literacy
2. Manchester (Mcr) becomes a model low carbon city
OBJECTIVES
(to be met over three years)
Every Manchester resident, learner and employee has access to MCL training
ASSUMPTIONS
1. It doesn't matter where the carbon is saved, i.e. through reduction targets or culture change (pragmatic)
2. Effective training (engages hearts and minds) and supports will increase the likelihood of behavioural change - Knowledge + Commitment + Support = behavioural changes
3. Targeting three primary audiences/contexts (community, place of learning, workplace) will mean that the message reaches individuals through multiple channels
4. Targeting groups and networks will result in a cascade effect leading to citywide coverage
5. Organisations have capacity to create their own tailored training programmes based on MCL standards
6. Potential of Mcr's industrial history (co-ops, literacy promotion, innovation) and legacy (a mess) as a jumping off point (responsibility plus capacity) – this provides both internal motivation and the world will pay attention
7. Council and other stakeholders understand the need to respond to climate change (see as challenge and opportunity)
8. Cooler has necessary contacts, networks and credibility to lead MCL
RISKS
1. Public concern decreasing
2. Costs (resource needs have been underplayed)
3. Recession - but could be opportunity
4. Fails to cascade through ineffective training or erosion of social capital (or other)
5. Reputational threats – other carbon literacy (CL) models or poorly implemented MCL mean CL perceived as boring or pointless
6. Balancing quality control and consistency versus adaptability
7. Insufficient sense of ownership/decentralised leadership among partners
8. Financial/business model failure; money runs out; SPOF (single point of failure) possibly due to too much dependency on Cooler
ACTIVITIES/ STRATEGIES
1. Outreach
2. Capacity strengthening (training + support; support = resources + mutual support)
3. Mcr-focused communications strategy (not defined) to support dissemination
4. Brand development/quality control (balancing consistency and adaptability)
5. Communications strategy to disseminate model to other cities, starting with Greater Mcr and Liverpool and then the world….
OUTCOMES (SHORT & MEDIUM)
3-year strategy:
Year 1 (Oct. 2011-Oct 2012)
1. Number of organisations committed
2. Number of people trained
OUTCOMES (LONG)
1. Cultural change
2. Carbon reduction (difficult to measure directly due to attribution problems, etc.; development of proxy indicators may be explored)
MCL –Theory of Change October 24, 2012

Appendix 4: References

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