The Social and Cultural Dynamics of Total Carbon Footprinting in Greater Manchester: An Ethnographic Report

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1. Introduction

In 2009, Manchester City Council endorsed the city's stakeholder climate change action plan 'Manchester, A Certain Future'. The plan included a commitment that by 2013 the city would be measuring its carbon emissions using a total carbon footprinting approach. In 2011, Small World Consulting were commissioned to produce a study of the total carbon footprint of Greater Manchester. This illustrated both that the city's total carbon footprint was significantly larger than the levels of carbon emissions captured by measurements of direct emissions, and that reducing Greater Manchester's total carbon footprint would require intervention into new areas of activity beyond the work that was already being done on energy efficiency in the areas of buildings, transport and energy. A second report is currently being conducted by Small World Consulting, which will draw up policy recommendations on the basis of the 2011 total carbon footprinting work. The work presented here is meant as a complement to the technical and policy analysis already conducted by Small World Consulting and Manchester City Council.

The total carbon footprinting approach makes clear that there are some fundamental drawbacks to the current method of measuring only the city's 'production based' CO2 emissions. Total carbon footprinting makes visible the carbon producing effects of all activities that are undertaken by Greater Manchester residents. No longer including only fuel and electricity used within the boundaries of the city (scope 1 and scope 2 emissions), total carbon footprinting accounts for the emissions of all fuel and electricity used by Manchester residents as well as emissions produced in the course of the production and transportation of all goods and services consumed within Manchester (scope 3 emission). Unlike production-based emissions accounting which uses the territorial boundary of the city as a limit whereby only the fuel and electricity used within the boundary become the responsibility of the city, total carbon footprinting requires that citizens, companies and authorities take on a much larger responsibility for the knock-on environmental effect of their consumption choices.

Total carbon footprinting thus appears to be a logical and equitable way of measuring environmental responsibility. Nevertheless, there still exists much skepticism over the viability of this methodology for providing a basis upon which the city and its residents might reduce their carbon footprint. The aim of this report is to explore the manifestation of, and reasons for, possible skepticism toward and potential enthusiasm for carbon footprinting through an analysis of the social and cultural significance of total carbon footprinting methods.

Rather than assuming that total carbon footprinting is a neutral technique which if executed properly and accurately, will produce information that will direct action, this report focuses on the broader role that total carbon footprinting plays as a *socially significant tool*. The report builds on an anthropological understanding of the way in which tools are part of the way in which people bring about changes to their environments and their worlds.

Anthropologists have long been interested in the way in which tools have multiple and context specific functions. A hammer is designed for hitting nails but it can also have a range of other purposes. For example, it can be used for extracting nails from a plank, for splitting wood, or for measuring distance. As well as a variety of material

uses, hammers also have multiple and context-specific social or symbolic functions. They might stand as a symbol of masculinity, a way of showing membership of an occupational community, they might be a treasured heirloom or something you lend a neighbour in an act of goodwill. 'Culture' is a concept that draws attention to the specific way in which generic tools are interpreted and used in particular settings.

It is in this vein that this report approaches total carbon footprinting as a culturally significant tool. The report thus aims to explore:

a) what are the various materially transformative functions which people who are considering using this method in Manchester hope that it might have?

b) what are the specific social or symbolic functions that it is imagined that total carbon footprinting might offer vis-à-vis other reporting methods?

2. Methodology

This report is based on research that was conducted between September 2012 and March 2013. The research used qualitative methods to investigate the way in which total carbon footprinting was being represented, discussed, and investigated by various different stakeholders within Greater Manchester. The research comprised:

1. Participant observation of two workshops which aimed to explore a) the policy implications of total carbon footprinting and b) current research and policy requirements within the broader field of climate change and consumption.

2. Eleven interviews with stakeholders from a range of public and private sector organisations working in Greater Manchester who are developing, using, or are aware of the method of total carbon footprinting.

3. Several informal meetings with members of the city council environment team about the benefits and pitfalls of total carbon footprinting.

4. Review of 'grey' literatures on total carbon footprinting, including the 2011 Small World consulting report produced for Greater Manchester.

The research findings are also contextualized within a 14-month ethnographic research project which has been looking more broadly at cultural dynamics at play in the work being conducted to reduce Manchester's carbon emissions.

Participant observations of the two meetings were written up as field notes, and the interviews were all recorded and transcribed. Notes, transcriptions and grey literature were analyzed and coded deductively to arrive at the report findings.

3. Findings

As explained in the introduction to the report, total carbon footprinting is approached here as a tool which has potentially many different functions and many different values associated with it.

3.1 The Primary Purpose of the Tool

The ostensible purpose of total carbon footprinting as it was developed for Greater Manchester has been to provide better and more realistic data on carbon emissions that can be used as the basis for economic policy development. In the 2011 Small World Consulting report, the authors argue that total carbon footprinting has the potential both to provide 'a framework for policy development' and will allow Greater Manchester to 'anticipate policy developments'.

The total carbon footprinting project has already begun to make inroads into these two aims, identifying, for example, food and waste as two key areas for policy development. This report will not reiterate the work that has already been done on identifying 'impact' or policy areas. Instead, this study is more focused on the *extent* to which total carbon footprinting appears likely to be able to influence policy decision making, and the potential kind of policy mechanisms that might be most appropriate for pursuit of actions to support the development of these areas. To understand this, we need to first consider other ways in which the range of ways in which the value of the tool of total carbon footprinting is being discussed in Manchester.

3.2 A Tool for Improving Trust

One of the most important effects of Total Carbon Footprinting that was articulated in interviews was the role it can play as a mechanism for producing relations of *trust*.

As one of the interviewees for the research put it:

'As with the whole climate change agenda for everyone on every scale, an awful lot boils down to who do you trust and how do you make up your mind about who to trust, and do you have a good enough basis for making your mind up about who to trust? And that goes down to the punter on the street, trying to make up their mind as to whether global warming is real or not…We need better faculties for working out who to trust than we're used to - it's not about whether or not someone is wearing a suit. It's not about whether they have a persuasive tone of voice. It's not about whether they can cite papers, because anybody can say, 'oh I have cited an academic'. It's not about whether they have got the word 'professor' in front of their name. There is more to it than that. And it is quite subtle and there are a whole mix of factors.'

Several interviewees felt that total carbon footprinting could be a useful tool for improving public trust.

During the October 2011 workshop, one of the presenters discussed a game that they played in the development of the total carbon footprint, called the 'windfall game'. In the windfall game, people are asked to rank different objects and activities in terms of

their carbon footprint. The presenter said that 'no-one put flights at the bottom of the list'. His point was that under a production-based method of carbon footprinting flights are not included in territorial emissions calculations. If participants had been asked to rank objects according to their current territorial emissions footprint, flights would indeed have come at the bottom of the list. The presenter suggested that counter-intuitive anomalies in currently forms of carbon accounting risk can be at best confusing and at worse the basis for the generation of mistrust.

The use of the example of flights used in the October workshop was particularly appropriate within the Manchester context. The airport has been a perennial point of contention in Manchester when it comes to discussions about carbon emissions reductions. It is commonly explained that landside emissions (those produced by the airport operations) are included in the current footprint of Manchester and that airside emissions on the other hand (flights etc.) are not. Whilst there are specific reasons why airline emissions are not included either in city or national emission statistics their omission has been a constant source of *mistrust* by environmental pressure groups with regards to the real intentions of public authorities.

In contrast, with total carbon footprinting flights are ranked according all the emissions they entail. This includes not just the fuel burned when the plane is flying, but a proportion of the emissions that are produced in the manufacture and maintenance of the aeroplane and the running of the airline. By getting rid of the arbitrary territorial boundaries of production based emissions reporting, total carbon footprinting appears to have the potential to resolve some of the confusions associated with the current techniques of carbon measurement. Because total carbon footprinting draws attention to the actual emissions of any activity, the presenter at the October event argued that it is seen by people as highly intuitive. As another interviewee who was otherwise quite skepitcal about the usefulness of the tool put it:

'Ultimately it has to be right – that if I'm eating a McDonalds burger I think about where the carbon comes from – not that I eat McDonalds burgers by the way. So I get it and it has to be good in that it is thinking about things in a holistic way and all my brain is wired to think about things in a holistic way – way people live their lives - it's the only way you can make decisions about things.

Because of the intuitive nature of the findings of the total carbon footprint, the tool is understood to have the potential to engender greater levels of trust between those who are producing the figures and those to whom the figures are directed.

Although the example of the airport is particularly pertinent to Manchester, the issue of trust is a generic feature of total carbon footprinting. In the transcription of a House of Commons Committee meeting where members of the council were asked to give evidence to the Committee on Energy and Climate Change on the potential of total carbon footprinting measurement, one of the participates stated that:

'*Total Carbon Footprinting is an honest way of reporting carbon emissions'*.

Total carbon footprinting is however, not immune to criticism over measurement. There is much acknowledgement that footprinting is rarely exact. Part of the process of engendering trust is working out how to deal with the inexactitude of carbon measurement:

'*What is more important than exactitude is direction of travel – if you are open and honest and say it is not an exact science, but it is an honest science'*.

Therefore, in order to avoid potential criticism regarding accuracy of the figures, the current method of TCF being proposed within Manchester has been chosen in part because it is highly **transparent**, using only publicly available data to make calculations.

'Yes, transparency…the climate change agenda got really hammered with the Univerisity of East Anglia sort of data and emails and things like that and poor comms and sloppy internal language and I think that transparency is the only way of doing that - and then you can put your data out for peer review and people can look at it and make their own decisions. It is much harder, even if it is transparent, to actually put a negative piece out if it is a biased piece because it is much easier for people to address it. They can say actually, that is not the case and you haven't looked at the right data and this is why you haven't done it. Whereas if it is leaked and it is not in the public domain..you know.'

By being transparent, several interviewees stressed that method makes itself available for interrogation and development as more detailed and accurate data is made available over time.

Another way in which trust is being generated is by ensuring that the figures that are arrived at are also **conservative.** As one interviewee put it:

'The ballpark we provide is always about 20% less the savings figures we arrived at. I always joke that if we were in the states it would be the other way around... We are not trying to oversell'.

Similarly, the total carbon footprinting methodology used by Small World Consulting to estimate supply chain emissions from industries based overseas, works on the assumption that the emissions of overseas industries are equivalent to those in the UK. Given that the UK has been one of the leaders in reducing territorial production emissions, the assumption that even developing countries have the same track record as the UK is a conservative assumption. Ensuring figures are conservative is also intended to improve trust. It protects the calculations against the accusation that they might be driven by politics rather than pragmatics. By remaining committed to a method that is as exact as possible, that is transparent and that is conservative, the aim is that this tool will be able to improve people's trust in the numbers that such reporting methods produce.

Total carbon footprinting cannot alone engender trust between citizens and organizations like Manchester City Council. However using a total carbon footprinting method that is transparent, conservative and as exact as possible appears to position total carbon footprinting as a powerful tool in engineering improved relationships of trust between organizations and citizens.

3.3 A Promotional Tool

With the standard way of measuring carbon emissions coming under criticism for being untrustworthy or dishonest, total carbon footprinting was suggested by many interviewees to be a means of marking out those organizations that are genuinely committed to a green agenda. Green credentials are becoming an increasingly popular means by which organizations can market themselves as ethical organizations. Although there has been some criticism of the way in which some organizations have promoted themselves as green companies whilst failing to change their practices in order to avoid charges of greenwashing (e.g. Shell is often held up as a good example of an organization that has been involved in practices of what is sometimes called 'greenwashing'), total carbon footprinting was seen by various interviewees as a potential means of making their claims to be a green organization more robust.

Manchester City Council's exploration of Total Carbon Footprinting to date is a good example of the way in which the development of this methodology has been part of a series of moves which has already begun to located Manchester as a key player in national policy making on green issues. In the 2011 Small World Consulting report on total carbon footprinting, the authors point out that:

'Comprehensive local responses to climate change are a relatively new development. GM is currently working with the Department for Energy and Climate Change (DECC) to pilot methodologies for a Local Carbon Framework approach. A place- and consumption- based policy framework is some years away, and GM is in a position to establish the template. Only a handful of authorities have this perspective on their radar'.

'At city level, the mayor of London has committed to 'establish a methodology to measure London's Scope 3 emissions'. Acting on its measurement would put GM at the vanguard among UK cities'.

'National policy has also begun to recognize consumption emissions: the Coalition Government's Carbon Plan commits to gather evidence on this, and to act on the most significant categories of emission, where UK consumption creates emissions elsewhere.'

Whilst these are laid out in the report as indicators of the way in which Manchester might be able to influence policy decision making, they also illustrate that environmental concerns have become powerful contemporary *cultural* preoccupation, symbolizing *innovation*, *enlightenment*, and a *capacity for forward thinking*.

This was particularly clearly illustrated by descriptions provided by one interviewee of the work being done by the Cooperative Group. The Coop have recently completed the construction of their new flagship headquarters in Manchester City Centre. The building is set to be the highest BREAM rated building in the world, and involves a range of innovative techniques and technologies for achieving exceptional levels of energy efficiency. The building is also designed to be future-proofed against predicted changes in the weather due to climate change. During an interview, a Coop employee explained the decision to build an ecologically sustainable building:

'It wasn't such a massive decision because people sort of assume that is what we should be doing. It is beginning to get embedded in the co-op rather than being something special.'

'When we built the tower next door it was the highest building in Manchester with eight stories. So we took the architects and engineers around and stood at the top of that building, and said look, that was designed in the 50s, and said, right, if you were going to do a big ambitious building in the 1950s, a skyscraper was the thing you would do – and that was the highest office block in Europe. So we said right, with today's attitudes and problems, what is a similarly ambitious project?...well we've got to build the greenest one!'

Total carbon footprinting was frequently referred to as a potentially useful tool for assisting in attempts to improve organizations' green credentials:

'Clearly if you are in the transportation industry - there are efficiencies you need to strive for. It's very mathematical then - you have got your straight correlation between what is the cost of being more effective to the payback. Or then do you start actually seeing a really distinct marketing benefit in being seen as at the forefront of environmental good practice in that respect. And some do. Stagecoach had [all offers] a year ago for some fantastic work that they had done. And you'll get some cynics saying that they had to, didn't they. Well yes, but they didn't have to do it to the extent that they did, because they understood to their branding to be seen to be really proactive and not to just go up by the lowest common denominator. Every time that bar is being raised'.

In addition, total carbon footprinting was also highlighted as a tool that might help to ensure that claims to sustainability were not undermined by not paying attention to the carbon impact of activities that have conventionally remained outside direct emissions measurements. In the House of Commons Transcript, one participant pointed out, for example, that

'On supply chain, a lot of it has been around the reputational impact of getting it wrong in the supply chain, and the damage that that has on the brand'

3.4 A Tool to Improve Efficiency

Whilst green-marketing is key for some companies and public sector organizations and is becoming an increasingly mainstream way of demonstrating an organization's commitment to social responsibility, green marketing still appeared in the interviews as a matter of a particular kind of corporate identity and organizational choice. Not all organizations are interested in marketing themselves as green, or doing so in the same way:

'You can't generalize, One, it depends on what their own aspirations are. So, a company like Siemens has obviously a big part of its business is geared towards low carbon industries. But again they will have another part of its overall business which will have its own CSR policy, of which environmental performance, environmental housekeeping and being a good neighbour is part of it. Now you can get very different iterations of that - it is not all related to size of companies. You will also get very

small companies who will have well developed CSR policies but possibly won't even put that label on them. You see, what we must not do is make sweeping judgments - what you can say is that most involved policies will come from the bigger companies, naturally, because they will have the resources more available. And of course, they will also come at it - it doesn't mean it is a bad thing - from a reputational perspective as well.'

In this respect, we might say that green marketing is an *available social position*, rather than a basic cultural preoccupation. In contrast, a ubiquitous concern that emerged from the interviews as lying at the heart of all contemporary organizations is the financial viability of the corporation or organization as a functioning entity. Whilst green marketing has become a means of demonstrating a *particular* version of a commitment to social responsibility, it is unlikely that the enthusiasm for embracing generalized responsibility would have occurred under contemporary conditions if it did not *also* lend itself to further emphasizing the financial management of any organizational entity.

Financial management is so ubiquitous a concern that it is usually understood as an abstract, technical process, rather than a cultural issue. However, financial management can also be seen as a key contemporary cultural preoccupation. For example, financial management participates in the re-creation of a belief in the formal qualities of economic relationships. It enables people to make value judgments about what activities it is necessary for them to pursue on a day to day basis. It involves imaginations of what the future might bring and memories and interpretations of past experiences. It shapes the way in which people and organizations evaluate success and failure and raises questions about what other kinds of successes and failures cannot be recognized when the primary measure of value is financial.

Given that financial management is thus a *core contemporary cultural preoccupation*, it is perhaps unsurprising then that an important role that total carbon footprinting is deemed to have is the capacity to *improve* organizational finances. Total Carbon Footprinting, like production based carbon measurement, was highlighted in several interviews as a tool which can assist in making businesses operate more efficiently. In the case of direct carbon emissions, efficiency drives have been focused on the cost savings that can be achieved through reductions in *energy use*. Total Carbon Footprinting expands the realm of efficiency to reconceive of efficiencies as being not just about energy but about *all resource use*.

Total carbon footprinting therefore has the potential to massively expand the fields within which efficiency savings can be made. Reconceiving of businesses as users of resources, total carbon footprinting draws attention to where resources come from, how resources are used within the business and what happens to resources when they leave the organization. In terms of organizational efficiencies, the primary area of concern is how resources are used within businesses.

With regards to this issue, total carbon footprinting was described by several interviewees as a tool which is beginning to be used to analyze business practices to help reveal inefficiencies and engineer the most efficient use of resources. An increased awareness of energy expenditure has already led to broader organizational changes which emphasize efficiency (e.g. new ways of working and implementation

of new technologies). Interviewees expected that total carbon footprinting could assist in further emphasizing a focus on organizational efficiency.

Enworks, for example have been assisting organizations with resource efficiency. They have used footprinting methods to help companies reduce their use of resources. Enworks approach the question of resource efficiency from the bottom up (if you reduce x amount of paper, it will save you x amount of carbon and x amount of money), rather than working with top down measures (an aim for an overall level of carbon or cost reduction for a firm). By working with a bottom up method of measuring total carbon reductions, the act of measuring carbon emissions remains closely linked to decision making about what carbon reducing activities to pursue:

'*the key thing about measurement is the importance of measuring something that has a causal relationship with what you are doing'*.

The power of total carbon footprinting as a method of achieving resource efficiencies requires a bottom up way of measuring potential savings. This is contrasted to a top down method of measuring carbon emissions, which is the method being used by Small World Consulting. The difference in methodology potentially poses a disjuncture between the usefulness of top down method of total carbon footprinting which can help the ambition of a city like Manchester to demonstrate its commitment to carbon reductions, and the kinds of measurement methods needed to determine which areas of action are a) most important and b) most realistic. This raises the important question of whether the current model of Total Carbon Footprinting developed by Small World Consulting allows for the measurement of activities that have 'a causal relationship with what the city is doing'.

3.5 A Tool for Questioning the Limits of Financial Management

Whilst the role of total carbon footprinting in reducing resource efficiency was seen as an important aspect of the tool, many interviewees also suggested that total carbon footprinting could not achieve resource efficiencies on its own. Financial efficiencies was not in itself a strong enough cultural argument for deploying a total carbon footprinting method of analysis. For these interviewees, total carbon footprinting also raised fundamental questions about whether financial management is the best method of achieving social and cultural goals. A number of interviewees suggested that total carbon footprinting is a tool that allows them to questions about the *limits* of current methods of measuring organizational success, and that it allowed them to begin to think about what other measurements might be more appropriate.

Several interviewees noted that whilst efficiency savings were generally seen as a good thing, many organizations are driven by other competing preoccupations. These included: anxiety and frustration over adherence to regulatory standards, anxieties over the expenditure of limited capital reserves, and lack of time to think about efficiencies as compared to other issues such as developing new business.

Pursuing efficiencies was not an automatic response to demonstrations of potential savings. Encouraging firms (and householders) to embark on achieving efficiencies and to remain committed to the project of being efficient required *ongoing normative social pressure.* For the resource efficiency organization Enworks, for example, this

took the form of the establishment of a long term relationship between their partners who carried out the resource efficiency analysis and the firms who were being provided with information about measures that they could implement.

In one interview, it was explained that the database used by one organization, for logging suggestions of what resource efficiencies might be deployed, purposefully retained all the information about those measures which had been suggested as potential sources of efficiency savings, including those that were considered not viable at the time of implementation. The purpose of keeping this information visible was to retain a constant pressure and reminder to companies that they could, and probably should be doing more to improve their resource efficiencies.

Given the acknowledgement that pursuing financial efficiencies is often less important for firms and individuals than other ways in which they might invest their time and resources, several interviewees reflected that tools like total carbon footprinting had the capacity to raise fundamental questions about the cultural supremacy of financial measures of success. Several interviewees commented that total carbon footprinting raised complicated questions about whether the measure of GVA – the dominant method of measuring the success or failure of urban development policies, was the best or most appropriate way of measuring the city's progress.

Foundational arguments about the value of Total Carbon Footprinting tend to argue that Total Carbon Footprinting offers a way of contributing to GVA. During the October workshop one of the presented suggested, for example, that total carbon footprinting potentially had the capacity to improve the city's GVA. However in contrast, those who were interviewed for this research emphasized less the way in which total carbon footprinting could contribute to GVA and focused more on the capacity of the tool to demonstrate the limits of GVA as a measure of success.

'GVA just allows you to compare GVA in one city to another city. But you could have one city that is doing it in a completely sustainable way, and you could have another city that is doing it on brown coal and child labour - but GVA would still look the same. It tells you nothing about how, just, the absolute…I have used the phrase many times - when people were in their teens looking at what they wanted to do in their life, nobody stood up and said 'I want to increase GVA by 3.4% above the baseline', that is not what drives us, when we are younger and it is not what drives us on a day to day level but yet we use it as a performance measure.

Whilst total carbon footprinting was thus seen as potentially beneficial for generating resource efficiencies, it's utility was also deemed to lie in expanding current ways of determining how to measure value.

3.6 A Tool for Protection

One of the key benefits of the tool that was discussed in interviews was its capacity to raise awareness of people's embeddedness in unpredictable globally interconnected systems.

At least three interviewees pointed out that total carbon footprinting is a tool that

enables organizations to think more carefully about how their business is related to complex international supply chains and global markets. One interviewee explained that if regulatory techniques like carbon taxes are put in place, there is a likelihood that this may affect the cost of commodities and resources that are currently imported from overseas. For this interviewee, total carbon footprinting is a tool that can help highlight the relative efficiencies of different suppliers, and can be utilized in decision-making about future procurement contracts in a way that can help protect against otherwise unacknowledged future uncertainties.

Another interviewee commented:

'if we could lower the resource use in Manchester then we would be in a good position when carbon markets come in'.

Being better aware of the global processes that might affect organizations in the future was a key preoccupation of many interviewees. One interviewee pointed out that not changing is not an option:

'*If you don't change, you will fail anyway'.*

Tools like Total Carbon Footprinting can provide a powerful trigger to begin to help people make organizational changes. One interviewee described, for example, the changes in an organization that they had approached to help them with resource efficiencies:

'A long time ago I worked with this company, and they didn't trust their employees to the point where he used to use his toilet as a storage area and he wouldn't put a light bulb in it, because he said if I put a light bulb in my toilet they'll just go in there and read the paper and they won't do any work, and four years later we had him stood on platform going on about health and safety and how he won a health and safety award and it had changed his business - and it's brilliant when you get stuff like that, where they just run with it after a while'.

One suggestion that has been made with regards to how total carbon footprinting might provide a protection against previously unacknowledged supply-chain uncertainties within Manchester, has been a call for greater investment in local industries and the shortening of supply chains themselves. Recent work by Small World Consulting has suggested potential areas where policy makers might intervene, including: the development of local food growing (to mitigate against some of the uncertainties of the global food system, and to reduce emissions produced through the transportation of food); and the development of a local 'reuse and repair economy'.

Whilst these suggestions simultaneously appear to offer a way of reducing the city's supply-chain carbon emissions and appear to protect the city against certain global uncertainties, the interviews demonstrate that in fact they do not necessarily resolve satisfactorily *either* issues associated with excessive carbon emissions, *or* issues regarding protection against global uncertainties.

In terms of supply chain carbon emissions, several interviewees observed the often surprising findings of total carbon footprinting methods. At the coop, for example,

one interviewee described how a total carbon footprint of Scottish and Spanish strawberries counter-intuitively found Scottish strawberries to be far more carbon intensive than Spanish strawberries. This was because of the production methods used for Scottish strawberries, where peat – a carbon intensive product - had been used as a fertilizer. This issue is something that is acknowledged by Small World Consulting and is the basis of a current baseline study to understand the actual carbon footprint of Manchester's local and imported food.

In terms of providing a method of protecting against global uncertainty, local food production is also not always the most reliable solution. Global food networks were themselves developed in part to provide protection against localized crop failures and any turn to local food, will necessarily have to be set alongside a broader recognition of the continued need for Manchester to be tied into global supply chain networks, albeit in potentially different kinds of ways.

Whilst total carbon footprinting is thus very useful as a tool for assisting companies in protecting themselves against global uncertainty, it is imperative to be open to the potential risks and vulnerabilities that suggested measures might themselves entail. An overly localist response to global dangers does not always offer adequate protection from the uncertainties associated with global supply chains. Indeed it is possible that a call for a more localised economy might well exacerbate local vulnerabilities in spite of trying to make things better.

3.7 A tool for navigating reality

The final way in which total carbon footprinting appeared to be potentially useful for interviewees was as a tool for navigating an otherwise opaque reality. Total carbon footprinting is a tool that is capable of representing things that cannot otherwise be known. Although the information produced by the tool is '*not evidence-based enough to form the basis of city policy'*, it still provides a powerful means of exploring and investigating a world that is assumed to exist behind the numbers.

Numbers are the means by which total carbon footprinting paints a picture of the world. Arriving at the numbers might be complicated, but the tool is nonetheless able to produce a set of specific numbers that act as a kind of map of the city or an organization. As one interviewee put it, total carbon footprinting is a bit like economics:

'economics keep coming back to that number because you can touch it and feel it and understand it'.

Similarly, another interviewee argued, that:

'*you have really got to get into your data to know what it is telling you. You have to inherently feel what that data means on the ground. If you can do that it is really useful. Then you can back the narrative'*.

By seeing the value of the data of total carbon footprinting as a tool for navigating realities rather than a means of describing an absolute truth on the ground, people who were interviewed explained that sometimes the accuracy of the data was not the most

important thing:

'Even if your data is not that accurate the big things don't change that much and the big thing will still be the big thing. It is important not get too hung up on accuracy. The direction is still the same'.

and,

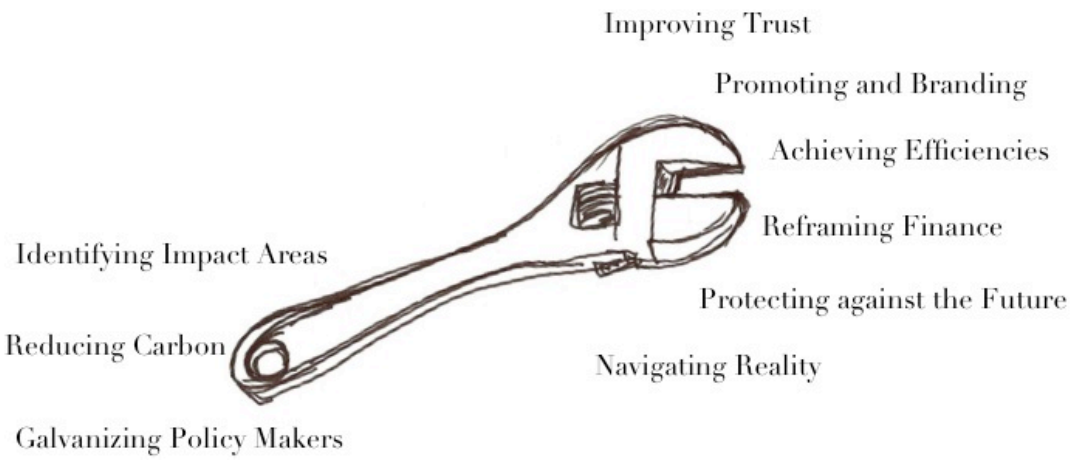
'we may not be able to capture the total progress we have made, but if we can capture the specifics, let's do that. It can be too complicated to do a phase 1 and phase 2 comparative analysis. You can spend too long to get to a perfect solution'.

One of the proposals for total carbon footprinting is that it replaces direct emissions measurements as a method of measuring progress. Comments for interviewees suggest an important distinction, however, between the value of footprinting methodologies as a guide for action, where accuracy is less important than direction of travel, and the value of footprinting methodologies as a tool for measuring aggregate success or failure, which risks confronting many pitfalls.

3.8 Redepicting Total Carbon Footprinting as a Tool

The following image (Fig 1), illustrates the findings of the report. On the left hand side the primary objectives of the tool are listed. On the right hand side, the other ways in which total carbon footprinting is understood to have transformative potential are listed.

Fig 1. The Utility of Total Carbon Footprinting



4. Conclusions and Recommendations

This study has approached the social and cultural significance of total carbon footprinting by investigating the various ways in which it is being imagined as a tool for bringing about a range of different kinds of social and material transformations. The purpose of this exercise has been to provide a basis from which to suggest a) when total carbon footprinting is likely to be able to influence decision making, and b) the potential kind of policy mechanisms that might be most appropriate for pursuing actions that can support the development of specific impact areas.

To summarise, the report has highlighted that total carbon footprinting has at least six functions in addition to its primary stated function of reducing carbon emissions and influencing policy. These are:

- Improving Trust
- Promotion and Branding
- Achieving Efficiencies
- Questioning Financial Measures of Success
- Protecting against the Future
- Navigating Reality

One key finding of this research is that different methods of total carbon footprinting might be more appropriate to the achievement of some of these aims than others. The method of total carbon footprinting developed by Small World Consulting is a top down measurement method, using aggregate data to develop an approximate picture for Manchester's carbon footprint. This is a powerful navigational tool, allowing a new way of engaging the present and future realities facing a city like Manchester. However, in contrast to bottom-up footprinting techniques which aim to measure the actual footprint of particular instances of resource use, according to the people interviewed in this research the top down method of measuring the total carbon footprint of a territory or organisation as a whole does not appear to have as great a potential as a method for determining the level of benefit that might be derived from pursuing particular interventions as opposed to others. This is because the data on the benefit of particular interventions cannot be easily discerned from the aggregate data provided in the top down carbon footprint.

If the top down carbon footprint provides a powerful tool for identifying potential areas of intervention, the approach taken here allows us to make some suggestions as how and why policy makers might or might not be able to intervene on the basis of the areas of intervention it highlights. One suggested areas of intervention has been supporting local food production. This report has suggested that any intervention to improve food production will need to address the potential *efficiency savings* that could be made in the area of food, the *potential risks* that are facing food supply in relation to problems of uncertainties embedded in both local solutions and global supply chains, and *alternative ways of valuing food* that exceed economic measures of GVA.

More than one interviewee pointed out that the kinds of changes that total carbon footprinting might be able to bring about might not take the form of explicit *interventions* at all. Indeed, one of the major criticisms of the total carbon footprinting

method was that it was by definition unable to provide the basis for new areas of policy intervention. This was primarily understood to be because the method is still new, emerging and under development and is not (yet) a standardised and universal measure of sustainable urban development:

'I worry slightly that this could be an exercise that GM spends a lot of time and effort on, and that is interesting to know but doesn't really have much day to day relevance because has no day to day traction because no one else is doing it."

One interviewee suggested that given the current marginal status of total carbon footprinting as a reporting method, a key way in which the council could respond to some of the areas highlighted by the Small World Consulting report was less as the source of new initiatives, and more as an 'influencer':

'local government is not there to tell people what they can and can't do, but can influence and can give advice'.

The interviewee gave the example of the council potentially providing advice for developers on the cheapest way of pursuing sustainable building methods, and engaging private landlords to encourage them to make their houses more energy efficient.

Another interviewee suggested that much of the transformative effect of Total Carbon Footprinting appears to derive from its capacity to reframe problems in ways that allow a rethinking of current forms of regulation, measurement or policy. In terms of developing something like a reuse and repair economy, for example, an important means of supporting this endeavour could come from understanding the legacy effects of previous initiatives that have inadvertantly *undermined* the capacity of organisations to develop in ways that could support a more equitable and sustainable city. A good example of a change already being pursued in this vein in Manchester is the loosening of regulations around the use of 'meanwhile land'. A number of interviewees saw considerable scope for observing how existing regulatory landscape blocks rather than assists the development of policies which might support the kinds of areas of intervention highlighted by the reimagination of reality provided by the total carbon footprinting methodology. Here the key requirement of policymakers would be to be open to reassessing conventional methods of managing urban developments, and to take into account the implications of the total carbon footprint when new policy and regulatory tools are being formulated.