

# **The role of bicycles and bicycle empowerment centres in improving the mobility and livelihoods of the poor, and assisting with low-carbon development in Cape Town**

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Dissertation presented in partial fulfilment of the requirements for the degree of Master of Philosophy in Energy and Development Studies



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## DECLARATION

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## ABSTRACT

The problems of resource depletion, climate change and high levels of disparity in wealth have caused growing disillusionment with conventional development practice. Out of this discontent have emerged alternative development concepts, such as sustainable development, green economy and low-carbon development (LCD). The common ground of these concepts is that they motivate for moving away from a growth at all costs approach to development, and instead stress the need to place emphasis on economic, environmental, and social aspects of development. Whilst low-carbon development is based on these three fundamentals, it developed out of the growing concern about the effects of climate change and therefore the need to decouple the development process from the burning of carbon. One of the elements of LCD that has as yet not been fully developed is its link with poverty alleviation.

In South Africa because of the high energy and emissions intensity of the economy, decoupling development from the burning of carbon is a particularly challenging process. That said, with the levels of inequality, and energy and emissions intensity of the country, the need for LCD is pressing. With transitioning to a low-carbon path to development an essential part of this process is the integration of the poor.

One of the major features of the way of life of low-income communities that needs to be changed is their mobility. In South African cities, transport for the poor is expensive, time consuming, inconvenient and unsafe, and represents a significant burden for these communities. Furthermore, due to the underdeveloped nature of the public transport network and dependence on private vehicles, transport is a major energy consumer and carbon emitter in South African cities. Cape Town is no different and in the efforts to earn the reputation of being a 'Green City' and improve the mobility of the poor, the transport network needs to be radically altered.

The purpose of this study is to investigate the role of bicycles and bicycle empowerment centres (BECs) in improving the mobility and livelihoods of low-income communities, in line with the principles of LCD. Based on the findings of semi-structured interviews and focus groups, the study evaluates their contributions, as well as identifying factors that are inhibiting progress. The study ends with a number of recommendations for how to increase the prevalence of commuter cycling in Cape Town, as well as ways in which BECs can expand in the future.

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## LIST OF ACRONYMS

ACSA	Airports Company South Africa
ANC	African National Congress
BEC	Bicycle Empowerment Centre
BEN	Bicycling Empowerment Network
BRT	Bus Rapid Transit
CBD	Central Business District
CDM	Clean Development Mechanism
CTL	Coal-to-liquids
ECAP	Energy and Climate Action Plan
GHG	Greenhouse Gas
GNP	Gross National Product
GT	Grounded Theory
I-CE	Interface for Cycling Expertise
IRT	Integrated Rapid Transit
IPCC	Intergovernmental Panel on Climate Change
LCD	Low-Carbon Development
LTMS	Long Term Mitigation Scenarios
NAMAs	Nationally Appropriate Mitigation Actions
NDP	National Development Plan
NMT	Non-Motorised Transport
NPC	National Planning Commission
NSSF	National Sustainable Settlements Facility
OECD	Organisation for Economic Co-operation and Development
PAMAs	Poverty Alleviating Mitigation Actions
SAMAs	South African Mitigation Actions
SARi	South African Renewables Initiative
SWH	Solar Water Heater
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

# CHAPTER 1 - INTRODUCTION

## 1.1 Overview to the study

The issue of anthropogenic climate change and its effects has become one of the most pressing concerns for humanity in recent decades (IPCC, 2007). Human activities such as deforestation and the burning of fossil fuels have dramatically increased the level of greenhouse gases (GHGs) in the atmosphere (IPCC, 2007). GHGs absorb infrared radiation and control the energy flows in the atmosphere. This is the natural process for warming the Earth known as the greenhouse effect. However higher concentrations of GHGs induced by human activities has disturbed the balance of gases in the atmosphere, and has led to changes in the climate system (IPCC, 2007). It is forecast that global temperature will increase by 1.4°C to 5.8°C by 2100 which would have catastrophic consequences such as, droughts, floods and sea level rise (IPCC, 2007). In order to prevent dangerous levels of GHGs, a stabilisation of GHGs is required. Consequently, governments around the world are being put under pressure to reduce their national GHG emissions. Under the Copenhagen Accord South Africa voluntarily agreed to reduce its emissions below business as usual by 34% by 2020 and 42% by 2025 (Department of Environmental Affairs, 2011). Developing countries are faced with the dual challenge of needing to raise the standard of living of the poor and at the same time reduce emissions and resource depletion. But in order to avoid a climate catastrophe and the exhaustion of resources, developing countries have to take into account these factors in their development efforts (Milani, 2000). In order for this to happen development needs to be reconceptualised. Low-carbon development (LCD) is one of the most recent concepts that has been developed that represents reconceptualised development practice. It refers to a development process that achieves economic growth and reduces emissions (Mulugetta & Urban, 2010).

Due to the carbon and energy intensity of the South African economy, there is a need for introducing LCD. Cape Town is characterised by different energy and emissions trends to the national profile. From an energy and emissions perspective, the transport sector is one of the most important sectors to consider in Cape Town. In 2007 the transport sector was responsible for 50% of energy consumption and 27% of carbon emissions in Cape Town (Sustainable Energy Africa & University of Cape Town, 2011). With these figures in mind it is evident that in the city's efforts to mitigate against climate change, the transport sector has an important role to play. Unlike the electricity sector, the transport sector does not currently have viable renewable

energy options that could replace liquid fossil fuels as the dominant energy source. Therefore, other strategies to address this problem are required to alter the emissions profile of the sector. The emissions intensive nature of the city's transport sector is not the only challenge it faces. Due to apartheid planning, non-white residents were forced to live on the outskirts of cities and the effects of apartheid planning are still visible in the structure of South African cities today (City of Cape Town, 2005a). Low-income households are situated predominantly on the outskirts of the city, and are forced to rely on a poorly developed public transport network. Consequently, the access of low-income households to urban opportunities is limited, households spend a disproportionate share of their income on long commutes, and mobility of these households is below a desirable level (City of Cape Town, 2005a). Apartheid planning neglected to acknowledge the importance of non-motorised transport (NMT) and the need for the infrastructure to support these modes of transport. As a result NMT makes up a small percentage of work trips (Behrens, 2006).

The transport network in Cape Town is inadequate to support desirable levels of mobility, and is a burden on the livelihoods of low-income communities and thus represents a significant barrier to the development of underprivileged communities. The growth in population and increasing urbanisation rates, will only compound the problems already present, including increasing emissions and energy consumption of the sector (Ward & Walsh, 2010). In order to improve mobility and livelihoods of the growing low-income population of Cape Town, and reduce emissions, significant changes in the transport sector are required.

## **1.2 Rationale**

Mobility is a crucial element of development that needs to be addressed for low-income communities in Cape Town.

Much of the rhetoric surrounding LCD in developing countries is about job creation, and the benefits of LCD for the poor. However in many cases LCD strategies are not formulated with the poor at the centre. As a result many of the job opportunities and benefits associated with LCD remain inaccessible to underprivileged communities. The research endeavours to show the importance of bottom-up contributions for a low-carbon future, by investigating the potential of bicycles and BECs in low-income communities to improve the mobility and livelihoods of the members of these communities. The study aims to demonstrate the value of placing emphasis on

utilising existing skills and resources in low-income communities, to incorporate them in a transition to LCD.

### **1.3 Central research question**

What is the potential for bicycles and bicycle empowerment centres to improve the mobility and livelihoods of the poor, and assist with low-carbon development in Cape Town?

### **1.4 Research questions**

1. What is the importance of transport for pro-poor low-carbon development in Cape Town?
2. What is the potential of bicycles and BECs to improve mobility of the poor?
3. What is the potential of bicycles and BECs to contribute to improved livelihoods and poverty alleviation?
4. How can the level of bicycle use be increased, and an expansion in number and scope of BECs be achieved?

### **1.5 Research approach**

The first phase of this study was a literature review on the research topic. This was followed by preliminary meetings, which were held to obtain an idea of what work has been undertaken on non-motorised transport in Cape Town. Two methods for generating data for the study were utilised; semi-structured interviews and focus groups. The interviews and focus group discussions were held at BEC workshops – workshops which sell and repair second hand bicycles – as these were identified as rich information sources for cycling in low-income communities. The choice of semi-structured interviews and focus groups is to enable a deeper understanding of the research questions and gain detailed, first hand insights from the participants. A more detailed methodology is presented in Chapter 2 including more details of the BECs.

### **1.6 Overview of study**

This dissertation consists of seven chapters. A background to the study as well as the rationale, research questions, and research approach. The research method follows and outlines the way in which the data for this study was collected. A review of relevant literature, including investigation into concepts such as low-carbon development, mobility, and non-motorised transport. The

results from the focus groups and interviews are then presented and subsequently discussed. Finally, conclusions are presented followed by a set of recommendations.

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## CHAPTER 2 – RESEARCH METHODOLOGY

This section outlines the research method for the study. It includes the different data sources that are utilised for this research. These include: secondary data, meetings, semi-structured interviews, focus groups and additional sources such as newspapers and websites. Most importantly the section outlines the ways in which data were collected, generated and analysed, and an explanation of why the research method selected is most appropriate for fulfilling the objectives of this study. Lastly the section highlights some of the challenges that were experienced during the research process.

### 2.1 Rationale for the approach

Based on the exploratory nature of the topic of this study, it was decided that a qualitative approach would produce the most valuable results. It is well known that bicycle use in Cape Town is not a common mode of transport, and the data exists to support this (City of Cape Town, 2005a). Research also shows the barriers to bicycle use in Cape Town (City of Cape Town, 2005a). However, less research has been focussed on how bicycles improve the quality of life for those that use them in Cape Town. Because of this, the decision was made to use BECs and their communities as a way of focusing the study, to ensure a sample that can provide the depth of insight required, for the study to make a meaningful contribution.

At the outset of the study six functional BECs existed in Cape Town. It was the intention of the study to utilise these six BECs, and interviews were initially held with all six. However during the course of the research one of the six BECs closed down, the BEC in Masiphumelele. In addition, the BEC owner in Mitchell's Plain, Rocklands expressed he did not want to host a focus group. As a result the four existing and willing BECs in Cape Town were utilised. These represent all feasible BECs in Cape Town that could be used to host focus groups.

The use of semi-structured interviews and focus groups is preferred to structured questionnaires. Whilst this brings challenges for representing results, the decision was made to adopt this approach as it was felt that little value would have been gained from capturing responses to a structured questionnaire. As the study is exploratory in nature, the aim of the research approach is to allow new insights to emerge and guide the study, rather than contributions from participants being constrained by predefined categories or questions in a questionnaire. Through this approach the study can make a unique and meaningful contribution. Chapter 4 demonstrates

some of the challenges of the research approach but also illustrates the benefits of the approach for capturing and portraying in-depth responses. It is evident that the research questions that were developed for this study, cannot be answered simply by asking a large group of people to provide answers to a set of predefined questions, and then tallying their responses to provide answers to these questions. Instead it is the intention of the study to unpack and interrogate these questions, and provide insight through the experiences and responses of participants, communicated through in-depth, targeted focus groups. The size of groups facilitated the depth of discussion required to adequately interact with the content of the research questions, in a way that would not have been possible with large groups. The samples are also limited to those that had some interaction with a BEC, which influenced the inputs made. The reason for this is that in order to gain deeper insights into the area of study, people in some way involved or interested in bicycles and BECs are needed to provide information. Not all participants use bicycles, but all have been exposed to bicycles and BECs in some way and could therefore contribute to the discussions.

## 2.2 Data sources

Both primary and secondary data are used for this research. The starting point for this study is a review of relevant literature to establish an understanding of the existing research and literature. Emphasis is placed on low-carbon development, the relationship between bicycles and other forms of NMT and mobility, as well as the mobility of the poor, and the impact of mobility on livelihoods of the poor. One of the main intentions is to understand the relevance and status of these topics in other parts of the world. National and local, policies and strategies, and other literature are used as valuable sources to provide information on the Cape Town and South Africa contexts.

In addition to a literature, the study utilises a number of other data collection methods. Table 1 list the different types of methods, as well as the number of participants included in each method.

**Table 1:** Data collection methods and number of participants

	Data collection methods		
	Preliminary meetings	Semi-structured interviews	Focus groups
<b>Number conducted</b>	6	12	4
<b>Number of participants</b>	6	7	27
<b>Total sample size</b>	40		

### **2.3 Preliminary meetings**

The research topic was initially proposed by the City of Cape Town's Energy and Climate Change branch, hence the first two meetings for this research were with the Energy and Climate Change Branch and Transport Department. Although this study differs substantially from the initial topic put forward by the City, the initial topic formed the base from which the study evolved. The meetings with the City of Cape Town were valuable for establishing the work the City has been involved in that is related to this work, and to establish the best avenues to explore to obtain the necessary information for this research. The City also acted as a valuable source of information by providing relevant policies and strategies.

With the primary focus of this research being around the potential of bicycles to improve the mobility of the poor and improve livelihoods, it emerged from the interviews with the City of Cape Town that the Bicycling Empowerment Network (BEN) is an important source of information.

To find out about the work BEN is involved in, and how this relates to the research topic, meetings were held with the Managing Director, Outreach Manager, and Training Manager at BEN. The information gathered at the meetings demonstrates the different types of work the organisation is involved in. Particularly important for this research is the BECs that BEN are responsible for having set up. As BECs are located in low-income communities and their core business is to sell and repair affordable, second hand bicycles, they were recognised from the beginning as an integral part of this research. Appendix 1 includes a list of the meetings as well as details of the meetings such as participants involved.

### **2.4 Semi-structured interviews**

Semi-structured interviews are a commonly used qualitative research method, as they enable a deep investigation of a research area, and are useful when seeking explanations and underlying reasons, or even when searching for the right questions for an investigation (Longhurst, 2010). Semi-structured interviews are also useful for informing the generation of guiding questions for the focus groups (Morgan, 1997). Semi-structured interviews do have a predetermined order but provide more flexibility than structured interviews, thus allowing new material to emerge from participants that would not have been captured by structured interviews or surveys (Longhurst, 2010). A series of semi-structured interviews were conducted with the owners of

the BECs in Westlake Eyethu, Lavender Hill, Grassy Park, Mitchell's Plain – Rocklands, Mitchell's Plain – Alphine Park, and Masiphumelele, to establish the functions of their businesses, and to find out more about cycling in their communities. An interview was also conducted with the owner of a bicycle shop in Kenilworth; Cross Town Cycles. This is to provide insights of a bicycle shop in Cape Town other than a BEC. The initial round of interviews provides information needed to better define the study and frame the interviewing process. After extracting the information from the interviews a second round of interviews was conducted with five out of the six BEC managers first interviewed. These interviews were used to discuss queries that had emerged from the initial round of interviews, and to discuss subject selection for the focus groups. The researcher and BEC managers decided together, based on the circumstances of each BEC, the make up of the sample. The interviews provide insight into the roles of BECs, and develop an understanding of how the current mobility of low-income communities provides numerous barriers to LCD in these communities. Appendices 1 and 2 provide a list of interviews and a list of guiding questions for the interviews conducted.

## **2.5 Focus Groups**

Focus groups originated in the 1950s in market research, as a tool to explore perceptions and choices of consumers (Bloor et al., 2001). They have since become a method that is used extensively in social research (Finch & Lewis, 2003). A key aspect of focus groups is that the interaction between participants is fundamental to shaping the data generated (Finch & Lewis, 2003). The interactions and contributions of the different participants allow each individual to reflect on their own views, and in certain cases, prompt participants to delve further into their own responses and provide a deeper level of insight (Finch & Lewis, 2003). Furthermore, focus groups provide a stronger social context to the discussion setting, where the interaction with the researcher is not as dominant as in an interview, and the group adopts some of the interviewing role (Finch & Lewis, 2003). This dynamic allows participants to introduce new ideas, and for data to emerge that may have been overlooked in an interview (Finch & Lewis, 2003). It also allows diverse views to be captured, and for the group to discuss the causes and consequences of the different views (Finch & Lewis, 2003). Through this process dominant themes begin to become visible.

Because of the unique features of focus groups, focus groups were selected as one of the core research methods for this study. Focus groups were conducted at four of the BECs (Westlake Eyethu, Lavender Hill, Grassy Park, Mitchell's Plain – Alphine Park). These focus groups are

made up of customers of the BECs who are members of the surrounding community. The purpose of the focus groups is to establish the role of bicycles in these areas, investigate the services provided to the communities by BECs, and if and how bicycles and BECs improve the mobility and livelihoods of people in their communities. The social context focus groups provide, the allowance for a deep investigation of themes, and the provision for the group to play an interviewing role and create space for new material to emerge (Finch & Lewis, 2003), are features of focus groups crucial for the study to achieve its objectives, and hence are central to the research approach. The focus groups vary from four to eight participants and include school learners, parents, and a number of different professionals to establish the uses for bicycles through a broad spectrum of settings.

Focus groups were recorded, written into transcripts, and the information is used to inform the results of the investigation. See Appendices, 1, 2 and 3 for details including lists of focus groups; list of guiding questions for focus groups, and list of participants of focus groups according to occupation.

## **2.6 Current affairs data sources**

Another source of data that the research utilised was to follow news about bicycles in Cape Town on online forums, websites, newspapers and other avenues. This is important to make sure the research remains up-to-date and aware of the initiatives happening on the ground. This information is useful to get an idea of the change occurring in Cape Town.

## **2.7 Data generation and analysis**

Carrying out data generation and analysis concurrently is essential for the evolving nature of an investigation (Birks & Mills, 2011). Coding of the data plays a key role in this process. Coding is used to identify important and recurring themes that emerge from the data, coding starts at a very basic level in the initial stages of the research, after which the coding becomes more advanced to fully develop the themes that emerge (Birks & Mills, 2011). Coding was carried out at the different stages of interviewing and focus groups and progressed as the study evolved. Importantly, after every interview and focus group the data generated was first coded before the next interview or focus group. This is essential as it meant that each stage of data collection is built on, and influenced by the previous stages of data collection and analysis, and therefore ensures the study evolved through every stage of the research.

## **2.8 Memo writing**

Memo writing gives a record of the researcher's thinking at all stages of the research (Birks & Mills, 2011). Memo writing is a part of every stage of this study in order to capture the insights throughout the research and the data analysis. The importance of this exercise is that it tracks how the thinking and interpretations of the researcher evolved as the study progressed. Using these insights and making comparisons between, proved a useful tool in the analysis of the data generated, and for developing recommendations that came out of the study. A key concern for the researcher is to remain conscious of the necessity to distinguish between the data and the analytical abstractions of the researcher (Birks & Mills, 2011). This was noted and kept in mind by the researcher throughout the research.

## **2.9 Data representation**

It is not the intention of this study to quantify responses of participants but rather achieve a deeper understanding of these themes in the sample studied, and allow insights to emerge from participants. The use of focus groups provided the space for in-depth insights to emerge and add the texture necessary for the study. Although the intention is not for responses to be quantified, representation of data is equally as important as in a quantitative study as the data is required to explain phenomena (White et al., 2003). To allow a deeper understanding the way in which data is represented is critical.

### **2.9.1 Direct quotations**

In order to effectively portray the material emerging from interviews and focus groups, different forms of illustrative material can be used (White et al., 2003). Direct quotations are an example of illustrative material. This study uses direct quotations as a means of representing the data from the interviews and focus group discussions. The quotations are used as a way of representing direct evidence from responses, and along with commentary, provide interpretation of the significance of the responses, and amplify the findings from the primary data. Although direct quotations are effective if used correctly, it is important to be aware that they do have limitations, particularly with representing diversity (White et al., 2003). These limitations should be considered when utilising and interpreting direct quotations.

### **2.9.2 Diagrammatic representations**

Diagrams are another way of representing data. A number of different types of diagrams are used. The strength of these is that they not only illustrate data, they are helpful in simplifying

complex relationships or phenomena and to enhance understanding of the findings that are more difficult to represent via text (White et al., 2003).

### **2.10 Limitations of research approach**

The sample size of this research is 40 participants, with 27 focus group participants. The sample size is based on the number of operational BECs in the Cape Town. Four operational BECs in Cape Town were utilised to conduct focus groups. Because of the limited number of BECs this study does not represent all low-income areas in Cape Town. There are significant differences between low-income suburbs around Cape Town and when viewing this study this should be considered. It is important to note that it is not intention of the study to represent all low-income groups. Rather the study seeks to gain a deep understanding of the research topic and its relevance to the study sample based on their responses.

Focus groups do have limitations, and a key consideration is to ensure dominant participants do not dictate the flow of discussions, and to ensure that reticent participants make as significant contributions (Finch & Lewis, 2003). In connection with this issue, two other considerations when using focus groups are the effect of the researcher on the quality of data because of the role of moderator that the researcher plays for the group; and the effect that the group has on individual contributions which includes tendencies towards conformity and polarisation that can play out because of the group context (Morgan, 1997). Conformity refers to participants conforming to the dominant views expressed by the group. Polarisation is on the opposite end of the spectrum and refers to the tendency for some participants to express extreme views because of the group dynamic (Morgan, 1997).

Both semi-structured interviews and focus groups allow a more open dialogue, whilst this produces valuable data, it also makes it challenging for the researcher to control the flow of conversation, and ensure discussions remain relevant to the research objectives.

For studies in which specific questions need to be answered, a large sample size is needed, and results need to be quantitative, surveys are a more appropriate tool. This is not the case for this research, and the research methods selected were done on the basis that they are the most appropriate means for answering the research questions (Maxwell, 2009).

## CHAPTER 3 – LITERATURE REVIEW

### 3.1 An alternative development process and its concepts

Because of the threats of resource depletion, dangerously high levels of GHGs, and the need to raise the living standards of the poor in developing countries, it is increasingly being accepted internationally that in order to address all these issues, development needs to take on a different form (Mulugetta & Urban, 2010; UNEP, 2011). Part of identifying the appropriate form of development is identifying where it is required. Development initiatives take on different forms if in a low-income or middle-income country, it is therefore necessary for the design of development initiatives to acknowledge this difference. A number of concepts have emerged to inform a change in the development process. Three of the main concepts are: sustainable development, green economy, and low-carbon development (LCD) (Osborn, 2013; UNEP, 2011; Wlokas et al., 2012; Yuan et al., 2011). This study focusses on LCD as the guiding framework, and as such the concept is elaborated on, whereas the green economy and sustainable development are only briefly touched upon.

#### 3.1.1 Sustainable development

Sustainable development emerged in the 1980s out of the concern over ecosystem degradation and resource depletion that was occurring at unprecedented rates (Pezzoli, 1997).

In 1987 the World Commission on Environment and Development came up with the following definition for sustainable development: "...development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987).

In 1992 the first Earth Summit took place in Rio de Janeiro to bring together nations to discuss the need for sustainable development. 20 years later Rio+20 Conference on Sustainable Development was held in Rio de Janeiro, in June 2012 (Osborn, 2013). The understanding of sustainable development has evolved since it was first introduced, but the core elements remain the same. Most importantly it is the mainstreaming of sustainable development in the global economy that requires attention, and gatherings such as Rio+20 are aimed at facilitating progress (Osborn, 2013).

### **3.1.2 The green economy**

According to UNEP (2011), the green economy is one that: “results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. In its simplest expression, a green economy can be thought of as one which is low carbon, resource efficient and socially inclusive.” (UNEP, 2011: 9).

The green economy differs from other alternative development concepts in that it has a narrower focus on economic development (Wlokas et al., 2012). Importantly the green economy recognises the value in the environment and its importance to the economy (UNEP, 2011; Wlokas et al., 2012). The green economy is fundamentally different to a conventional free market economy, and therefore the transition to a green economy requires a complete restructuring of the economy (UNEP, 2011).

### **3.1.3 A look into LCD and a transition to a low-carbon world**

There are a number of definitions that exist for the term low-carbon development (LCD), and as development priorities differ from country to country, arriving at a universal definition would serve little purpose (Mulugetta & Urban, 2010). That said, regardless of the exact definition, three key themes are common: reduce greenhouse gas (GHG) emissions, utilise and develop low-carbon energy, and promote economic growth (Yuan et al., 2011). In essence the challenge is to decouple economic growth and the growth in the burning of carbon. LCD differs from other alternative development concepts in that it is primarily concerned with reducing the carbon intensity of development (Yuan et al., 2011). For developed countries it refers to transforming an already developed economy into one that has lower carbon intensity. For developing countries it is about reducing carbon and emissions intensity, and achieving the development goals of the country, in order to do so following a different path to conventional development (Skea & Nishioka, 2008). Particularly for the developing world, an important preoccupation of LCD is to be a process that promotes equity in terms of access to opportunities and the benefits of LCD (Skea & Nishioka, 2008; Wlokas et al., 2012).

As part of a shift to a low-carbon world, mainstreaming climate change issues in development practice is a key factor for altering development thinking. (Mulugetta & Urban, 2010). Two principal reasons for mainstreaming climate change in development practice are to minimise the negative impacts caused by climate change, and to capitalise on the opportunities created by mitigation actions (Mulugetta & Urban, 2010). One of the misconceptions surrounding LCD is

that transitioning to a LCD path is a burden on the economy – but there is now evidence that shows that such a transition, by pursuing alternative paths to development, builds a more resilient economy in the long term, and presents new economic and development opportunities (Skea & Nishioka, 2008; UNEP, 2011).

Part of the LCD process is to acknowledge the impact of human activities on the environment (Jackson, 2011). Shifting to development that minimises negative impacts on the environment, cannot be achieved without the active participation of citizens and companies. As human activities are at the heart of the problem, so citizens need to be the drivers of change (Jackson, 2011).

### **3.1.4 The justification for investing in LCD in South Africa**

The need for LCD on a global scale is clear. However, it has also been stressed the importance of LCD being rooted in the local context (Mulugetta & Urban, 2010). Thus, the relevance of LCD for South Africa is based on the national context including the environment, economy, and its development challenges.

South Africa is a country characterised by high energy intensity. This means that every unit of GDP energy requires high energy inputs. A useful indicator of energy intensity, is the level of CO<sub>2</sub> emissions per unit of GDP. According to the International Energy Association (2010), South Africa has a figure of 1.84 CO<sub>2</sub>/GDP (kg/1995US\$), compared to a world average of 0.73 CO<sub>2</sub>/GDP (kg/1995US\$). The energy consumption for the country is high in relation to the level of development (Department of Environmental Affairs, 2011). Because coal is used for over 90% of national electricity generation and to produce the country's local liquid fuel supply through the Fischer-Tropsch coal-to-liquids (CTL) process, energy usage is associated with high emissions (Department of Environmental Affairs, 2011; Vanderschuren et al., 2010a). Table 2 shows the comparison of emissions per capita and emissions per GDP between South Africa and the rest of the world.

**Table 2:** Emissions intensity of South Africa compared to the rest of the world (International Energy Agency, 2010)

	<b>CO<sub>2</sub>/capita (tonnes/capita)</b>	<b>CO<sub>2</sub>/GDP (kg/1995 US\$)</b>
<b>South Africa</b>	6.93	1.84
<b>Africa</b>	0.9	1.02
<b>OECD</b>	10.61	0.41
<b>World</b>	4.39	0.73

The table shows that in South Africa CO<sub>2</sub>/capita and CO<sub>2</sub>/GDP is substantially higher than the world's average. To add to the vulnerability of the economy, crude oil is the single largest import of South Africa (Vanderschuren et al., 2010b).

In light of the global climate negotiations and the agreement that the global economy needs to peak emissions at 550ppm to keep below a 2°C increase in average global temperature (IPCC, 2007), South Africa is required to reduce its GHG emissions. The South African Government has shown the intention to make reductions by the commitments they made under the Copenhagen Accord (Department of Environmental Affairs, 2011).

A core element of LCD is its relevance to the context within which it is to be implemented. Part of the approach is to align its objectives with the development goals of a country (Yuan et al., 2011).

The National Climate Change Response White Paper highlights the dual challenge South Africa faces in the two principal objectives outlined by the paper (Department of Environmental Affairs, 2011: 11):

- “Effectively manage inevitable climate change impacts through interventions that build and sustain South Africa’s social, economic and environmental resilience and emergency response capacity.
- Make a fair contribution to the global effort to stabilise greenhouse gas (GHG) concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe that enables economic, social and environmental development to proceed in a sustainable manner”

As development and climate change objectives can contradict each other, the challenge is to develop strategies that align. For instance the aim of the NDP to expand access to energy services will lead to an increase in emissions, if expansion is done in the same way it has previously, by increasing the provision of coal-generated power (National Planning Commission, 2011). Even though the emissions would not be major, a focus on developing renewable energy to expand the provision of electricity would deliver greater benefits. And as people move out of the poverty, the increased energy consumption would not be associated with the same high levels of emissions as if dependent exclusively on coal-generated electricity.

Since 1994 South Africa has shown steady economic growth, growing at an average of 4% between 1994 and 2008 (South African Government, 2010). Even with these levels of growth, poverty and severe inequality are still dominant features of South Africa's economic landscape (National Planning Commission, 2011). This is reflected by the fact that in the mid-2000s the richest 10% of households received 40% of national income (South African Government, 2010). This inequality is accompanied by a high unemployment rate, which in 2010 was as high as 40% for the age group 16 to 30 years (South African Government, 2010). As it is well-known, the apartheid era is the root of many of these problems, and certain features of its legacy remain long after it ended, and continue to entrench poverty and inequality (National Planning Commission, 2011).

The spatial layout of South African cities is one of the most visible elements of apartheid that exists today (National Planning Commission, 2011). The Group Areas Act of 1950, made it law for race groups to occupy different areas of cities. Non-white residents were forced to live on the outskirts, whilst white citizens occupied the suburbs closest to the city (Maylam, 1995). One of the consequences of this was that the majority of non-white households were forced to live far away from the economic opportunities in the city (City of Cape Town, 2010; Maylam, 1995). Because of this, South Africa is still a divided society, and many of the benefits of development remain inaccessible for much of the poor. In addition, South Africa's rapidly urbanising population is putting pressure on the infrastructure and services of cities (National Planning Commission, 2011).

The physical infrastructure reflects and further contributes to the segregation and inequality of access to opportunities. In former non-white areas infrastructure was grossly underinvested and poorly maintained. Although it has been improved, it still hinders the poor's connectivity to the

city and its opportunities (Maylam, 1995; National Planning Commission, 2011). In the 2011 National Development Plan (NDP), the National Planning Commission (2011) identify the need for investment into infrastructure, as the current infrastructure is inadequate to support higher than the growth rate of 4% per annum from 1994 to 2012 (National Planning Commission, 2011).

Both the NDP 2011, and the New Growth Path have been developed by the national government to address the development challenges of the country. As part of these processes, both plans identify the need for a transition to a low-carbon economy and the role it can play in addressing the country's challenges (National Planning Commission, 2011; South African Government, 2010).

The New Growth Path highlights five priority areas for sustainable job creation, the green economy is one of these five (South African Government, 2010).

The NDP outlines nine areas that need to be addressed for South Africa to work towards its Vision 2030. Four of these are particularly relevant to this study (National Planning Commission, 2011):

- Creating jobs and livelihoods
- Expanding infrastructure
- Transitioning to a low-carbon economy
- Transforming urban and rural spaces

These are two important documents developed by the South African government for shaping the future of the country. In both documents significant importance is attached to a low-carbon future.

### **3.1.5 The link between LCD and poverty alleviation**

It is widely acknowledged that developing countries will be the worst hit by the impacts of climate change because of the lack of technical, financial and institutional capacity to adapt (Beg et al., 2002; IPCC, 2007). Within these countries the poor will suffer the most (Beg et al., 2002; IPCC, 2007).

One of the defining characteristics of LCD is it acknowledges the importance of other factors besides wealth that are indispensable for efforts to alleviate poverty (Funder et al., 2009). LCD will help to avoid dangerous levels of GHGs, and therefore reduce the risk of climate change impacts on the poor (Funder et al., 2009; UNEP, 2011).

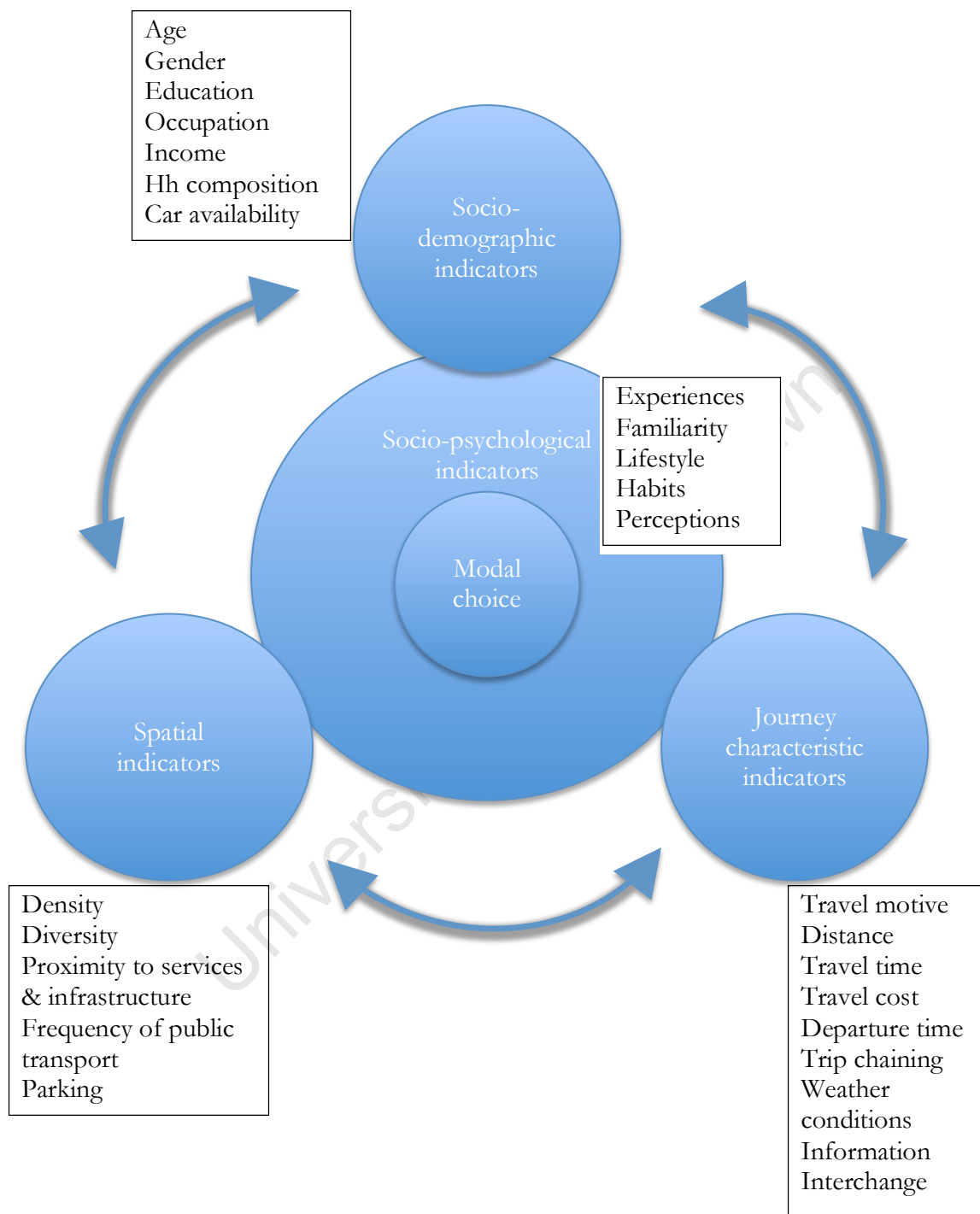
Mitigation actions are an important part of the commitment to LCD. A crucial link that needs to be articulated is that between mitigation and poverty alleviation (Beg et al., 2002). In some instances linkages have been identified, but they remain vague. There are opportunities to develop these linkages, which need to be accompanied by specific strategies to ensure that mitigation opportunities do contribute to poverty alleviation and integrate the poor (Wlokas et al., 2012).

Wlokas et al. (2012), propose the concept of poverty alleviating mitigation actions (PAMAs). This concept demonstrates that mitigation actions provide opportunities for combating poverty. Mitigation actions designed to contribute towards poverty alleviation are likely to yield more success and need to be rooted in the local context, with an emphasis on local needs, knowledge and skills (Mulugetta & Urban, 2010).

### **3.2. Mobility and the importance of transport in LCD**

“Mobility is defined as a measure of the *human agency* with which people choose to move themselves and their goods around, dependent on the performance of the transport system available and characteristics of the individual.” (Bryceson et al., 2003).

Mobility is fundamental to the lives of all people. It is a key concern to this study, which seeks to interrogate the concept of mobility as well as its relevance to LCD. A key aspect of mobility is modal choice. Figure 1 illustrates the various elements of modal choice. Socio-demographics, journey characteristics, and spatial indicators represent the objective determinants of modal choice (De Witte et al., 2013). Socio-psychological indicators represent the subjective determinants of modal choice (De Witte et al., 2013). Modal choice is determined on the basis of the interaction between these indicators (De Witte et al., 2013).



**Figure 1:** Determinants of modal choice (De Witte et al., 2013)

Figure 1 illustrates the complexity and multifaceted nature of modal choice. This study aims to unpack components of modal choice, and its relevance for bicycle use in Cape Town. The

following sections discuss the impact of transport systems on mobility, and whether mobility aligns with LCD.

### **3.2.1 Transport as a barrier to LCD and the importance of NMT**

Transport modes represent different means for achieving mobility, which plays a role in the everyday lives of all people. Depending on the transport system, it can facilitate better quality of life, or restrict access to opportunities and entrench poverty for the marginalised (Efroymsen & Rahman, 2005). Therefore the planning and designing of transport networks, defines whether mobility plays a role in contributing to the objectives of LCD, or acting as a barrier to it (Kane, 2010).

Passenger transport networks today are facing more challenges than ever before particularly in developing countries. Population growth and urbanisation lead to urban sprawl and increasing pressure on these systems (Khadpekar, 2009; Portabella, 2009). These conditions make it difficult for a transport network to provide efficient service to all users (Khadpekar, 2009). Due to the increasing numbers transport networks have to serve; congestion, high energy use, and pollution have become dominant features of many of these networks (Khadpekar, 2009; Massink et al., 2011). This in a time when the risks of climate change are necessitating reductions in the energy consumed and emissions produced from transport (Kane, 2010). Historically the models adopted by transport planners have varied according to which part of the world they are being applied in. European cities placed an emphasis on public transport and NMT to improve mobility, whereas transport planners in the United States focused on car-orientated transport (Knoflacher, 2007). In the 1950s European transport engineers, educated in the United States introduced car-orientated planning in Europe (Knoflacher, 2007). With the increase in ownership of private cars, it was believed that investing in car-orientated planning would improve mobility through increasing its speed and distances of travel (Knoflacher, 2007). Consequently, car-orientated planning became the practice in cities all over the world. This type of planning places emphasis on expanding road networks and highways to improve mobility in a city. But although this provides temporary alleviation of traffic congestion, it encourages private vehicle use, therefore worsening the energy and emissions intensity (Khadpekar, 2009). This kind of planning caters for car-owners, but disadvantages those who do not own cars and has been the prevailing mindset in transport planning in developing countries until recently (Litman, 2009). If this thinking continues, transport systems will become features that threaten how liveable cities are, rather than improving mobility and access to opportunities

(Gwala, 2009). Along with planning favouring car users, it has also neglected the importance of NMT (Portabella, 2009). A factor that has influenced this has been that transport planning has lacked the ability to assess the true value of NMT (Litman, 2009). One of the most serious consequences has been that the crucial role NMT plays in improving mobility of those that do not drive cars, has not been recognised (I-CE, 2000; Litman, 2009). Because NMT has not been properly acknowledged or its value assessed, it has been underinvested in, in the developing world (Kane, 2010). Not only does undervaluing NMT act as a barrier to its expansion, it fosters a car-dependent culture (Kane, 2010). Investments to support car use are expensive and promote low-density development, and create an environment that makes it more difficult for NMT travel. A diverse transport system, which caters for a variety of transport modes, has social benefits, is more environmentally-friendly and reduces the cost of transport (Knoflacher, 2007; McCann, 2000). McCann (2000), indicates that car-dependent communities spend as much as 50% more on transport than those reliant on a diverse transport network. The introduction of car-orientated planning in cities where public transport and NMT were the predominant transport modes, demonstrates the differences between these two schools of thought, as well as the problems created by investing in car-orientated planning in densely-populated, growing cities (Knoflacher, 2007). It is evident that car-orientated transport planning is no longer a feasible solution for the world's growing population (Khadpekar, 2009; Knoflacher, 2007). Rather than reducing the gap between the rich and poor, a car-centred transport system exacerbates inequality and can no longer be held as the desirable system to work towards (Efroyimson & Rahman, 2005). Contrastingly, investments in public transport and NMT in European cities such as Amsterdam and in developing world cities like Bogota, have shown the time, financial, social, and environmental benefits associated with this kind transport planning (Knoflacher, 2007; Nair & Kumar, 2005).

In order to develop a transport system that improves the mobility of the poor, caters for growing demand, and lessens energy and emissions intensity, there needs to be a radical transformation in transport planning globally, but particularly in developing countries like South Africa.

### **3.2.2 Transport for poverty reduction, social equity and development**

Particularly in the developing world, development initiatives and transport are the focus of much attention. Both are important for improving life in developing countries, as is the integration between the two (Kirkels, 2011).

As part of a transition to LCD, mobility especially in cities needs to be redefined. However, with private cars predominantly being driven by affluent members of society, car-orientated planning has served their needs rather than the needs of all society (Efroymsen & Rahman, 2005; Knoflacher, 2007). The majority of poor households in developing countries rely on NMT and public transport (I-CE, 2000). But because these modes of transport have been underinvested in, in countries adopting car-orientated planning; mobility for the poor is inconvenient, time consuming, expensive, unsafe and a restraint on their ability to fully participate in political, social and economic life (Efroymsen & Rahman, 2005; I-CE, 2000; Khadpekar, 2009). Furthermore, many poor households have a diverse range of income sources which are often present at different locations (Kirkels, 2011). This means that multiple trips need to be undertaken to access income-earning opportunities for the household, not taking into account the number of other motives for travel required by low-income households such as social and recreational purposes (Kirkels, 2011). It should be acknowledged that low-income communities do not only require access to essential services. In order to operate as citizens that enjoy a desirable standard of living, they need to be able to access an array of services and opportunities beyond essential services, just as high-income households do (Behrens, 2004). Public transport designed around the purpose of moving people from home to their place of work and back, with inadequate recognition of the need for mobility that allows households to utilise all opportunities and services provided by a city, cannot be expected to fully satisfy the mobility demands of its users (Behrens, 2004). Poor households develop complex and flexible survival strategies, and transport decisions are made on the basis of these (Kirkels, 2011). Thus, designing transport systems purely around commuting is a narrow way of developing a system and creates one that further aggravates the plight of the poor (Kirkels, 2011). Transport planning needs to acknowledge the complexity of the livelihoods of low-income communities, and play a role in improving livelihoods, and making cities more liveable.

Vehicle-orientated transport planning has caused many of the issues associated with transport networks today. These issues warrant a shift to accessibility-orientated planning (Kirkels, 2011). Accessibility-orientated planning removes a bias for planning around a specific transport mode, and rather places emphasis on what needs to be accessed by all households, and what is the most efficient way of catering for these demands (Kirkels, 2011). Implicit in an accessibility-orientated approach is the acknowledgement that different modes are most suited to different distances and contexts, and this applies for all households (Kirkels, 2011). This represents a radical departure

from the mindset that treats private cars as the only option, and planning around, and permitting behaviours that support private vehicle use. For short distances, walking, bicycling and other forms of NMT are quicker, cheaper and more convenient than motorised modes and do not have the same negative impacts (Efroymson & Rahman, 2005). Whereas motorised forms of transport make longer distances possible, and yield time savings (Knoflacher, 2007). Within motorised transport, mass transport options like trains and buses, deliver the same time savings as private cars, but do not have as severe consequences of contributing to traffic congestion and GHG emissions, whereas the ability of private cars to deliver direct trips increases the convenience of travel (Knoflacher, 2007).

A transport system that is designed to improve conditions for the poor, benefits everyone as everyone can make use of such a network (Efroymson & Rahman, 2005). On the other hand, investing in a car culture benefits only those that own cars and those that do not are excluded and disadvantaged (Efroymson & Rahman, 2005). Radical changes in transport planning can help to reduce the cost of travel for all households (Efroymson & Rahman, 2005; Kirkels, 2011).

As the majority of the low-income households in developing countries rely on NMT and public transport, these forms of transport should be treated as priority for planning and investment (Litman, 2009). An extensive public transport system and infrastructure to support NMT, are key ingredients for a more equitable and productive society, as it provides more equal access to opportunities for all people (Behrens, 2004). Importantly, the mix of different transport modes needs to be carefully thought out as each mode has its capabilities and limitations, and the system needs to match modes to contexts in order to maximise the benefits of the system (Efroymson & Rahman, 2005; Khadpekar, 2009).

There are many examples around the world of how NMT plays a role in the mobility of the poor and as part of their livelihoods. In Asia rickshaws are widely used as taxi services, or to transport goods (Efroymson & Rahman, 2005). Asian cities have become severely affected by traffic congestion, and increasing the number of cars on the roads will only add to the problems. Already in Bangkok it is estimated that every day US\$1.4 million is wasted on fuel due to cars idling in traffic (Efroymson & Rahman, 2005). The time spent in traffic amounts to about 44 working days per person per year. If this time had been used productively the country could have added 10% to gross national product (GNP) (Efroymson & Rahman, 2005). These cities cannot

afford to continue promoting private motorised transport. This realisation is causing a resurgence in the popularity of NMT. In some rural villages in Kenya bicycles are used as ambulances. Whilst in some cities in Kenya bicycles provide a taxi service or are offered as rentals (Efroymson & Rahman, 2005; Kirkels, 2011). It is also common in many cities in the developing world for bicycles to be used to transport goods especially for street stall owners (Efroymson & Rahman, 2005). Importantly where bicycles and rickshaws are used to provide taxi services, they are generators of local jobs. Even repair and spare part supply can be taken care of by the domestic market. The skills exist at the local level which means that local people can perform these tasks, strengthening local economies. According to Efroymson and Rahman (2005), it is possible for the construction of bicycle lanes and other NMT infrastructure to be labour-intensive and create many low-skilled jobs. However in many countries such construction is mechanised and therefore only creates a few jobs, mainly skilled (Efroymson & Rahman, 2005). In countries with high unemployment, low-skilled, labour-intensive techniques are appropriate. Cape Town's NMT Strategy identifies the need for NMT infrastructure to be constructed through labour-intensive methods (City of Cape Town, 2005b).

Due to the flexibility they provide, most NMT modes respond well to the livelihood complexity of the poor (Kirkels, 2011). They are therefore better suited for meeting the needs of those involved in the informal economy. Roughly 50% of those involved in the informal economy in Africa are reliant on walking as their main mode of transport (Kirkels, 2011). This represents a significant pool of potential cyclists. Bicycles demonstrate versatility and suitability for the variety of uses in the informal economy. They are often used to carry goods for sellers, and reduce time spent travelling and open up bigger markets than if reliant on walking (Kirkels, 2011). An important part of this is the number of trips that low-income commuters are able to take (Bechstein, 2010; Nair & Kumar, 2005). This is vital for small-business entrepreneurs. In some of the townships surrounding Pretoria in South Africa, low-income commuters dependent on bicycles indicated that income or available cash do not influence the number of trips they are able to do in a day (Bechstein, 2010). This is because besides the initial investment of buying a bicycle, there are no travel costs. Conversely, captive public transport users expressed that their budget only permits them to take a certain number of trips a day (Bechstein, 2010). Much of the time this number is lower than the necessary or desired number, but is all that is possible financially (Bechstein, 2010). Bicycles and other forms of NMT have the ability to build the self-reliance of the poor and allow them to access the services and destinations necessary for improving the quality of their lives. Remaining dependent on motorised public transport is

unaffordable for the poor and may continue to deprive them of the opportunity to function as a member of society that is able to access all that is needed to build a better life (Bechstein, 2010).

NMT not only saves household money but can also result in significant public savings. Infrastructure for NMT modes is more cost-effective than an extensive road network as are the vehicles (Börjesson & Eliasson, 2012; I-CE, 2000). Investing in NMT also ensures savings on fuel costs. In the case of South Africa these are mainly imported fuels (Vanderschuren et al., 2010b). Furthermore NMT modes do provide opportunities for the establishment of new small industries, for example bicycle or rickshaw manufacturing. Such industries require a fairly low level of technology and the know-how exists (Efroymsen & Rahman, 2005).

In essence NMT modes represent the fairest modes as they are accessible to everyone, and in turn so are their benefits. Studies show that cycling is a competitive transport mode, rather than a strategy for improving health and alleviating traffic, although these are additional benefits (Börjesson & Eliasson, 2012). A transport system that places emphasis on NMT and the supporting infrastructure and integrating it with a well-developed public transport system, can help to make mobility more equal across income groups, and at the same time reduce energy consumption and emissions (Kirkels, 2011). As demonstrated in Figure 1 people's decisions around mode selection are not only based on objective factors, there are also subjective influences, these include gender and culture (De Witte et al., 2013).

### **3.3 Cycling in the context of culture**

Gender and culture have been shown to have an effect on whether people cycle (Pucher & Buehler, 2008). Commuting by bicycle varies men and women based on the differing perceptions of men and women cycling (Steinbach et al., 2011). The result is that in most cases there is a higher rate of cycling amongst men than women. Along with the influence of gender amongst some cultures cycling is not perceived as a desirable transport mode particularly for women (Steinbach et al., 2011). The low cycling rates within such cultures means the visibility of cycling is low in these communities, meaning people are rarely exposed to cycling (Steinbach et al., 2011). The lack of exposure to bicycles hinders possible growth in bicycle use in these areas. However in other cultures cycling is perceived positively for both men and women (De Witte et al., 2013). Although not uniform culture influences are strong, but despite it being an influential factor, it need not dictate the level of bicycle use. Evidence shows that policy can play a facilitative role in changing or entrenching mindsets (Pucher & Buehler, 2008). This is evident in

the different rates of bicycling in the Netherlands compared to the USA. Policy and infrastructure have incentivised bicycle use and discouraged car use in the Netherlands, whereas policy and infrastructure investments in parts of the USA have done the opposite (Pucher & Buehler, 2008). The effect is observable in the different cycling rates where cycling makes up 27% of trips undertaken in the Netherlands but only 1% in the USA (Pucher & Buehler, 2008). So although it is important to remain cognisant of how culture influences the perception of cycling, it is equally as important to recognise that with the right signals this can be changed (Steinbach et al., 2011).

Culture not only affects modal choice, but also the broader transition to LCD. Because LCD promotes a move away from our traditional understanding of development, it requires a change in culture. Culture is determined by place and therefore it is necessary to get an understanding of Cape Town and the challenges it presents for LCD.

### **3.4 An overview of emissions, transport and development in Cape Town**

In order to evaluate whether NMT, and specifically bicycles can play a meaningful role in LCD in Cape Town, a better understanding of the city's energy and emissions profile, and development challenges is needed. Cape Town's energy profile reveals different trends to the national one, and as such, presents different challenges. Looking at the energy consumption break down of Cape Town, it is clear that the dominant consumer is the transport sector which is responsible for 50% of energy consumption (City of Cape Town, 2011b). With regard to carbon emissions, the picture changes slightly: residential, commercial and transport are responsible for 29%, 28%, and 27% respectively. There is also a heavy reliance on fossil fuels which is visible in the high emissions profile of the City (City of Cape Town, 2011a). Cape Town's carbon footprint of 7.8 tonnes per person is higher than the national average of 6.93 (City of Cape Town, 2011b; International Energy Agency, 2010).

Local government can play an important role in working towards the ambitious national commitments to emission reductions. Cities are considerable energy consumers in South Africa and with the high carbon footprint and reliance on fossil fuels, it is appropriate for Cape Town to devise ways to reduce energy and emissions intensity (City of Cape Town, 2011b).

Reducing the energy and emissions intensity of Cape Town is a tremendous challenge. To overcome it, significant changes are required. The seriousness of this challenge is reflected in the

energy consumption and GHG emissions growth forecast if Cape Town is to follow a business-as-usual trajectory. In order to become a green city, a radical departure from the status quo is required (City of Cape Town, 2011a). However, as with the national context, the greening of the economy cannot happen without an understanding of the development challenges, which means including the needs of disadvantaged communities in the proposed way forward.

### 3.4.1 Development challenges in Cape Town

Cape Town has a population of approximately 3.82 million people with an annual growth rate of 3% (City of Cape Town, 2011a). Due to the increasing population, the city is growing at roughly 1 232 hectares per year (Ward & Walsh, 2010). The 13% increase per year of informal dwellings is significantly greater than the annual growth in formal dwellings, which is only 1.7% (Ward & Walsh, 2010). The disparities present in the city are evident in the vast differences in population densities. Whilst the average population density of Cape Town is 12.28 people per hectare, low-income areas on the outskirts of the city, such as Khayelitsha, have population densities around 150 people per hectare (Turok & Sinclair-Smith, 2009). These trends are illustrated in Figure 2. In addition, unemployment is highest in densely populated low-income areas. Unemployment grew from 19.6% in 1996 to 25.8% in 2010 (City of Cape Town, 2011a).

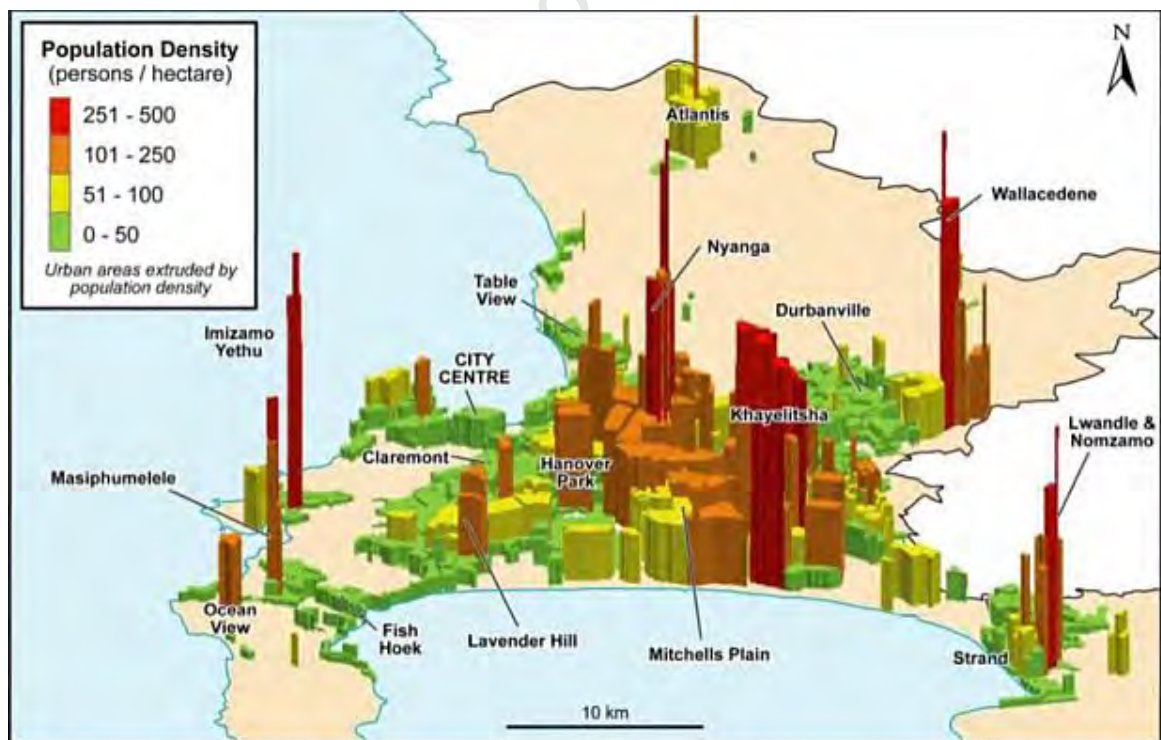


Figure 2: Population density in Cape Town (City of Cape Town, 2011b)

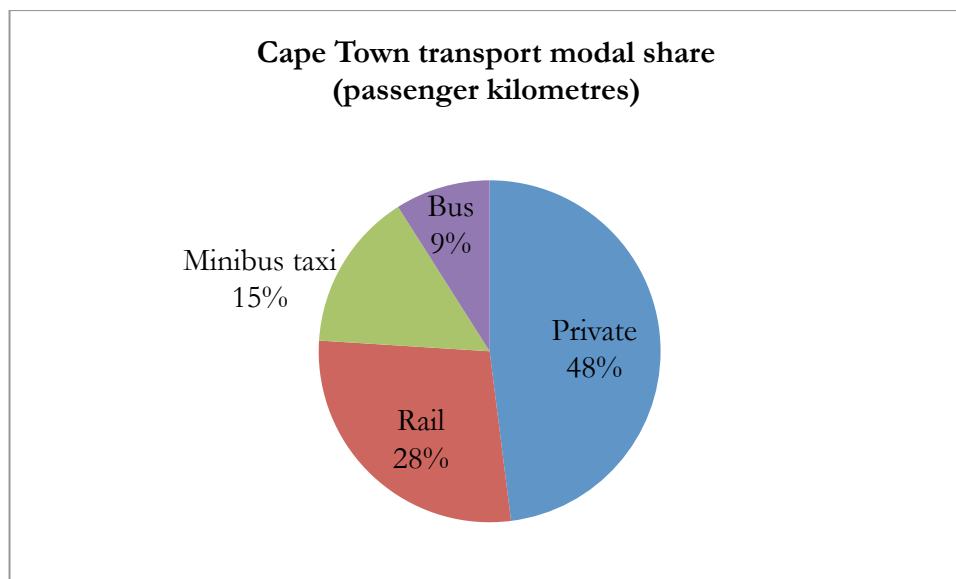
47% of households in Cape Town earn R3 200 or less per month (City of Cape Town, 2012). In addition, the distribution of income across race lines is grossly uneven. This is reflected in the Gini coefficient of Cape Town that stood at 0.57 in 2010 and represents significant income inequality (Western Cape Provincial Treasury, 2011). Compared with other South African cities, the figure is the norm, but considering the international alert line is 0.4, this value represents an extremely high level of inequality (Western Cape Provincial Treasury, 2011).

### **3.4.2 The case for investigating transport in Cape Town and its relevance for LCD**

Significant changes need to be made to improve the quality of life of all Cape Town residents and to reduce the city's carbon footprint. This suggests a need for LCD in Cape Town. There are numerous facets to the challenge of Cape Town transitioning to a low-carbon city but this study focuses specifically on transport as a mechanism to contribute towards a transition to LCD. It assesses the characteristics of transport in Cape Town, and how bicycles and BECs can help to improve mobility of the poor in a sustainable manner and contribute towards poverty alleviation.

Understanding the characteristics of the transport sector in Cape Town, is essential for identifying what the priority areas are for transport improvements, and for developing effective strategies. Figure 3 represents the modal share in Cape Town and shows that private cars account for almost half the passenger-kilometres travelled in Cape Town, followed by trains and then minibus taxis, with buses having the lowest share (City of Cape Town, 2011a). At this point it is fitting to draw attention to the mini-bus taxi industry in South Africa. Although mini-bus taxis are regarded as a form of public transport because they provide a public service, mini-bus taxis are privately owned (Barrett, 2003). The mini-bus taxi industry emerged in the 1960s as non-white residents were relocated far from the commercial centre of cities (Barrett, 2003). This made commuting by trains and buses expensive and the routes became inadequate to provide a service to the increasing area they had to cover (Barrett, 2003). This led to entrepreneurs beginning to offer transport services by mini-bus (Barrett, 2003). Although the government at the time made attempts to block the emergence of the mini-bus taxi industry, the industry has since grown into one that today makes up a significant portion of the modal share in Cape Town, as shown in Figure 3 (City of Cape Town, 2011a). Despite the perception that it is a form of public transport, the mini-bus taxi industry receives no subsidies from the government, those employed by the industry have no employment contracts, there are no labour regulations, and no standard wage payment (Barrett, 2003). It is important to be aware of this distinction to appreciate that the mini-bus taxi industry is different to a mode of public transport. However for

the purpose of this study, and in line with the predominant perception in the country, mini-bus taxis are included as part of the public transport network.



**Figure 3:** Transport modal split in Cape Town (City of Cape Town, 2011a)

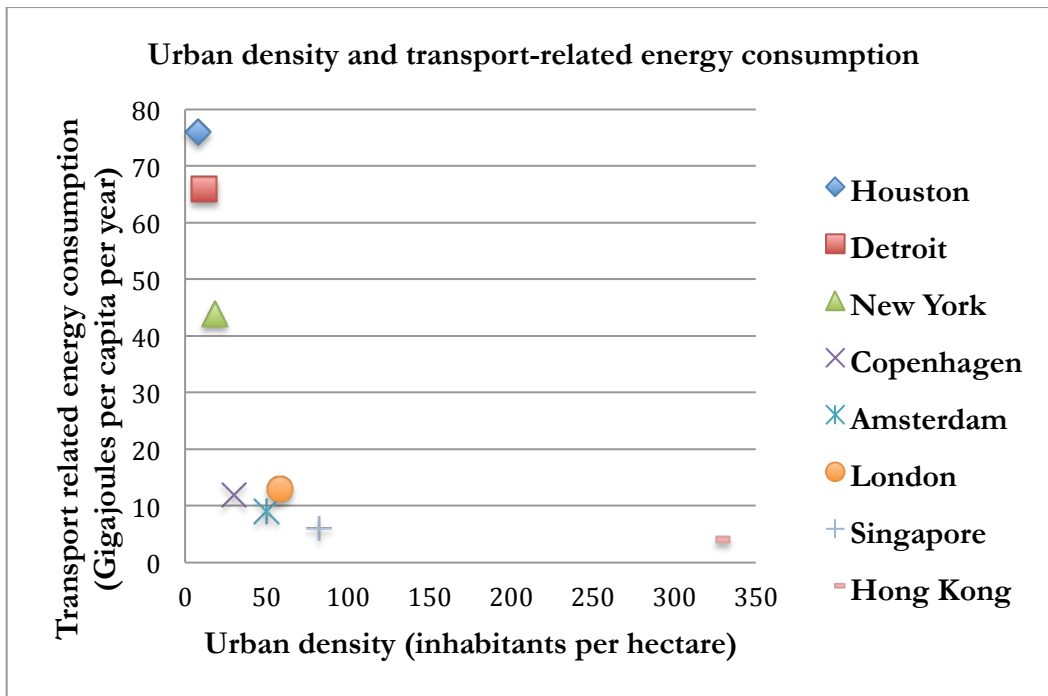
Along with the high dependence on private vehicles, the other striking feature of Figure 3 is the absence of NMT in the modal share. Because the modal share is represented in passenger-kilometres, although many people rely on walking as a transport mode, the distances people walk are short in relation to distances covered by motorised transport, the modal share of NMT is reflected as insignificant. The way in which data has traditionally been collected, does not properly acknowledge the contribution of NMT, this may have skewed the data towards motorised transport. Regardless of how the data was collected or represented, NMT plays a much smaller role in mobility in Cape Town than it could. Although not captured in Figure 3 according to the City of Cape Town (2011a), combined walking and cycling are responsible for only 2% of transport in Cape Town.

Energy consumption of transport modes is another differentiating feature between modes. When it comes to energy efficiency, the private car is by some distance the most inefficient mode of transport (City of Cape Town, 2011b). Cycling and walking are the most energy efficient modes, evaluated on the basis of energy consumed per passenger kilometre (City of Cape Town, 2011b). Trains use about a quarter, and buses a third of energy per passenger kilometre of private cars (City of Cape Town, 2011b). It indicates a high dependence (shown in Figure 3)

on the most energy-consuming form of transport, and little emphasis placed on the most energy efficient modes of transport.

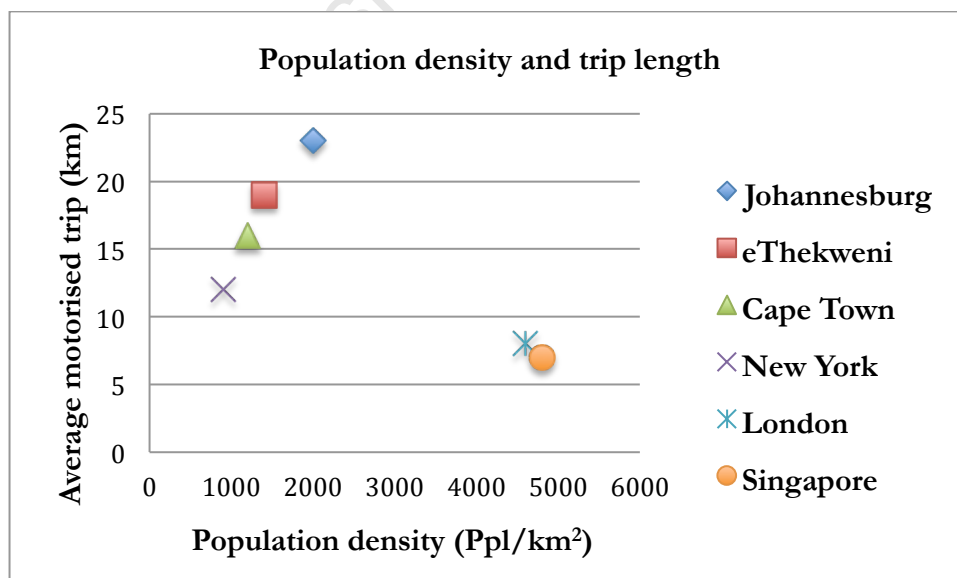
Coupled with the issue of reliance on the most energy-inefficient transport modes is the sector's reliance on fossil fuels. Together diesel and petrol provide for 52% of total energy consumption in Cape Town (City of Cape Town, 2011a). These are the principal reasons behind the energy and emissions intensity of transport in Cape Town. Long travel distances are an added issue due to the spatial layout of the city (Maylam, 1995). Because of the layout a road and highway network was invested in to support car usage (City of Cape Town, 2009a). As a result the average commuting distance is over 25 kilometres (City of Cape Town, 2011b).

Figures 4 and 5 illustrate population density and transport-related energy consumption, are inversely proportional (Turok & Sinclair-Smith, 2009; Newman & Kenworthy, 1989; Vanderschuren, 2006). It is clear that energy consumed by transport is significantly higher in North American cities than in European cities because of the difference in population densities, and to an even greater extent in Asia. From the two figures it is evident that Cape Town and New York have similar population densities but Cape Town has longer average trip distances (Newman & Kenworthy, 1989; Vanderschuren, 2006). This suggests Cape Town's transport-related energy consumption is higher than New York, and closer to the other American cities in Figure 4. An important feature of high-density cities such as London, is that they have placed emphasis on public transport and NMT, compared to American cities that are car-dependent. Dense cities support the development of NMT and public transport networks. Interestingly, Amsterdam and Copenhagen, the two cities in the world with the highest cycling rates although not the densest cities, their transport sectors are low energy consumers. This demonstrates the impact that high NMT use rates have on energy consumption.



**Figure 4:** The relationship between energy consumption and urban density (Newman & Kenworthy, 1989).

The City of Cape Town has developed a Spatial Development Framework and Densification Strategy in order to address the dysfunctional spatial layout of the city (City of Cape Town, 2010; City of Cape Town, 2009a).



**Figure 5:** Effect of city population density on average trip length (Vanderschuren, 2006)

The major way in which density of a city determines its emissions profile, is in the way it dictates the appropriate modes of transport. Dense cities promote the use of NMT. Apart from the manufacturing of bicycles, cycling produces zero emissions which is the climate value in cycling (Massink et al., 2011). Whilst proving the climate value of cycling in Cape Town is beyond the scope of this study, it is worth drawing attention to the differences in emissions of the various transport modes. Table 3 provides a comparison between transport modes according to emissions per vehicle and passenger.

**Table 3:** Global CO<sub>2</sub> emissions comparisons between transport modes (Massink et al., 2011)

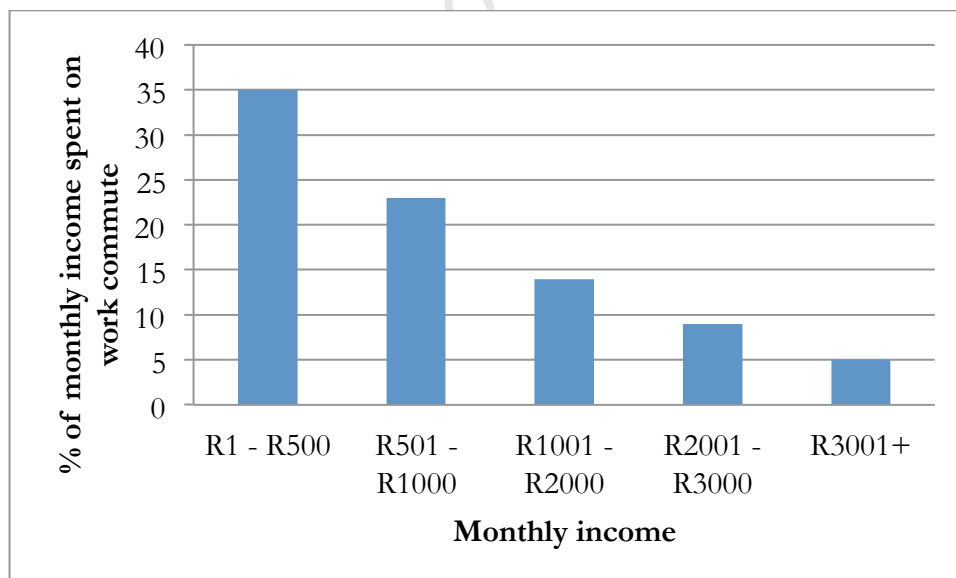
	CO <sub>2</sub> per vehicle (kg/km/vehicle)	Average occupancy	CO <sub>2</sub> per passenger (kg/km/passenger)
<b>Walking</b>	0	0	0
<b>Cycling</b>	0	0	0
<b>Motorcycle</b>	0.028	1.2	0.023
<b>Car</b>	0.28	1.37	0.204
<b>Bus</b>	0.8	27.5	0.032
<b>BRT</b>	1.74	96	0.018

Of note is that private cars emit roughly ten times the emissions per passenger that a modern bus rapid transit (BRT) bus does. This is significant for Cape Town because of the dependence on private cars and the fact that the new MyCiti BRT system is under construction (City of Cape Town, 2011b). An extensive BRT system combined with an emphasis on NMT infrastructure has the potential to deliver significant emissions savings for Cape Town's transport system.

In spite of the fact that emissions associated with different transport modes is important, when investigating reasons for modal choice, the cost of a transport mode is arguably the most influential factor. Despite the expense of private cars, it is the dominant transport mode in Cape Town (City of Cape Town, 2011a). This may be indicative of the preference for the convenience of the private car, as well as the reluctance to rely on the poorly developed public transport network (Behrens & Schalekamp, 2010). However, the high cost is prohibitive for much of the population. This means that the majority of those who do not make use of private cars, do not do so by choice but rather due to affordability (Behrens, 2004). Minibus taxis are substantially cheaper than cars in rand/passenger-km terms. This and the extensive area covered by taxi routes are the principal factors behind minibus taxis being a popular transport choice (City of Cape Town, 2009b). Although buses are less expensive than minibus taxis, they are not as

widely used. This may be due to the fact that bus routes are not as extensive and, therefore, people have to walk longer distances to pick-up points. The cheapest form of public transport is rail, which is a significant factor for trains accounting for the second most passenger kilometres travelled (City of Cape Town, 2011a).

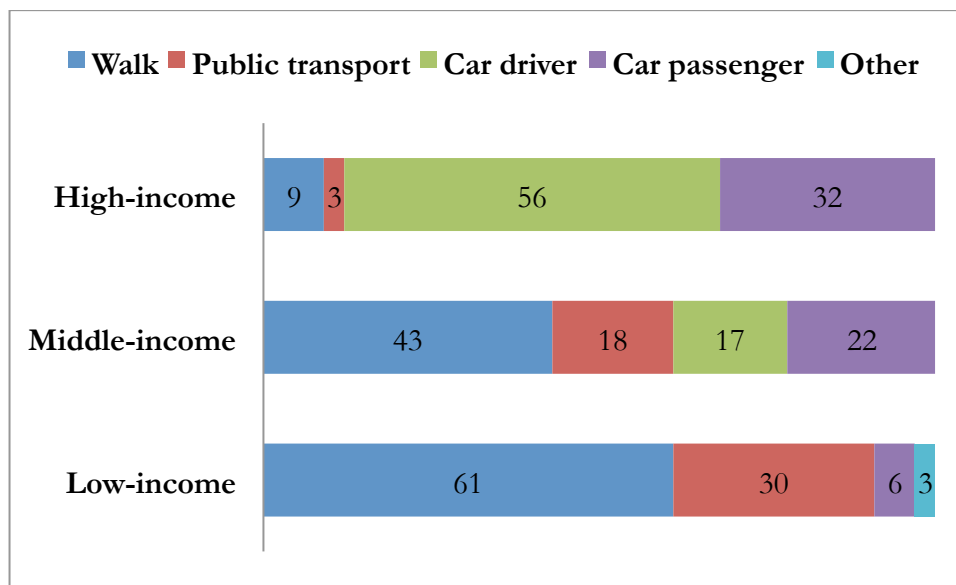
Cost of transport in relation to household income, is of particular interest for this research as it gives an indication of the cost of mobility across different income groups. Figure 6 illustrates how the percentage of monthly income spent on work commute varies according to income group. This data is at a national level, so may be slightly different for Cape Town, but the dominant trends are common, as they are internationally (McCann, 2000). There is a strong trend showing that as income increases, the percentage of income spent on commuting reduces (Department of Transport, 2005a). Households below R1000 a month spend between 23% and 35% of their monthly household income on their work commute (Department of Transport, 2005a). These figures are staggering, and when compared to higher income groups, they reveal the financial burden of mobility for the poorest households. On average, households that earn more than R3 001 a month spend only 5% of income on work commutes (Department of Transport, 2005a).



**Figure 6:** Percentage of monthly income spent on work commute (Department of Transport, 2005a)

Figure 7 provides more information on mobility of households in Cape Town, and the decisions they make to meet their mobility needs by providing information on the interaction between

income and mode choice. It is clear from this figure that the vast majority of low-income households depend on walking and public transport as their primary modes of transport (Behrens, 2004). The higher incomes groups are less dependent on walking and public transport, with cars playing a more dominant role in the mobility of middle and high-income households. Significantly, high-income households are heavily reliant on private cars, which is a major reason for the high share of passenger kilometres travelled by this transport mode (Behrens, 2004).



**Figure 7:** Main mode use percentages according to household income in Cape Town (Behrens, 2004)

These trends are reinforced when modal splits are interrogated by area. For people entering the Cape Town CBD from Khayelitsha, a predominantly low-income, informal settlement, 85.7% of trips are by public transport, 10.5% private transport, and 3.8% NMT (Department of Transport, 2005b). In contrast, of the commutes to the CBD from the more affluent suburb of Wynberg, 14.8% public transport, 78.6% are private car dependent, and 6.6% NMT (Department of Transport, 2005b). This is indicative of the segregation that still exists in most South African cities today, and how mobility differs significantly between income groups. The previous two figures, show that the financial burden of mobility for poor households and the reliance of these households on NMT and public transport, and therefore motivate for these forms of transport need to be invested in to assist the poor.

In addition to mode choice and cost, time of travel also varies significantly according to income group in Cape Town. Due to the dependence on walking and public transport, low-income households spend significantly longer travelling every day (Behrens, 2002). With increasing

incomes, households become more dependent on motorised transport, especially private vehicles, with less of their time devoted to walking and hence travel times decrease with income (Behrens, 2002). The multi-modal nature of low-income household travel also contributes to longer travel times. Because of the way in which mode choice varies according to income group, low-income households spend on average nearly double the time travelling each day that high-income households do (Behrens, 2002). The longer travel distances of low-income households also contribute to longer travel times (City of Cape Town, 2011b).

Because many public transport users are captive users, despite their dissatisfaction with public transport they remain reliant on it (Behrens & Schalekamp, 2010). Table 4 shows the results from a study that was carried out in Cape Town to assess the performance of the public transport system. As illustrated in the table, passengers are dissatisfied with various elements of the system and the reasons vary between the transport modes (Behrens & Schalekamp, 2010).

**Table 4:** Public transport (Behrens & Schalekamp, 2010)

<b>Public transport satisfaction</b>		
<b>Train</b>	<b>Bus</b>	<b>Minibus-taxi</b>
Seat availability	Bus stop weather protection	Driver behavior
In-vehicle overcrowding	Bus stop seating	In-vehicle overcrowding
In-vehicle security personnel	Service punctuality	Rank security personnel
Open doors	Driver behavior	Rank cleanliness
Service punctuality	Bus stop information	Seat comfort
Station weather protection	Service transfers	Rank weather protection
Service frequency	Seat availability	Law compliance
	Fare affordability	Rank staff customer care
	Security personnel	
	Bus stop cleanliness	

One of the key ways to facilitate change is to develop well-defined strategies upon which the transition to LCD can be built. NMT strategies can make a contribution to forming part of the clearly defined strategies that are required for a transition to LCD. The following sections examine two policy examples from Cape Town.

### 3.4.3 A review of the City of Cape Town's non-motorised transport strategy

In 2005 the City of Cape Town released a NMT strategy. This is an important development as NMT has been neglected in planning and policy in South Africa. Reviewing this strategy provides a better understanding of the aims of the City, and the policy responses formulated.

The aim of the NMT Strategy for the City of Cape Town is twofold: to develop a policy and accompanying objectives and strategies to improve the NMT environment and culture in Cape Town, and a plan that identifies key NMT routes and places in Cape Town, that should be treated as priority NMT nodes (City of Cape Town, 2005a). In order to achieve these aims the strategy identifies four primary objectives (City of Cape Town, 2005a):

- Increase cycling and enable walking as modes of travel
- Promote a changed culture that accepts the use of cycling and walking as acceptable means to move around in the city and elicit more responsible NMT behaviour.
- Create safe pedestrian and cycling environments
- Develop a quality, attractive and dignified environment

The Strategy highlights seven themes to be focussed on. These include the following.

**Access** – With the increasing rate at which informal settlements located on the outskirts of the city are developing, more people are becoming further removed from employment opportunities and public amenities. This has increased the demand for travel, particularly for public transport. For communities where public transport is unaffordable or inaccessible, trips are supplemented by walking long distances (City of Cape Town, 2005a).

**People and communities** – Public spaces are generally poorly maintained, unsafe, and susceptible to crime. This is largely due to poor planning and the lack of an integrated approach to design. As a result the NMT environment is inadequate throughout the city and worse in poorer areas (City of Cape Town, 2005a).

**Social and economic transformation** – The City of Cape Town has identified the small business and tourism potential associated with an increase in NMT activities and NMT support services, and as well as the need for NMT infrastructure. This has the potential to develop

environments that support social and economic transformation. NMT can also improve conditions in the informal economy (City of Cape Town, 2005a).

**Table 5:** The social and economic opportunities of NMT outlined in Cape Town’s NMT Strategy (City of Cape Town, 2005b)

	<b>Strategic theme</b>	<b>Responsible sector</b>
<b>3.1</b>	<b>Infrastructure</b>	
3.1.1	Provide, manage and maintain facilities that support local economic development in conjunction with public spaces. Provision for appropriate trading facilities Improvement of facilities for traders Development of design and maintenance guidelines for trading facilities	Design, Planning, Transport, Maintenance, Enforcement, Economic Development
3.1.2	Incorporate heritage, conservation and tourism needs as part of public space development	Tourism, Heritage, Design, Planning
3.1.3	Support labour intensive methods and SMME businesses in NMT facility construction	Transport, Planning and Design
<b>3.2</b>	<b>Economic Opportunities</b>	
3.2.1	Develop and support low cost mobility initiatives that includes bicycle service centres, bicycle shops, secure bicycle parking, bicycle deliveries, and tourism-linked NMT projects	Design, Planning and Transport
<b>3.3</b>	<b>Social Considerations</b>	
3.3.1	Provide NMT as an alternative mode to captured public transport riders Improve availability of low-cost bicycles to poorer communities	Transport, NGO's
3.3.2	Provide quality urban environments that support NMT and social integration	Transport, Urban Planning

**Environmental sustainability** – Long commuting distances, correspond to high energy consumption and carbon emissions. Greater emphasis on NMT and public transport will help to lessen the environmental impact of the transport system (City of Cape Town, 2005a).

**Awareness** – The lack of recognition of NMT as a mode of transport has caused a culture that disregards NMT users and the same disregard is reflected in planning and infrastructure. It has

also created the perception that NMT is an inferior mode of transport. Many people are unaware of the benefits that NMT can deliver (City of Cape Town, 2005a).

**Integration** – The absence of integrated planning is one of the principal causes of the poor NMT environment in Cape Town. The lack of integration includes poor project coordination, non-alignment of budgets and lack of institutional coordination (City of Cape Town, 2005a).

**Public participation** – The NMT Strategy acknowledges the importance of public participation and identified and involved internal and external role-players. A stakeholder forum was conducted in September 2005 (City of Cape Town, 2005a).

#### **3.4.4 A review of the Energy and Climate Action Plan (ECAP)**

The need for LCD in Cape Town has been clearly expressed; in order to make this possible, policy support is imperative to incentivise and support the changes that are required. Given the nature of former policies, many significant changes are necessary. On the whole a completely different mindset needs to accompany planning to come up with policy that responds to the challenges the city is facing.

The ECAP is evidence of the progress that is taking place in Cape Town to move towards a new paradigm of policy and planning. The ECAP was developed by the City of Cape Town to outline a path required to move towards a more energy secure city. The Plan highlights the following primary criteria: low carbon, economic development, poverty alleviation, and resilient city (City of Cape Town, 2011b). As this strategy is important for the low-carbon future of Cape Town it is of value to this study.

In order to become more energy secure the plan proposes an ‘Optimum Energy Future’. One of the main motivations for this is that proceeding along a business-as-usual path will be accompanied by various risks (City of Cape Town, 2011b). Risks include: vulnerability to the consequences of peak oil, of which higher energy prices would be a primary concern (City of Cape Town, 2011b). Job losses would be likely in industries such as the energy sector and any potential opportunities from being a green city would be lost (City of Cape Town, 2011b).

The three main mechanisms identified to transition to the ‘Optimum Energy Future’ are electricity efficiency, transport efficiency, and renewable energy electricity (City of Cape

Town, 2011b). Although this would be slightly more expensive than following a business as usual approach, the economic benefits and efficiency gains would outweigh the extra cost (City of Cape Town, 2011b).

Of the ten objectives of ECAP three are of notable relevance to this study. They are the following (City of Cape Town, 2011b):

Objective 4: Build a more compact, resource-efficient city

Objective 5: Develop a more sustainable transport system

Objective 10: Raise awareness and promote behaviour change through communication and education

To work towards a compact, resource-efficient city the Spatial Development Framework (SDF) was developed. This includes three key strategies: planning for employment and improving access to economic opportunities; managing urban growth and creating a balance between urban development and environmental protection; and building an inclusive, integrated, vibrant city (City of Cape Town, 2011b). The Densification Strategy and Urban Edges Policy, which are awaiting approval from Council, provide more detailed strategies on how to achieve densification and create development nodes, in order to support the overarching goals of the SDF. District spatial development plans and environmental management frameworks are still in the planning phase but will play a role in the future (City of Cape Town, 2011b).

Objectives 4 and 5 are interlinked as a compact, resource-efficient city is not possible without a quality public transport network, and a good public transport network is not possible without a compact city.

Developing a more sustainable transport system as outlined in Objective 5 is one of the most important aspects in contributing to achieving the objectives of the ECAP. Importantly, the new National Land Transport Act (2009) enables cities to take control and responsibility of their public transport networks. This has allowed cities to tailor their approaches to their local contexts. The City of Cape Town in their efforts to improve public transport has initiated three programmes: Integrated Rapid Transit (IRT) Programme, Non-Motorised Transport (NMT), and Employee Trip-reduction Programme (City of Cape Town, 2011b). Phase 1A of the IRT included the rollout of the MyCiti BRT service. Bicycle and pedestrian lanes are another component of the MyCiti network. Service began in May 2010 and the vision of the city is to

expand the network to cover the entire city. An important feature of the system is its emphasis on integrating all modes of transport (City of Cape Town, 2011b).

The investment into the IRT Programme, represents a significant turning point in Cape Town's transport planning. Currently 6.9% of the transport budget is spent on NMT, 21.6% on roads, 5% on other public transport and 54.8% on the IRT Programme (City of Cape Town, 2009b). The development of an extensive IRT network necessitates a large portion of the budget. However, before the construction of the IRT, only a small percentage of the transport budget was dedicated to public transport (City of Cape Town, 2009a). Very little was invested in NMT, and a large portion of this, was spent on pavements. There was a preference for investing in the road network to support private vehicle ridership (City of Cape Town, 2009a).

The employee trip-reduction programme was initiated by the City of Cape Town in conjunction with the Western Cape Provincial Government and five other major employers to implement measures that help reduce trips made by their employees, reduce single-occupancy vehicle use, and encourage a shift to public transport (City of Cape Town, 2011b). These measures include: telecommuting, flexible working hours, public transport incentives, NMT, and vehicle multi-occupancy (City of Cape Town, 2011b). The aim of the strategy is to help relieve traffic congestion and reduce emissions. In terms of developments for NMT, the inner city and IRT phase 1 have been implemented as has the Klipfontein corridor (City of Cape Town, 2011b).

Objective 10 - raising awareness and promoting behaviour change through communication and education programmes (City of Cape Town, 2011b). Behaviour change of society is an integral part of a low-carbon movement. To facilitate this information needs to be effectively communicated to people. Initiatives such as the: Smart Living Campaign, Youth Environmental School (YES) Programme, and Climate Smart Cape Town, are all methods the City is using to increase awareness in the city (City of Cape Town, 2011b). The Smart Living Handbook concentrates on waste, energy, water and biodiversity, and demonstrates how lifestyle changes can make a difference (City of Cape Town, 2011c).

### **3.5 Shova Kalula**

In South Africa over the last decade there has been an increased effort to improve the conditions for NMT users and to increase their prevalence as transport modes. Policy on a National, Provincial and Local Government level has begun to reflect this progress. This is evident in the

policy examples provided from Cape Town such as the Cape Town NMT Strategy and Energy and Climate Action Plan. The Shova Kalula Programme is one of the projects being implemented to increase the uptake of bicycles as a mode of transport. It was introduced in 2001 by the National Department of Transport. The main aim of the project is to improve the mobility of poor households by providing low-cost mobility in the form of bicycles. The focus is mainly for learners from rural and peri-urban disadvantaged communities that are situated long distances from their places of learning but have to walk to reach them (Department of Environmental Affairs, 2012).

A long term goal of the programme is to improve bicycle infrastructure and to promote bicycle use in cities and their surrounds. The last major aim of the project is to support the establishment of bicycle micro businesses around the country. The function of these would be to make available locally manufactured bicycles, and also provide repair services. Not only would this add a job-creation element to the project but they would be essential in ensuring the sustainability of the programme (Department of Environmental Affairs, 2012).

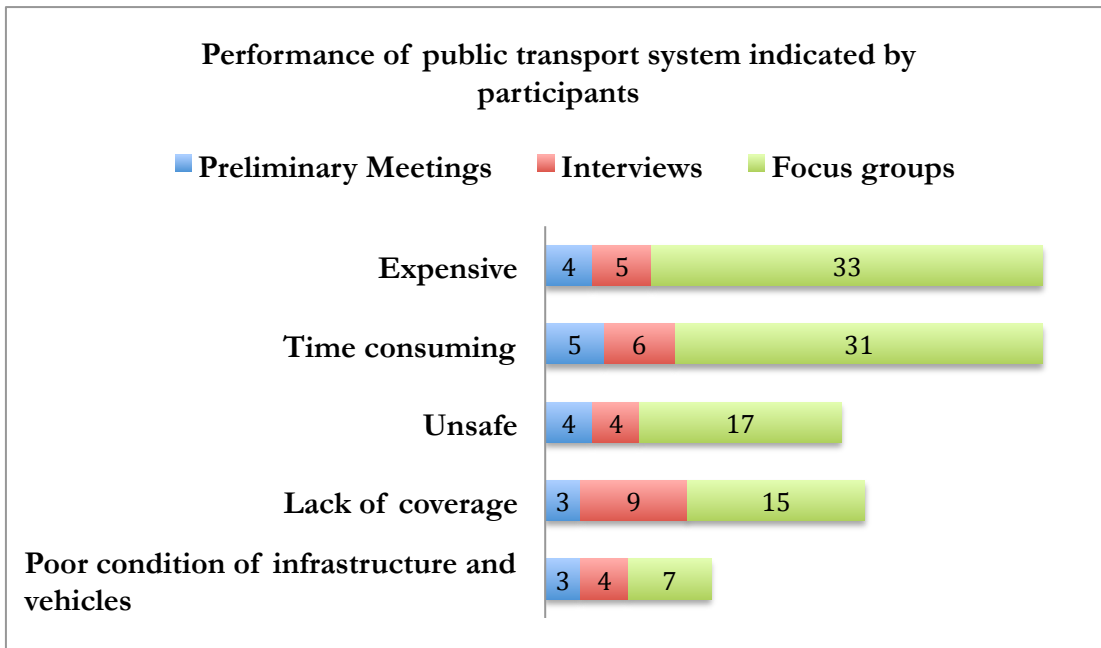
## CHAPTER 4 – RESULTS

Thus far, this study has discussed the fact that mobility of low-income households in Cape Town is below the level required to support a desirable standard of living, and acts as a barrier to their development. The literature also shows how important NMT is for the poor, and can play a role in improving the lives of the poor in a low-carbon manner (Kirkels, 2011). This chapter presents the results related to how bicycles and BECs are influencing the mobility and livelihoods in the BECs' communities, based on the interviews and focus groups that were conducted as part of this research.

### 4.1 The role of bicycles in the transport system for improving mobility

As a primary objective of this research is to explore how bicycles and BECs impact on the mobility of the participants of this study, an important starting point is to understand the mobility of participants in the broader context of the transport system available to them. This understanding enables a greater appreciation for the role of bicycles and BECs, within the broader system.

Looking at the performance of the transport system demonstrates why public transport is often an undesirable transport option in Cape Town. Figure 8 represents the prominent views raised by the participants in preliminary meetings, interviews, and focus groups about the public transport system they currently rely on. The length of bars indicates the level of frequency with which each issue was raised in the meetings, interviews, and focus groups.



**Figure 8:** Factors related to performance of the transport system represented as a number of times raised by participants of meetings (6), interviews (12, with a total of 7 participants) and focus groups (4, with a total of 27 participants).

The numbers in Figure 8 should be viewed in relation to the number of meetings, interviews, and focus groups conducted as indicated in the caption of Figure 8. Six meetings and 12 interviews were carried out, along with four focus groups, which had a total of 27 participants.

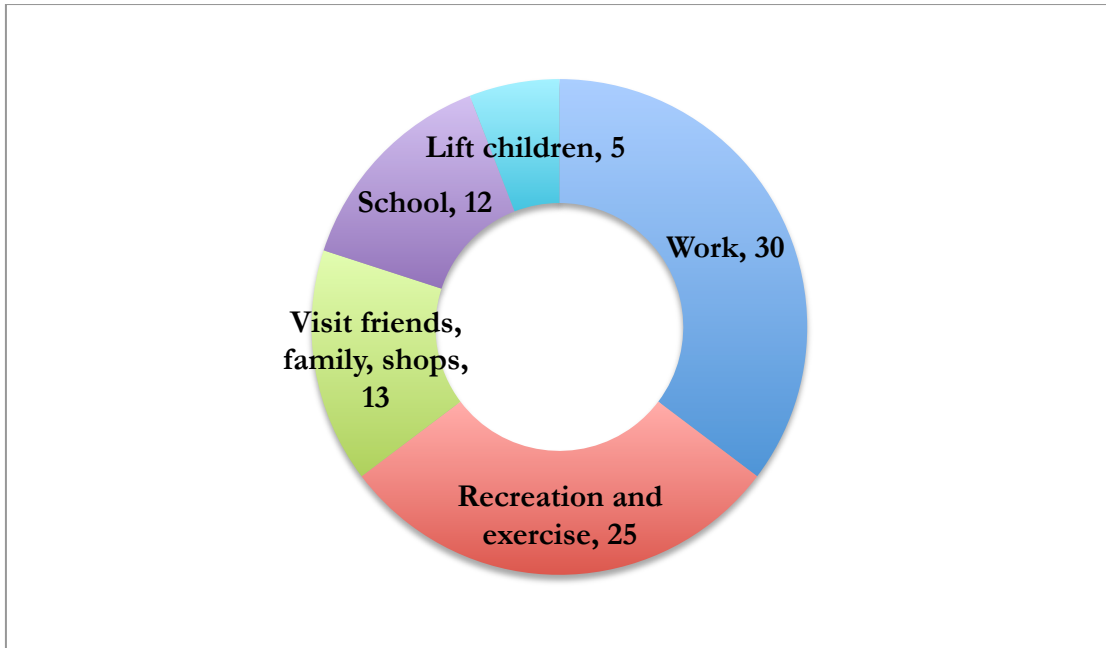
Based on the number of times raised in relation to number of participants per method, the financial burden of public transport is a serious issue for focus group participants, whereas it is less prevalent for those in the interviews and meetings. This is largely due to the majority of focus groups participants being from low-income households, and dependent on public transport; whereas most of the meeting participants and to a lesser extent the interviewees, are from higher income groups and are not as dependent on public transport. As a result they are less familiar with the financial implications of relying on public transport for mobility.

The time consuming nature of public transport is a major factor for users. The trends are similar to those reflected for the issue of the expense of public transport. With meeting and interview participants mainly being car drivers, they do not have the same appreciation for the time consuming nature of using public transport. Participants that do use public transport indicated that regular delays, and because of the lack of coverage of the public transport network travel by

public transport is time-consuming. They explained that because of the lack of coverage, users have to rely on a number of different modes and make multiple trips to reach their desired destinations. For many participants walking to train and bus stations or taxi stops, is the predominant way in which they supplement their trips. Some expressed that the use of minibus taxi services is common, as their coverage is extensive and therefore are suitable for transporting people from their homes, to train or bus stations. Although this saves commuters time and makes travel more convenient, participants expressed that it significantly increases the cost of travel if having to pay for the multiple legs of a single commute. The issue of lack of coverage was most frequently raised in the interviews, in terms of proportion of participants. This issue is prevalent for the interviewees as they consist of BEC owners and a bicycle shop owner. Much of their business of selling bicycles stems from people seeking alternatives to offer them more direct travel. Many of the customers of the BECs expressed the time savings and direct travel offered by bicycles, making BEC owners more aware of the lack of coverage and time-consuming nature of public transport.

Participants also raised concerns about lack of safety and the poor condition of vehicles and infrastructure of public transport. The frequency with which this was raised is similar across meetings, interviews and focus groups. This is mainly due to the common perception towards public transport in Cape Town. For people that are car dependent the perceived issue of poor safety makes public transport an undesirable option for them. Focus group participants attributed the issue of poor safety of public transport as a major reason for members of their communities choosing to use bicycles instead of public transport. Despite the negative features associated with public transport, public transport users such as those in focus groups, continue to use public transport, as although public transport imposes a financial burden, the expense is still more affordable than private vehicles

When talking about mobility with participants, they demonstrated that mobility encompasses movement for all purposes not just work commuting. In order to cater for mobility needs, the transport system needs to fulfil a range of functions. Participants in this study indicated that bicycles are being used for a wide array of functions to improve mobility of community members. Figure 9 illustrates the frequency each use was raised by the focus group participants.



**Figure 9:** Functions for bicycles in low-income communities as expressed by focus group participants, represented as level of frequency with which each use was raised.

The motive for travel influences the modal choice of participants. By looking at the roles of bicycles in the participant communities, it is evident that because of the diverse range of activities they are used for, they play a significant role in enhancing the mobility of small groups in these communities that are bicycle users.

The most frequently raised use for bicycles expressed by participants, is for work purposes. Participants indicated that there are also pockets of people in their communities that use bicycles for their work commute, and as part of their businesses. They explained how bicycles are particularly useful for people who need to get to a number of locations for their everyday work, such as gardeners and painters. According to participants bicycles are used in this capacity by individuals that do not own cars, as it allows them to transport more stock, and saves them time than if they are to walk, and money as it saves them from having to use public transport. Although focus group participants identified many ways in which bicycles are being used by micro-businesses, they also drew attention to the fact that they are only used by a small number of people, and could be used more extensively.

Recreation and exercise is the next most commonly raised function for bicycles. With the dominance of sport cycling in Cape Town this is unsurprising. In order to cater for this demand, cycling clubs have been set up at three of the BECs and provide the opportunity for people,

especially children, to get involved in cycling. Participants expressed that their involvement in these cycling clubs, provides them with the opportunity to compete in cycling races. Participants also use bicycles for recreational activities such as going to the beach, enjoying the natural surroundings by bike, or to go fishing.

Routes that do not require travelling on a highway are most suitable for cycling. For participants to visit family members, trips are mainly short and do not require crossing highways as many participants indicated that family members live in the same suburb. The use of bicycles for visiting family members, as well as going to the shops, was raised 13 times in the focus groups. Participants indicated using bicycles for these purposes saves them time and money, and is more convenient than travelling by public transport for these purposes.

Using bicycles for commuting purposes is another function of bicycles. Bicycles for travelling to school was raised 12 times. Many of the participants indicated that schools in their communities are close enough to walk to, and therefore most learners in their areas walk to school. That said some school children do cycle to school, especially those who are part of the cycling clubs that some of the BECs have. There are also parents who give their children lifts to school on bicycles or ride to school with the children, although this does not seem prevalent with it only being raised five times. One participant described their daily routine below.

*Even the little kids' parents give the kids a lift to school on their bikes.*

*My daughter is riding, chances are that she will teach her kids and get them to ride. Because we ride to school every day. Every morning, every afternoon. Even if it's raining but sometimes when it's raining too bad I call on him<sup>1</sup> and say can you borrow me the bakkeie to lift the kids and he will gladly do so...*

Despite the many use for bicycles, participants did express that a problem with bicycles is that they cannot carry big loads or more than one adult. And therefore are not always the best travel option for entire families. With the evidence of bicycles for improved mobility discussed, the other major concern is to establish the potential contributions of bicycles and BECs to poverty alleviation.

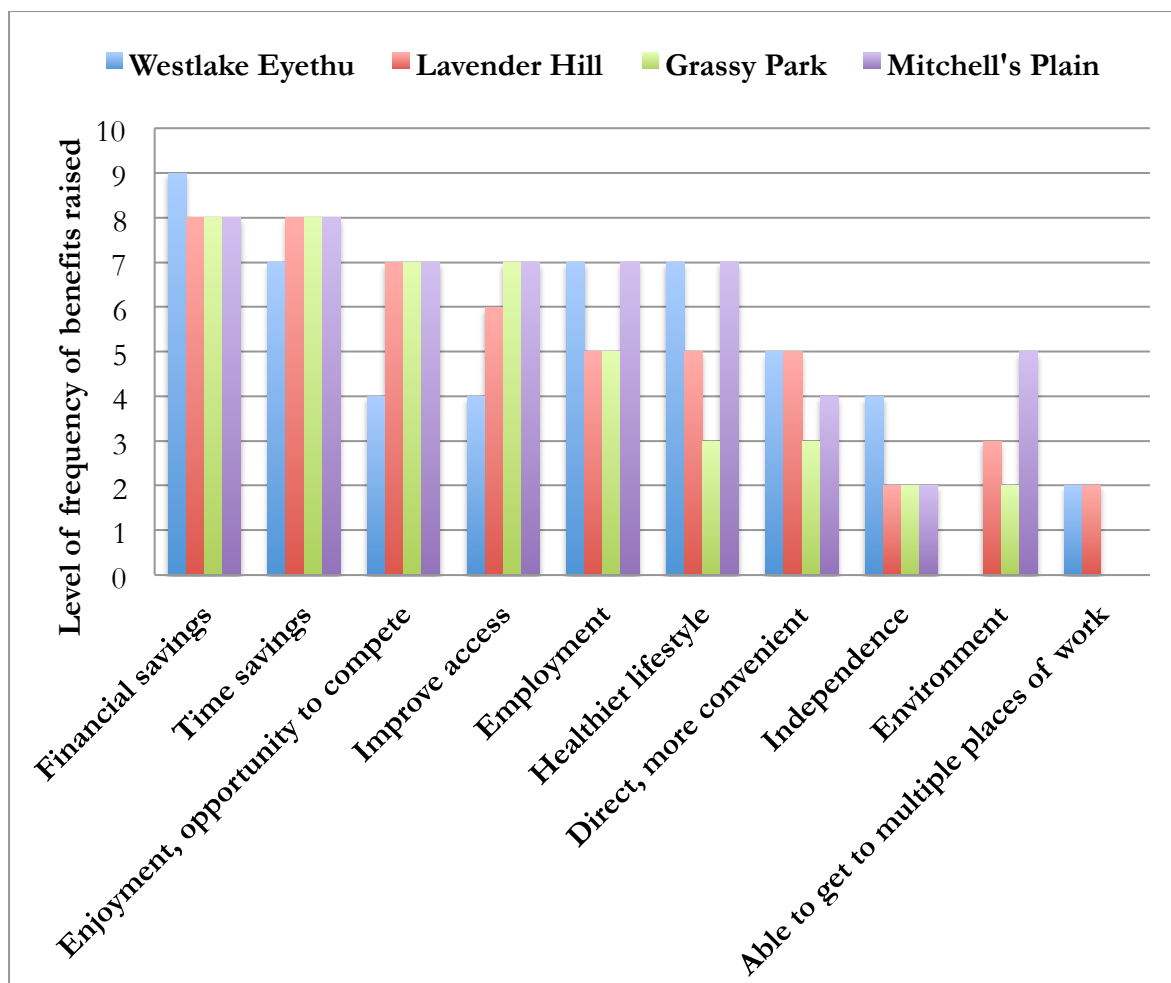
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<sup>1</sup> One of the participants pointing at another focus group participant to indicate who was being referred to

#### **4.2 The contributions of bicycles and BECs to poverty alleviation**

The role of bicycles in contributing to LCD is an idea that has been discussed in this study. Although promoting bicycles and BECs were not conceived as LCD initiatives, through improving mobility and livelihoods in a low-carbon manner, bicycles and BECs do have the ability to make a contribution to LCD. The section that follows investigates their potential to improve livelihoods and assist with poverty alleviation. Improving mobility in itself, makes a contribution to poverty alleviation. In order for LCD to be truly pro-poor better integration of the poor in the process is essential. One of the main aims of this research is to investigate what opportunities exist to advance the integration of underprivileged communities in Cape Town's LCD path and demonstrate that by placing emphasis on the skills they possess, LCD can be a process that values and incorporates their contributions and benefits them. In order to illustrate and explore this idea, the study uses the case of bicycles and BECs.

Figure 10 provides an indication of which benefits of bicycle use focus group participants feel are most prevalent. The scale represents the level of frequency with which each benefit was raised in each focus group.



**Figure 10:** Benefits of bicycles according to BEC communities as indicated in focus group discussions. Scale: Most frequent (7+), Regularly (4-6), Seldom (1-3), Never (0).

#### 4.2.1 Financial savings of using bicycles

The most commonly expressed benefit of using bicycles as expressed by participants is “financial savings”, as illustrated in Figure 10. The figure shows that “financial savings” is the most frequently raised benefit within, and also across focus groups. The majority of focus group participants are dependent on public transport, and they indicated this is expensive for them. The following excerpts from the focus groups demonstrate how the financial burden of mobility, is significant for members of the BECs’ communities that took part in the focus groups.

*I use my bike to go wherever I want to go. Rocklands, to my sister in Lansdowne, I get a bit tired but as you go on you get used to it. I don't worry about the car, I sold my car, I have my bike. Petrol is expensive. I am unemployed at the moment, but I use my bike to go to the shops, my brother in law. It is very easy; you don't have to sit in traffic.*

*Still a lot of people can't afford bicycles, they can't even buy bread, there are only a few of us who are fortunate. How can others afford a bike? People can't save in this place, there is no money to save.*

The statement reveals that the circumstances of the BECs' communities pose numerous challenges. The biggest factor in terms of expense of bicycles is the initial investment required. Whilst participants expressed the view that in the long run bicycles are able to deliver savings, many members of their communities do not earn enough to save and cover the initial expense of a bicycle. The burden for those who are dependent on private cars is even greater, hence so few people from low-income communities own cars.

According to the participants the minimum one-way taxi fare is R6 and, therefore, the daily minimum travel cost of people that rely on taxis is R12. This translates to R60 per work week and roughly R240 a month. This is a conservative estimate based on only two taxi trips for each weekday; it can be assumed that a higher estimate is more accurate. Bicycles supplied by BECs range from approximately R400 to R700.

It is commonplace for governments to subsidise public transport. Subsidies make public transport more affordable and encourage high levels of ridership. One of the participants from Mitchell's Plain felt that similar thinking can be applied to promoting bicycle use. This idea is expressed below in the statement of a research participant.

*If the City want people to buy bikes. Then just like they offer subsidies for train and bus, they must offer subsidy for everyone who buys a bike. Say they give you a voucher, or pay you back in some way. Then you will find a lot of people will buy bikes and there will be less cars on the road.*

#### **4.2.2 Time savings of using bicycles**

"Time savings" is the next most prevalent benefit that emerged from the focus groups. Figure 10 shows that the trends are similar to that of financial savings with it being a dominant theme within and across focus groups. Because public transport does not provide them with a direct route, their trips always consist of a number of different transport modes. This makes travel time consuming. Participants that use bicycles indicated that they are a quicker form of transport as they provide door-to-door transport, reducing the need for multimodal travel.

### 4.2.3 Enjoyment, and opportunity to compete

“Enjoyment, and the opportunity to compete” in cycling races, although not as prevalent a benefit as financial and time savings, is a benefit that was frequently discussed. It is noticeable from Figure 10 that for participants of the focus group at the BEC in Westlake Eyethu the benefit of enjoyment and competing is not as prevalent a benefit as it is for participants of other the other focus groups. Contrastingly, the Lavender Hill focus group participants view this benefit of bicycles as important. The BEC owner in Lavender Hill runs a cycling club, which has made cycling more accessible for school learners in the area. This is growing the culture of cycling in his community. The BEC in Westlake Eyethu has no cycling club.

Competing in cycling events is viewed as important for the youth in these communities as many have few opportunities to do so, as shown in the excerpt below. Participants also expressed that this is important as it allows children to meet others from different communities, and allows them to dedicate their time to cycling rather than getting involved with gangs, a concern raised by parents in the communities. Here a parent summarises the issues he has and the hopes associated with cycling.

*So bike lanes will be good for Mitchell's Plain and good for the children, because the children here have nothing to do. So cycling will keep them busy. So it is a good idea what his shop does...*

*The teenagers in the community want a cycling club but we need road bikes, and for that we need funding. If we establish a cycling club people will see it is a popular thing to do as they will associate it with people from their community taking part in professional cycling races like the Tour de France. More people will want to do it, and they will be able to see it as a way of breaking out of poverty and improving their lives. It will also help to address problems like gangsterism and drugs*

### 4.2.4 Improved access from using bicycles

The ability of bicycles to “improve access” to the city is an important aspect this research seeks to investigate. This benefit was raised frequently in two of the four BECs. From the responses provided by participants, it is evident that bicycles are used most for going to shops, and for social and recreational activities. Participants indicated that using a bicycle for these purposes, made these trips quicker and easier. Again Figure 10 shows the Westlake Eyethu BEC to be an outlier, with ‘improve access’ not as dominant a theme as in the other three focus groups.

The ease with which destinations can be reached is another aspect of accessibility and one that frequently emerged during focus groups. Focus group participants discussed various factors that characterise their travel, these include: travel time, number of trips, degree of coverage of transport modes available to them, level of integration of the transport network, and safety. Participants expressed that a combination of these factors makes travel inconvenient and time-consuming. Bicycle users feel that owning a bicycle improves ease of travel for them, saving them time, improving access to wherever they needed to go, and providing more direct trips. One thing that participants feel needs to change is the integration between transport modes. They noted that because they are not permitted to take their bicycles on trains or buses, it significantly reduces the capabilities of their bicycles. The following excerpt is indicative of this frustration.

*But I hate the law that you can't have your bike in the train, it's rubbish. Because if you could have it in the train I would do a lot with my bike*

*Ja that is ridiculous they want to charge you extra, maybe an adult fee to take the bike on a train*

The lack of integration between transport modes evidently places a constraint on the mobility of participants.

Despite the many ways in which bicycles improve the mobility of those that use them, participants feel that safety concerns are still a major reason for people choosing not to use bicycles. Many feel that the law does not protect them, and because laws protecting cyclists are not sufficiently stringent, this puts cyclists at risk. Safety concerns are not limited to fear of accidents but also include the exposure to crime, both theft of bicycles and hijackings. Below shows the concern as expressed by one of the participants.

*Also crime, bikes get stolen, or they point a gun to your head or a knife and take the bike off you. I know we were cycling on the M5 these two guys came out of nowhere and knocked my friend off his bike.*

*And we just rode on 'cause we couldn't stop because the guy had a gun.*

*...but it can be quite hazardous in the mornings, it's quite overcrowded on the roads, you can't ride on the R300 you will get killed – you see that is the worst part – if they had a cycle lane there then people could cycle to Belville or wherever.*

Because of these unsafe environments many people are too scared to ride and so make use of other transport modes.

#### **4.2.5 Bicycles for employment generation**

“Employment creation” potential of bicycles was raised numerous times in all focus groups. Participants indicated that through increasing the prevalence of cycling in Cape Town, BECs will become more established and be able to employ more people and new BECs could open up. The idea of companies using bicycles to supply business services where appropriate was also discussed. The different ways that bicycles are being used by businesses, and ways for BECs to expand their services are discussed at a later stage in this chapter.

#### **4.2.6 Health benefits of cycling**

NMT-dependent mobility has health benefits. The importance attached to a “healthier lifestyle” by different focus groups varies within and between focus groups as illustrated in Figure 10. Health benefits of cycling were frequently raised in the Mitchell’s Plain focus group and the participants highlighted that the community is becoming more health conscious.

*Yes there are, people have become a lot more health conscious here in Mitchell’s Plain. You see more people running and riding.*

The majority of the participants in the Mitchell’s Plain focus group are middle-aged and indicated that they use bicycles as a way of keeping fit and to lose weight. The same is true for the Westlake Eyethu participants, with one middle-aged man mentioning that a hip injury prevents him from doing most exercises, but cycling is possible and beneficial for him. Contrastingly, in the Grassy Park focus group, the health benefit is a much less dominant theme. The group consists of younger participants, with those involved in sport cycling citing fitness as a major motive. As for the Lavender Hill focus group, it is the group with the most school learners, but also the strongest sport cycling culture because of the cycling club at the BEC. Consequently the majority of these learners cycle with the club and compete in races, therefore placing importance on the need to be fit. However those participants not involved with the club, do not place much value on the health benefit.

#### 4.2.7 Direct travel, environmental benefits, and flexibility of travel by bicycles

The ability of bicycles to provide more direct trips and therefore increase the convenience of travel, was not the most frequently mentioned in any focus group but was raised regularly. That said, the most prevalent benefits, time and financial savings are a result of bicycles offering more direct trips. So although it may not have been explicitly or frequently mentioned by many participants, this benefit is implied by other benefits participants view as critical. Some participants also felt that being independent of the delays and timetables of public transport is one of the most significant benefits of using a bicycle.

The emissions savings and environmental benefits of bicycles did not emerge as a dominant theme in the majority of focus groups, but it is a theme that was raised regularly by participants in the Mitchell's Plain focus group.

*Yes it's a good idea, people save money, it's healthy, encourages young people. Roads are now unsafe. Also the environment and pollution – it is very helpful, global warming, carbon footprint, if you drive on your bike – the fumes from the bus are harmful.*

Whilst this may be evidence of some awareness of environmental issues, environmental impacts of transport and other broader environmental issues are shown not to be major concerns for the participants of this study or their communities. Certainly environmental impacts of transport are not significant enough to influence the modal choice of participants. So whilst increasing the prevalence of bicycle use will contribute to lowering the carbon-intensity of the transport sector in Cape Town, based on the responses of participants, this benefit of cycling is not one that dictates modal choices of participants.

The last benefit listed in Figure 10 'able to get to multiple places of work', although it is not a dominant theme that emerged out of any of the focus groups, there are a handful of participants that expressed that their work day requires them to get to a number of locations. These participants indicated that relying on the public transport network available in Cape Town to meet their mobility requirements works out costly both in terms of time and money, and therefore bicycles are well suited to their needs.

Up to this point the benefits of using bicycles for focus group participants has been discussed, and particularly how these benefits relate to improved mobility and livelihoods. BECs play a key role in increasing the prevalence of bicycle use in their communities. The following sections illustrate the way in which BECs do this.

### 4.3 The roles of BECs in their communities

Table 6 lists the different services offered by BECs and descriptions of these services. The table is based on responses of focus group participants and the interviews with BEC owners.

**Table 6:** The role of BECs in making cycling more accessible to the poor, as expressed by BEC owners and focus group participants.

Services offered by BECs		
Service	Description	Number of times raised
Increase accessibility	BECs improve the accessibility to bicycles and repairs through their close proximity to their communities, as well as offering cheaper products and services. They are also places where there communities can find out more about cycling.	35
Cycling clubs	BECs have set up cycling clubs to give the opportunity for school learners to train together and participate in cycling races.	25
Quality and affordability	Affordable products and services are key aspects of BECs. The high quality of the products and services, is an advantage BECs provide that other low-cost options do not.	13
Lay-by's	This service allows people to pay off a bicycle over a period of time, whilst the BEC owner reserves it for the customer.	7
Roadside and home repairs	BECs offer call out services to do roadside bicycle repairs or bicycle repairs at customers' houses.	6
Bicycle mechanic training	BEC owners provide bicycle mechanic training for members of their cycling clubs.	5
Taxi service	The Lavender Hill BEC is working on the idea of a taxi service using a bicycle rickshaw.	2

Table 6 illustrates some of the ways in which BECs are different to the typical bicycle shops in Cape Town. The sections that follow discuss the different services offered by BECs.

#### 4.3.1 The role of BECs in increasing accessibility to quality bicycles, repairs and information

The numerous ways in which BECs increase the accessibility to cycling, emerged as the most frequently raised service that BECs offer to their communities, alluded to 35 times in the four focus groups. A common theme that emerged from all focus groups was that before BECs were established in their communities there were no bicycle shops nearby. This meant people had to

travel long distances to get to a bicycle shop. Not only did physical location make it difficult for people to utilise the services of a bicycle shop but high prices made the products and services of these shops unaffordable for the communities of the focus groups. As indicated by participants, the upfront expense of specialised road and mountain bicycles are prohibitive for poor households, and these are the type of bicycles that the majority of bicycle shops in Cape Town focus on supplying. Conversely participants expressed that the affordability and suitability of the bicycles supplied by BECs, makes the BECs an appealing option for people from the community that want to buy bicycles.

In addition to improving accessibility in terms of distance and price, due to the location of BECs and the fact that BECs are run by a member of the community, they serve the important function of acting as information nodes for cycling. Information about cycling is lacking in many of the BECs' communities and people do not have places where they can find out more about cycling. In the opinion of focus group participants, language even plays a role in the ability of customers to find the information they need. With BEC owners being members of the community they speak the language of the majority of their surrounding communities, Afrikaans or Xhosa depending on the location. Below is the account of a participant on the way in which information is a barrier in her community.

*I didn't know what to do until I came to Mesback and he told me what to do. I googled it. But what happens to the people that don't have money to join these groups? What happens if you don't have money to buy a bike, a road bike costs a lot. What about those people who really want to cycle but don't know what to do and are so clueless? Like if a young boy comes to Mesback and wants to cycle, he will ask what can he do.*

As evidenced in this statement, the knowledge gap and accessing knowledge is a problem in these communities. BECs have narrowed this gap and this is evident from the responses of the members of the community that interact with BEC owners. With BECs increasing the exposure of their communities to bicycles, the benefits of cycling to these communities have become more visible as one BEC owner explained.

*My daughter is riding, chances are that she will teach her kids and get them to ride. Because we ride to school every day. Every morning, every afternoon.*

Participants feel that introducing BECs in other areas has the potential to have similar effects and increase the prevalence of cycling in more communities.

According to participants before BECs, repair services available to them were either far away or sub-standard. Whilst providing affordable bicycles is an essential aspect of the business of BECs, the emphasis on repairs is an equally as important and unique service of BECs. Some BECs even offer roadside repairs and call out repairs to customers' houses. It is evident that increasing the accessibility to cycling is valuable to the communities of the BECs, as without the BECs many of the services they offer are not available to these communities.

#### **4.3.2 The role of BECs in addressing the need for affordability and quality**

Whilst affordability is the primary concern for nearly all participants, the need for quality is also highlighted by the fact that it was raised 13 times. Participants said that places like Makro supply bicycles for similar or even lower prices than BECs, but that the quality of bicycles is not of the same standard.

Because many of the present and potential customers of BECs have little disposable income and are involved in the informal sector, there is a need for BECs to develop a service that offers some financial flexibility. Some BECs have recognised this need and begun to offer 'lay-by's'. The value in this service is that it allows people to pay off a bicycle gradually and whilst they are paying it off, the BEC owner reserves the bicycle for them. This provides customers with a solution for managing with the upfront expense of bicycles, which is something that most other bicycle shops in Cape Town fail to address. However not all BECs offer this service, consequently in some of the focus groups this service was not mentioned.

#### **4.3.3 BECs and cycling clubs**

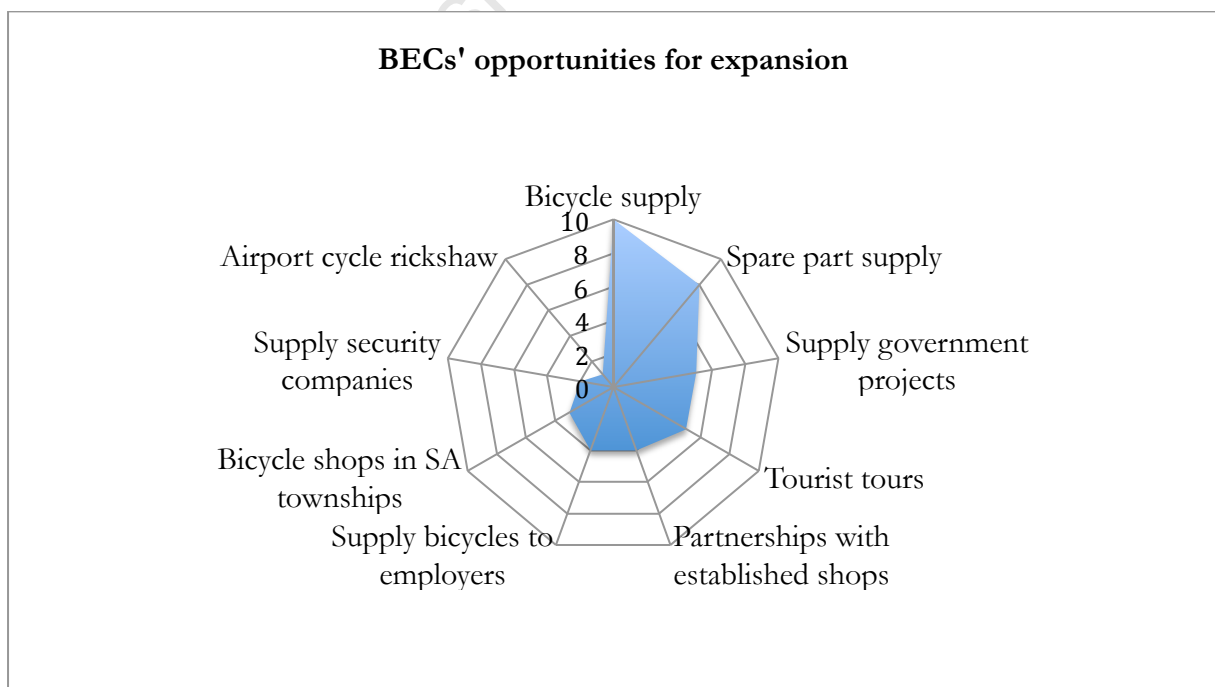
The role of BECs in sport cycling by running cycling clubs is the second most frequently raised service of BECs, being raised 25 times in the four focus groups. This demonstrates that the prevalence of sport cycling in Cape Town strongly influences people's perceptions of the function of bicycles. The value of cycling clubs offered by BECs was mainly brought up by the focus groups of BECs, which have cycling clubs. Although it was raised in others, it was not as dominant. As most of the BECs are located on school grounds, learners represent a sizeable potential market for developing cycling clubs. The BECs that do have cycling clubs lend bicycles to their members, mostly school learners. Club members indicated that without the club they

would not have access to bicycles. The clubs also present the opportunity for learners to compete in races. Some BEC owners have even taken it upon themselves to give bicycle mechanic training to the club members so that learners are able to fix bicycles themselves. One cycling club in particular has created such a strong community that it acts like an aftercare for its members. Locating cycling clubs at schools exposes more learners to the capabilities and benefits of bicycles. The positive way, in which the members of the cycling clubs perceive bicycles, is testament to the difference these clubs are making. In spite of the many positives, some of the BECs still do not have their own cycling clubs.

In partnership with BEN the BEC in Lavender Hill has come up with the idea of using a bicycle rickshaw as a taxi service, mainly for old people in the community. The idea is not operational yet.

#### 4.4 The opportunities for expansion of BECs

It is clear that BECs offer an array of services that have become important for their communities. With time BECs have become more established businesses and there remains potential for them to expand further. The focus group participants and BEC owners expressed their ideas for how BECs can expand in the future, and the frequency each idea was raised is represented in Figure 11.



**Figure 11:** Opportunities for expansion of BECs, as expressed by BEC owners and focus group participants, represented as level of frequency with which each opportunity was raised.

The thinking communicated by the BEC owners shows that many of them have ambitious visions for their shops, and ideas of how to grow their businesses.

#### **4.4.1 Improving current business**

Most of the ways that the BECs envisage for expanding their businesses relates to improvements in their existing business practices. The most frequently raised of these is to improve the supply of bicycles for the BECs, as represented in Figure 11. Improving the spare part supply is the next most frequently raised, being brought up eight times. BEC owners expressed that when their shops are well stocked, they are most profitable. However available capital is a constraint for how well stocked BECs can be. BECs owners also discussed that because they buy spares for the same price as the rest of the public, repairs are not a lucrative element of their businesses, as they are only able to charge for labour. Focus groups participants believe that if the issue of spare part supply and bicycles is addressed it will improve the profitability of BECs.

#### **4.4.2 The opportunity for BECs to work with government and employers**

Another one of the major opportunities that BECs see for improving business is increasing the scale of their businesses. Acting as suppliers to government projects was raised on five occasions. The BEC owners indicated that their involvement in government projects would give them a chance to do business on a bigger, more profitable scale. This is part of their vision to expand into businesses that are more than workshops. This is a target of the BECs, because currently the profit margins of their businesses are tight, and one of their primary concerns is to become more lucrative businesses.

The opportunity to work with employers was only raised in the focus groups of the Westlake Eyethu and Mitchell's Plain, Alphine Park, BECs. The BEC owner in Mitchell's Plain, Alphine Park, explained how the owner of a small construction company bought ten bicycles for their workers to commute to and from work. As well as supplying bicycles for these workers, the BEC owner ran a short training course on the basics of bicycle maintenance. The construction workers expressed that travelling by bicycle instead of public transport saves them time and money. An important aspect of the financial benefit for workers is that their company purchased the bicycles. A monthly instalment was then deducted from their salaries over the following six months to pay off the bicycles. This is a way of addressing the obstacle of the high upfront cost of bicycles, which is often cited as a major barrier against people from low-income communities

using bicycles. In addition, one of the most crucial benefits workers described, is that they can work overtime without having to worry about how to get home. This gives them the opportunity to earn extra money. When they were reliant on public transport, the irregularity of transport services in the late afternoon and evening prevented overtime work. As safety is a concern of the workers they cycle to and from work in groups. Those living close together meet up and make the trip together. The idea of supplying bicycles to employers was raised by BEC owners in Westlake Eyethu and Mitchell's Plain, Alphine Park, as both have some experience of supplying bicycles to employers. They feel there is scope to run similar schemes with other and bigger employers. This is a service beyond the scope of the initial business model of BECs and hence it was not mentioned in all focus groups.

Supplying bicycles for tourists tours, is another more niche activity raised by the BEC owners in Masiphumelele and Westlake Eyethu. The BEC in Masiphumelele was involved in supplying bicycles to organisations that run tourist bicycle tours. Considering the volume of tourists in Cape Town during the summer, this is an avenue that could supply a great deal of work for BECs. A cycling club in Khayelitsha, Velokhaya has partnered with a local travel company Bike & Saddle and runs township tours on bicycles. Initiatives like these are important for BECs as they offer ways to diversify their income streams, making their businesses more resilient in quiet times. The issue of diversification is a crucial element of successful BECs. For example, the wife of the BEC owner in Westlake Eyethu, set up a tuckshop next to the BEC so that customers can buy food and drinks, whilst waiting for their bicycles to be repaired. Their long-term vision is to turn the tuckshop into a restaurant.

#### **4.4.3 The opportunity for BECs to work with the private sector**

The opportunities that are not directly linked to the current business activities of BECs were not frequently raised. However certain BEC owners, particularly the one in Westlake Eyethu did come up with a number of suggestions. Some of these are to do with working in conjunction with the private sector. One of the opportunities is to work with ADT<sup>2</sup>. ADT relies on bicycles to provide one of their services – the neighbourhood patrol. Not only would this provide an avenue for bulk bicycle sales, but the maintenance of a patrol fleet and need for spares would generate a regular flow of income. A key constraint that BEC owners drew attention to is the unpredictability of business, and the small profit margins of doing repair work. BEC owners indicated that they often do not have money to buy spares, so they ask customers to buy the

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<sup>2</sup> ADT is a security company and provides a patrol on bicycles as one of their services

parts and then charge for the labour. A constant income source would address this issue and make repairs more profitable, because if the BEC owners purchase the spares, they could add a mark up in addition to the labour charge. The problems with the current spare part supply is a recurring theme in all the focus groups. The following is an account from one of the BEC owners, expressing his ideas about partnerships with the private sector.

*My shop is well established now and doing well. I met with ADT so that I could be responsible for their bicycle maintenance...I also approached the post office to see if I could do the same and custom build bikes for them. I am still waiting on them. These are the bigger opportunities that are needed to really make business grow...*

*I have been meeting with the Airports Company South Africa (ACSA) to speak about rickshaws at the Cape Town airport to replace the golf carts. The proposal is in collaboration with Synergy who work with big companies, such as DSTV and ABSA. The rickshaws will also have an electric motor to assist the drivers. ACSA are in full support of the idea as it won't cost them anything. There will be companies paying for advertising on the sides of the rickshaws. This is what will fund the rickshaws.*

The idea of financing the bicycle rickshaw at the airport through advertising would be appealing for the airport, as it means they can take on board services at very little, or no cost. These ideas of working with different companies, represent opportunities that would allow BECs to expand considerably. It also demonstrates the importance of BECs first becoming well-run businesses before they can start thinking about branching out into these kinds of business opportunities. The difference between Westlake Eyethu and the other BECs is evidence of the way in which the stage of business development dictates available opportunities.

#### **4.4.4 The potential for BECs to increase cycling in South African townships**

The lack of bicycle shops in South African townships represents a potential market that is largely neglected, apart from the services provided by BECs. Making cycling affordable and accessible to the millions of people living in South African townships is a significant opportunity, and through partnerships with established bicycle shops, one BEC owner has begun to investigate the possibility of setting up bicycle shops in more of South Africa's townships. BECs have created a market by offering services that other bicycle shops do not offer.

*I think for me my goal is to make it affordable and accessible to people in the townships, that's why I'm really working on the deal I spoke to you about with Olympic Cycles<sup>3</sup> to open a shop together. And make sure you know there are about 5 million people out there in the townships. No cycle shops. You know make it accessible, make it affordable...*

As outlined in the above statement forming partnerships with well-established bicycle shops is one of the ways BECs owners see for expanding their businesses. Interestingly, the idea of expanding to other townships was not raised by all BEC owners. This is indicative of only one or two BECs being in the position to think about establishing another shop, whereas the others need to concentrate on improving their businesses.

#### 4.5 The uses of bicycles for business purposes

BECs are not the only businesses utilising bicycles. Table 7 lists the business activities that bicycles are being used for, in the communities of the BECs as expressed by focus group participants.

**Table 7:** The existing uses of bicycles for businesses in the communities of BECs, as expressed by BEC owners and focus group participants

Bicycle uses for businesses		
Business activity	Description	Frequency raised
Gardening	Bicycles are used by gardeners to transport their equipment and get to different places of work.	10
Postal service	The postal service in Cape Town uses bicycles to deliver post to households.	7
Street vending	Street vendors use bicycles to transport their stock.	5
Painters	Bicycles are used by painters to transport their equipment and get to different places of work.	5
Food delivery	Certain companies and individuals use bicycles to deliver food.	2
Plant selling	A man in Mitchell's Plain uses a bicycle to transport plants to make door-to-door sales.	1

The participants of this study described the variety of ways in which bicycles are being used for business purposes. Although these examples were cited numerous times by the focus group participants, bicycles are only utilised in these capacities by a small collection of individuals in their communities.

<sup>3</sup> Olympic Cycles is a well-established bicycle shop in Cape Town

The job creating potential of BECs has been discussed in previous sections, as well as their opportunities for growth. As evidenced in Table 7 and in the following excerpts, bicycles are also used to contribute to people's livelihoods.

*I know guys in Capricorn who use their bikes to carry stuff from the shops, they are buying stuff for other places, their shop, food or clothes, you know those bikes with trailers they put anything on them. You can see some people maybe now they buy a car but all along he was transporting his stock by bike. Like me if I go to the shops I use my bike, I don't have to use a taxi.*

*Yes there is a guy who does grass cutting, he has a trailer which he hooks on his bike, and carries all his equipment on this trailer. And then there is a guy who is selling plants and he goes around on his bike.*

*I met a lady from Muizenberg at the community hall, she told me how she employed a guy to do her gardening once a week. Then she came to buy him a bike. This has allowed him to work for many different families. This shows what opportunities a bike can open up for people.*

*There are guys who are doing couriers in town delivering stuff on bikes,*

*In Tygervalley where I work, there is a take away place. And companies in that area order from the take away place. Then there is a guy who has a bag with him and delivers the food on the bike.*

The above excerpt demonstrates the many different uses of bicycles for by micro-businesses. The independence and flexibility which bicycles provide, suit the informality of these activities and the money they save helps to improve the performance of these micro-businesses.

Businesses that are dependent on getting to a number of locations to carry out work, and need to transport equipment, mobility is essential, which makes bicycles a valuable asset. Gardeners are an example of those involved in a business activity that benefits from the use of a bicycle and hence it is the most frequently raised use for bicycles by a business. Painters and street vendors are also commonly cited examples. All three of these occupations are common in the BECs' communities, and this is reflected in the responses of the focus groups, as they are exposed to them in their everyday lives. One of the oldest examples of bicycles used in daily business practice is the postal service. All over Cape Town bicycles are used to deliver post. This is the second most frequently raised occupation as shown in Table 7.

Other less frequently raised examples of businesses using bicycles include food and plant delivery, and the Lavender Hill community suggested starting a bread delivery service using bicycles and the local bakery.

During the focus groups a number of creative ways that bicycles are being, or could be used in small business activities were identified. Increasing the popularity of bicycling in Cape Town has the ability to create business opportunities and contribute to improving local business practices. Participants expressed the opinion that currently bicycles are being under-utilised for business purposes.

University of Cape Town

## **CHAPTER 5 – DISCUSSION**

This study has presented evidence from the literature, and focus groups and interviews on the importance of transport for LCD, and the way in which BECs and bicycles can improve mobility and livelihoods. This chapter discusses the findings of the study including how bicycles and BECs are making a contribution to the transition to LCD that is required, as well as factors that are inhibiting progress.

### **5.1 The importance of transport for pro-poor low-carbon development in Cape Town**

The various elements of LCD and its relevance and the need for it in South Africa, and specifically Cape Town, have been discussed. The definition of mobility provided by Bryceson et al (2003), gives an indication of the magnitude of the task that faces the transport sector in Cape Town, if it is to support mobility for all. Given the low population density of Cape Town (Turok & Sinclair-Smith, 2009), the prevalence of private vehicle use (City of Cape Town, 2011a), and the emissions intensity of the transport sector in Cape Town (Sustainable Energy Africa & University of Cape Town, 2011), transport in Cape Town is in contradiction with the goals of LCD. An additional layer to this carbon-intensive network, is the levels of inequality the system fosters, illustrated in the responses from focus group participants, and how the financial burden, main mode use, and time of travel is determined by income (Behrens, 2002; Behrens, 2004; Department of Transport, 2005a). All these factors point to the fact that at present, transport in Cape Town is a significant barrier to LCD, and there is an urgent need for changes in the transport network for it to make a contribution to LCD in Cape Town.

### **5.2 The potential of bicycles and BECs to improve mobility**

Mobility is a far more complex concept than simply the movement of people or goods. Mobility dictates the dynamics of a city and how people interact with a city and its opportunities (Bryceson et al., 2003), and therefore is a concept, which is not uniform but varies significantly for people, dependent on a wide set of variables. NMT plays a key role in mobility of the poor in developing countries (Litman, 2009). Despite this, NMT has been severely underinvested in, in Cape Town hence the small portion of the modal share that NMT is responsible for in Cape Town (City of Cape Town, 2011a). By looking at the roles bicycles fulfill in communities, it is possible to see how bicycles can, and do improve mobility of those that use them. Figure 9

shows the ways in which bicycles are being used within the communities of the participants of this study. The figure reflects the ability of bicycles to improve the mobility of their users in the wide array of purposes they are used for, even if only for a very small percentage of Cape Town's population. By increasing the use of bicycles as a transport mode, the benefits of using bicycles can become wider spread in Cape Town, as is evident in other parts of the developing world (Efroymson & Rahman, 2005; Kirkels, 2011). For low-income communities, there is a need for their selected modes of transport to provide flexibility and respond to the full array of mobility needs, without making the cost of mobility prohibitive (Bechstein, 2010; Kirkels, 2011). The responses of focus group participants demonstrate that by being used for business purposes, commuting, social purposes, and other functions, bicycles offer a suitable mode of transport for the poor. This is indicative of how bicycles and their related infrastructure, are able to address the features of the transport system that prevent low-income communities from fully participating in the life of the city. The current transport network in Cape Town is one that maintains numerous hurdles for those that do not own cars, primarily the poor. Though the use of bicycles addresses numerous barriers, they are not the only solution. Bicycles deliver benefits for travelling short distances but less so for distances over 20 kilometres (Efroymson & Rahman, 2005). Integration of bicycles with the broader transport network is important to expand the uses for which they are appropriate. This requires improvements in other components of the transport system. The following section, based on the responses of participants, will have a more detailed look at how bicycles and BEC, can address some of the problems confronting the mobility of low-income households in Cape Town, and also how some of these features make it a challenging environment for bicycles and BECs. The main concern of this study is how these benefits relate to improved mobility, and contribute to improved livelihoods, and poverty alleviation.

### **5.3 The potential of bicycles and BECs to improve livelihoods and contribute to poverty alleviation**

In order for LCD to be truly pro-poor, better integration of underprivileged communities in the process to transition to LCD is essential. One of the main aims of this research is to investigate what opportunities exist to advance the poor's integration into Cape Town's LCD path, and demonstrate that by placing emphasis on the poor and the skills they possess, LCD can be a process that values and incorporates their contributions, and is beneficial to them. In order to illustrate and explore this idea, this study used the case of bicycles and BECs. Based on the findings of this investigation the following section seeks to provide evidence for how bicycles

and BECs can play a role in poverty alleviation, and contribute to a more inclusive low-carbon future.

### **5.3.1 The role of bicycles and BECs in addressing the financial burden of mobility**

Figure 10 details the benefits of bicycles as indicated by participants of the focus groups. The issue of the financial burden of mobility has emerged as a prominent theme in this study. Based on a conservative estimate of two minibus taxi trips for each weekday, the cost of transport is a minimum of R240 a month per person, purely for commuting. Despite the fact that over an extended period of time the cost of public transport exceeds the initial cost of a bicycle, many households remain dependent on public transport, as the frequent small payments are more manageable with their income streams than paying a lump sum. Thus, for a family of four, based on the estimates provided by participants, the monthly cost of transport is R960. For households with a monthly income of R3 500, based on this estimate their household travel costs would be 27% of their income. An alarmingly high proportion considering 47% of households in Cape Town earn less than R3 200 a month, meaning that close to half of households in Cape Town spend roughly a third of their income on transport (Cape Town, 2012). According to the Department of Transport (2005a), households in South Africa earning less than R1 000 a month spend up to 35% of their income on their work commute. The estimates from the participants' responses, indicate the financial burden of mobility for poor households may now be even more severe, than in the past.

Given this context affordable transport alternatives are crucial for low-income households. With the majority of bicycles sold by BECs ranging from R400 to R700, based on the amount participants currently spend on public transport every month, the payback period for a bicycle is on average between two to three months. After the initial payback period, bicycle users could save close R240 a month, which they could put to other uses. This illustrates the long term savings that can be delivered by bicycles. The provision of quality, low cost, utility bicycles is what makes the service offered by BECs unique, and has been severely lacking in Cape Town. Without an adequate supply of these kinds of bicycles, the growth of cycling as a mode of transport is hindered especially in low-income areas.

The importance that participants attach to bicycles for addressing the financial burden of mobility is evident in Figure 10, where it is shown as the most prevalent benefit of bicycles for

participants. Not only are bicycles an effective way for these households to save money, savings are accompanied by improved mobility. Once a bicycle is purchased, the number of trips of the user is not hindered by cost. This benefit is demonstrated by Bechstein (2010), based on the experiences of people in Pretoria commuting by bicycle.

### **5.3.2 Bicycles as a low-cost, desirable alternative to public transport and complimentary transport mode**

Two trips a day cannot be expected to meet all mobility demands (Bryceson et al., 2003). The existing public transport network was designed to move people from the low-income suburbs on the periphery, into the city for work, and then back to their homes (Barrett, 2003). Although there are efforts like the investments into the MYCiti BRT, to improve transport services available to all and address some of the issues caused by the spatial legacy of apartheid, the spatial layout of the city that the current public transport network has inherited, provides a challenging environment for a public transport system to operate effectively in. With the layout of the city and historical underinvestment in public transport, the current public transport system does not provide a satisfactory level of mobility for its users (Behrens, 2004), the dissatisfaction with public transport expressed by participants in Figure 8 illustrates the negative elements of the public transport system. Furthermore extensive development of the network is required if it is to be able to support mobility beyond commuting purposes (Behrens, 2004). The inadequacy of the public transport network is highlighted by the extent to which low-income households supplement large parts of their trips by walking long distances. And is further evidenced (in Figure 8) by “time consuming” and “lack of coverage” being raised frequently as issues associated with public transport, by focus group participants, who are predominantly public transport users. Interestingly, although an activity survey in Cape Town discovered that 61% of low-income households rely on walking as their primary transport mode (Behrens, 2004), this is not reflected in the modal split of Cape Town, which shows an absence of NMT in the modal split (City of Cape Town, 2011a). This is an important point because without recognising the role that NMT plays, its importance is not appreciated and planning of new systems will neglect the need to invest in supporting infrastructure.

Considering the unemployment rate in Cape Town is 24% and is even higher in the communities of the BECs (City of Cape Town, 2012), and that the expense of public transport emerged as a prominent issue particularly for focus group participants as shown in Figure 8; the provision of affordable mobility solutions will help to remove a significant financial burden for households in

these communities. And, although most aspire to buying a car, car-dependent households spend roughly 50% more on transport than households that rely on multiple modes – making it unaffordable for most low-income households (McCann, 2000). Creating attractive and affordable alternatives to car-dependent mobility is therefore needed in Cape Town. Viewing bicycles as part of the transport network and improving public transport to incorporate bicycles as part of this network, has been shown in other parts of the world such as Bogota in Colombia, to be the most effective way of developing an alternative to car-dependent mobility (Nair & Kumar, 2005).

### **5.3.3 Public savings from investing in bicycles and supporting infrastructure**

The financial savings discussed so far predominantly refer to savings for households. However, another factor that was alluded to by focus groups is the potential for public savings. Investing in NMT infrastructure that complements the public transport network is more cost-effective than solely concentrating on a road network for cars to support mobility in the city (I-CE, 2000). The IRT Programme and its investment in BRT as well as NMT infrastructure demonstrate that finally a shift in transport planning is occurring in Cape Town. Despite being the most cost effective investment to improve transport services for all, it should be noted that the investment required is significant and needs to be viewed as long term strategy. An additional saving is the fuel costs. South Africa imports the majority of the liquid fuel supply, and spends foreign exchange reserves doing it (Vanderschuren et al., 2010b). Investing in NMT infrastructure and increasing NMT use would reduce the demand for liquid fuels and save money spent on imported fuels.

Subsidies for public transport are also a significant expense. Based on international experience it is suggested that the fares of public transport should cover approximately half of the operating costs, and the rest should be covered by subsidies (City of Cape Town, 2009b). Bus subsidies allocated by the Department of Transport to the Western Cape Government amount to R540 million per annum, and R385 million per annum for the operating costs of rail commuter services (City of Cape Town, 2009b). These subsidies are aimed at making transport more affordable for those who cannot afford to pay the full cost of commuting (City of Cape Town, 2009b). Focus group participants in Mitchell's Plain are of the opinion that a subsidy for bicycles is the best way to encourage people to use bicycles as their mode of transport. This is a more cost effective option than subsidies for public transport, and potentially easier to target compared to the existing public transport subsidies that are blanket subsidies, which means they

benefit all users, not just those who need it – this makes provision of the subsidy expensive. It would be unreasonable to think that bicycles should be subsidised, and public transport subsidies phased out. However it does illustrate that NMT represent cost-effective modes of transport, and investing in these modes and the supporting infrastructure, is a way of improving transport services at a lower cost than if motorised transport is invested in exclusively.

### **5.3.4 The ability of bicycles to address the time-consuming nature of mobility of low-income communities**

The time of travel is another crucial factor that emerged. Figure 8 highlights how, for focus group participants, the majority of which are public transport users, the time-intensive nature of travel by public transport is a major factor. This finding is reinforced by Figure 10, which shows the prevalence with which the time savings generated by bicycles was raised as a benefit. It is the second most frequently raised benefit of bicycles. According to Behrens (2002), low-income households spending roughly double the amount of time on daily travel as high-income households (Behrens, 2002). Focus group participants attributed the multimodal nature of their trips as the principal reason for their time intensive travel. Dependence on public transport necessitates multimodal trips. Furthermore the distance that members of low-income communities need to cover in South African cities is long, because these communities have historically been located on the outskirts of the city (Maylam, 1995). Figure 2 shows Mitchell's Plain and Lavender Hill, as examples of this trend. The suburb of Grassy Park neighbours Lavender Hill, with Westlake not too far from there, so it is clear travel distance is a factor for all the BEC communities. By investigating modal choice according to suburb, it is evident that there is a stark difference in dependence on public transport between income groups with 85.7% of trips entering the CBD from Khayelitsha by public transport, whereas from suburb of Wynberg only 14.8% of trips are public transport (Department of Transport, 2005a). Khayelitsha is a predominantly low-income suburb, whereas Wynberg is a middle to high-income suburb. The relationship between transport modes and income is clearly shown by Behrens (2004), with walking and public transport being the main modes for low-income households and with increasing income the role of walking and public transport becomes minor, with a shift to private vehicles as illustrated in Figure 7. Participants indicated that the use of bicycles addresses many of the time-related issues of travel through providing more direct trips, not being subject to delays frequently associated with public transport, and not having to sit in traffic. The issue of time of travel is a key concern of this research, as it is a feature that distinguishes mobility across income groups and speaks to underlying fundamental differences in mobility; such as

accessibility, convenience of travel, and how direct travel is. When trying to understand how mobility is different across income groups, the factors that contribute to these differences need to be defined. The time of travel is a factor that can be quantified and used to display differences in mobility. It is also a factor that can be used to investigate other relevant features, and how the introduction of bicycles and integration with the public transport network, impacts on these.

Given the long travel times of low-income households (Behrens, 2002), working members of the households often have to leave early in the morning to get to their place of work and return to their homes late. For those with young children, this leaves little time for parents to spend with their children. The ability of bicycles to provide participants with door-to-door travel, prevents the need for multimodal travel, and saves time. However it is important to consider that bicycles only deliver time savings for relatively short distances (less than 20 kilometres), whereas for long distances motorised transport results in time savings (Efroymson & Rahman, 2005). So for people in Mitchell's Plain to get to the CBD, by bicycle is not the quickest way, which is why participants expressed the need for bicycles to be permitted on trains. For getting around Mitchell's Plain and to neighbouring suburbs, bicycles do show that they can be direct and save time. Figure 9 illustrates that bicycles are used for travel within a suburb for purposes such as visiting friends or going to shops. As all BEC communities are located on the outskirts of Cape Town, it does place a constraint on what uses bicycles are appropriate for. The potential of bicycles needs to be understood, and supported. For instance for the direct short trips they can serve within and between suburbs, supporting infrastructure is required. Whereas for longer trips, changes in the broader network are required, for instance permitting bicycles on trains and buses. Permitting bicycles on the MyCiti buses is the first example of allowing bicycles on public transport in Cape Town. Bicycles are only permitted in the wheelchair area of MyCiti buses and if there is no space in this area, a passenger with a bicycle needs to wait for the next bus that does have space. This is to ensure passengers have preference over bicycles. In April 2013 a law change was also introduced allowing bicycles on the trains for a R20 fee. Whilst these laws may not be entirely satisfactory at this stage, they are encouraging signs. In other cities bicycles are only allowed on public transport outside peak commuting hours (Martens, 2007). This seems to be the optimal solution as it allows bicycle users to take their bicycles with no extra cost, but avoids bicycles from taking up valuable space in busy peak commuting hours. A different approach to promote inter-modal integration is the experience in the Netherlands, where there has been major investment into improving parking facilities for bicycle at train stations

(Martens, 2007). This prevents adding to congestion on public transport, but means that a passenger's bicycle can only be used on one side of the train or bus trip (Martens, 2007).

### 5.3.5 Bicycles for improving access to the city

The evidence presented thus far demonstrates how mobility varies between income groups, and how this influences the level of access different income groups have to the city. Bryceson et al (2003) provide the following definition for accessibility: “Accessibility denotes the *physical proximity*, or ability and ease of reaching various destinations, or places offering opportunities for a desired activity.” (Bryceson et al., 2003: 7).

It should be noted that improving access includes many features some of which are contained in the other benefits that are discussed. So whilst “improve access” may not appear the most frequently raised benefit in Figure 10, elements of improved accessibility are contained in benefits such as financial and time savings, making trips more direct, and allowing users to get to many places of work.

The first element of the definition is physical proximity, which refers to how distance to the destination of a desired activity is. A point that has been made is the positioning of Grassy Park, Lavender Hill, Westlake Eyethu and Mitchells Plain on the outskirts of the city and it is mainly over shorter distances that bicycles improve access (Efroymson & Rahman, 2005).

“...ability and ease of reaching various destinations” is arguably the most crucial aspect to link with poverty alleviation. For it is the ease with which different income groups are able to reach their desired destinations, that differentiates mobility across income groups in Cape Town. The long travel distances, the indirect nature of trips, and the time-consuming nature of trips that were raised as prominent characteristics of participants' daily travel, are indicative of the difficulties in getting around the city that those from low-income communities experience.

The final aspect of accessibility included in the definition is ‘places offering opportunities for a desired activity’. This demonstrates that accessibility cannot be evaluated on a person's ability to get to work but rather that the mobility of each person provides for all motives of travel (De Witte et al., 2013). This is a feature that has not been appreciated by our current public transport network (Maylam, 1995). As raised, access to work and basic services has often been the focus of efforts to improve the lives of the poor (Behrens, 2004). Indeed this is imperative, but this study

acknowledges that in order for low-income communities to move towards a desirable quality of life there also needs to be an emphasis on accessing more than basic services. Based on the variety of purposes bicycles are fulfilling in the communities of the BECs, the ability of bicycles to provide mobility for activities outside commuting is one of the strongest contributions of bicycles.

The need for transport modes that provide the flexibility to meet the needs of the poor's complex and informal livelihoods is important to support and improve their way of life (Kirkels, 2011). Although it is not a dominant benefit expressed by participants, it is only relevant to those that need to reach numerous destinations as part of their work day. These are the kinds of mobility patterns associated with many of those involved in the informal sector, and therefore although not reflected as important in this study, is an important benefit for those informal traders whose current mobility is a constraint to their businesses.

### **5.3.6 The role of bicycles in generating employment and improving existing businesses**

The need for job creation in Cape Town and South Africa has been highlighted in the National Development Plan, Cape Town NMT Strategy, and ECAP of Cape Town (City of Cape Town, 2005a; City of Cape Town, 2011b; National Planning Commission, 2011), and with the focus of this study being on bicycles for the low-income communities, the job creation potential of increased bicycling in Cape Town is important to this work. With the unemployment rate of 24% in Cape Town (City of Cape Town, 2012), a valuable finding that emerged from the focus groups and interviews, is the job creation potential communities associate with an increased bicycling culture and expansion of BECs (illustrated in Figure 11), as well as the use of bicycles for business purposes as shown in Table 7. The employment generation potential of bicycle use is a feature that has been demonstrated in other parts of the world, particularly Asia (Efroymsen & Rahman, 2005), but less evidence is visible in Cape Town and South Africa. The NMT Strategy of the City of Cape Town highlights the importance of the job creation aspect of increasing the prevalence of cycling in the following statement: "Develop and support low cost mobility initiatives that includes bicycle service centres, bicycle shops, secure bicycle parking, bicycle deliveries, and tourism-linked NMT projects...Improve availability of low-cost bicycles to poorer communities." (City of Cape Town, 2005b). The City of Cape Town's ECAP also expresses the job creation potential of investing in green technologies (City of Cape Town, 2011b). These examples from these two policies show that policy makers in Cape Town

acknowledge this potential. However, the same evidence is not visible on the ground. BEC owners expressed that they feel they do not receive support from local government. Improving the interaction and relationship between local government and those on the ground that can make an impact, is a key component of allowing bicycles and the associated micro-enterprises to reach their full potential. So whilst the job creation potential is present, and acknowledged in policy, implementation is needed. Part of this is opting for low-skilled labour intensive methods for building infrastructure to support bicycles (Efroymson & Rahman, 2005), the City of Cape Town's NMT Strategy highlights the importance of labour intensive methods from a job creation perspective (City of Cape Town, 2005b). Bicycles can also be used as a way of improving the performance of informal and micro-enterprises, for whom transporting their stock or their services to a wider market is a challenge. Participants cited gardeners and street vendors as some of the examples where this is relevant. According to Bryceson et al (2003) definition of mobility, *how* to transport goods is an important factor. Bicycles enable shop owners to transport stock quicker, over longer distances, and in greater volumes than on foot. This is the case especially for street vendors. It makes a significant difference to the way that vendors operate. In countries such as Kenya and India, the use of bicycles in this capacity has helped to reduce the cost of transporting goods and services of micro-businesses both in terms of time, money, and convenience (Efroymson & Rahman, 2005). Table 7 indicates that there are a variety of ways bicycles are being used for businesses. However these were not raised frequently in focus groups, as bicycles are only used in such capacities by a very limited group of people in the communities of the focus group participants. From this evidence it would appear these opportunities have been underutilised in South Africa, mainly because the barriers to bicycle use, and a culture that does not recognise bicycles as a mode of transport. Such opportunities should be given more consideration, as they improve profitability of micro and informal businesses. Informality is often perceived as negative and prevented by regulation. However the informal economy provides a livelihood to a major proportion of low-income communities, who will not enter the informal economy. Finding ways to support those in the informal economy should be encouraged.

### **5.3.7 Emissions savings of cycling**

Bicycles also yield emissions savings over other transport modes (Massink et al., 2011) and this is an essential attribute for a transport mode to be able to improve mobility in line with the principles of LCD. Not only does cycling bring about emission reductions, the manufacturing of bicycles compared to cars also results in substantial savings (Massink et al., 2011). The climate

benefit of getting more people on bicycles is that the more prevalent bicycle use becomes in Cape Town, the greater the emissions savings will become. As shown in Table 3 considering that the average private car emits 0.204 kilograms of CO<sub>2</sub> per passenger per kilometre, and the average bus emits 0.032 kilograms of CO<sub>2</sub> per passenger per kilometre, there are significant savings that can be achieved through increasing bicycle use (Massink et al., 2011). Additional emissions that could be considered are the emissions associated with the additional food that needs to be consumed to provide energy for walking and cycling. Additional food is needed to provide the energy for walking and cycling. There are emissions associated with food production and transportation. Quantifying the emissions savings of bicycles and the emissions associated with extra food production is beyond the scope of this study but is an area for future research.

### **5.3.8 Cycling as a desirable transport mode**

Initiatives such as the Smart Living Campaign and Smart Living Handbook have important roles to play in raising awareness about sustainability issues throughout Cape Town (City of Cape Town, 2011b). A key issue for bringing about change is creating the awareness of the need for change. Campaigns such as the Smart Living Campaign are aimed at making available the information supporting the need for change, and also to show ways in which change in lifestyles can be made (City of Cape Town, 2011c).

So far this study has provided evidence showing that the benefits accompanying bicycle use regardless of environmental benefits, are sufficient for motivating people to choose bicycles as their mode of transport for distances typically less than 20 kilometres (Börjesson & Eliasson, 2012). The responses of this study's participants demonstrate that people's decisions to use bicycles instead of public transport are based on tangible benefits delivered by bicycles rather than the environmental motives. When raising awareness about LCD and the importance of aligning development with environmental objectives, the message that LCD need not be a process where people incur greater costs, but rather that it is a process that produces environmental benefits, and in addition economic, social and other benefits. In the case of Cape Town the Smart Living Campaign is crucial for communicating the benefits of a transition to LCD. It shows that changes in lifestyle can deliver environmental benefits as well as save money.

The enjoyment of cycling and health benefits of cycling are factors that focus group participants attach value to. Whilst neither of these are central to this study, it is worth briefly discussing them and the relevance.

The enjoyment of cycling and the opportunity to compete, may not seem the most relevant benefit, as the study is investigating bicycles as a transport mode, not as a piece of sports equipment. In spite of this, this benefit does have relevance for the study and Figure 9 and 10 show that it is a frequently raised aspect of cycling in the focus groups. The difference between focus groups of the enjoyment of cycling and opportunity to compete, is based on location and composition of focus groups. Those BECs located on school premises, and with school learners in their focus group, are the ones that this benefit is most dominant. This suggests the importance of location of a BEC and the market this exposes them to. The fact that learners find much enjoyment in cycling highlights that school learners or young people should be one of the focus areas for promoting cycling, as it is in this group that a cycling culture can gain most traction. Participants expressed that cycling is perceived as an activity for young people and as neither suitable nor enjoyable for older people. The positioning of BECs and its impact on business is critical. Places like schools and stations have high volumes of people commuting and therefore provide exposure to large markets for BECs. Additionally the “enjoyment of cycling benefit” has a poverty-alleviating element. Participants expressed the lack of opportunities for children in their communities. Cycling provides a source of entertainment, and a productive way to use their free time, which in the opinion of participants can help to keep the children away from involvement in gangs.

The health benefits delivered by relying on bicycles for mobility are often cited as a benefit of a cycling culture in society (Börjesson & Eliasson, 2012). The term active mobility can also be used to describe NMT (Börjesson & Eliasson, 2012). All forms of NMT require human power and therefore activity is associated with all these forms. By appreciating that these forms represent an active mobility, it leads to the acknowledgement that these forms of transport (bicycles in this case) have the potential to improve the health of many of the city’s residents, especially those that are unable to fit in exercise outside working hours. The perceived health benefits of cycling vary between focus groups, with younger participants placing value on getting fit for races, older participants seeing it as a way to lose weight, whilst others place little value on this aspect of cycling. As discussed, because of the time spent commuting by low-income households, there is little or no time left before or after work to exercise and it is not a priority for most. Incorporating exercise as part of people’s daily commutes has the potential to improve exercise levels in the city at low cost (Börjesson & Eliasson, 2012). A healthy workforce is essential for a productive economy.

The importance of transport for the economy is evidenced in the problems that are being experienced in cities like Bangkok (Efroymsen & Rahman, 2005). Whilst the conditions in Cape Town are not nearly as severe, if the trend of overreliance on the private car persists, given the rising income levels associated with development, Cape Town could find itself in a similar position in the future. To prevent such a situation NMT and public transport need to become attractive enough transport modes to cause people to move away from car-dependent mobility.

The following section will discuss how the emergence of BECs has contributed to poverty alleviation, as well as the opportunities that are available to them.

#### **5.4 The role of BECs in making cycling more accessible to the poor**

Given the way in which the current transport system in Cape Town, fails to adequately serve the needs of the poor, there is a clear need for interventions that improve conditions for the poor. The findings that emerged from the focus groups show the unique set of services that BECs offer. Table 6 lists these services, which is useful for understanding how BECs have managed to improve the accessibility of cycling for their communities, and in so doing address some of the issues associated with the current transport system.

##### **5.4.1 The role of BECs in increasing the affordability of cycling**

Although bicycles are a low-cost transport option, focus group participants indicated that the bicycles sold by the majority of cycling shops in Cape Town are too expensive as they are designed for road cycling or mountain biking. BECs in selling second hand, affordable, utility bicycles are providing a unique service, one that makes cycling more affordable and therefore accessible to low-income communities. Despite BECs offering more affordable bicycles, the upfront, once off payment is still unmanageable for some households. As many of these households have no access to credit, it is not feasible for them to buy a bicycle. The value in the 'lay-by' system that the BECs have developed is that it makes bicycles affordable for customers who otherwise are not able to afford the upfront payment. It is an example of the financial flexibility that is needed by low-income communities, but not offered by other bicycle shops. Kirkels (2011) highlights the importance of services that align with the livelihoods and survival strategies of the poor. Because BEC owners are part of the community in which they operate, they are aware of the needs and constraints of their communities and have tailored their services accordingly.

#### **5.4.2 The value in the location and information provided by BECs**

Another reason for BECs being able to respond to the needs of underprivileged communities is because of their location. BECs are located in low-income areas and provide a service to these communities; their proximity makes BECs easily accessible for these communities. Physical proximity is fundamental to accessibility (Bryceson et al., 2003). Another benefit of the close physical proximity, is the ability of individuals to easily take their bicycles in for repairs and services. The emphasis BECs place on repairs is critical as the majority of bicycle shops in Cape Town place more emphasis on selling new stock. BECs even offer roadside repairs, or will travel to customers' houses to do repairs. In order for cycling to increase it needs to be a reliable transport mode, and repair services to ensure bicycles remain in working order are fundamental to this.

There are evidently numerous factors that hinder an increase in bicycle use in Cape Town. Lack of awareness is identified by the NMT Strategy as a major barrier to bicycle use (City of Cape Town, 2005a). Both the NMT Strategy and ECAP identified the need to promote awareness (City of Cape Town, 2005a; City of Cape Town, 2011b). The focus group participants indicated that the BECs have been instrumental in supplying information about cycling to their communities as demonstrated in Table 6, and even the fact that customers can converse in English, Xhosa, or Afrikaans with the BEC owners to discuss their queries. The BECs involvement on the ground is what makes them so effective in dispersing information. In the efforts of the City to promote awareness it is important to identify and support potential nodes on the ground such as BECs, that will ensure information reaches all sectors of the population.

Through being established with the intention of serving low-income communities, the services provided by BECs are appropriate for these communities, and through making bicycles more accessible to these communities; BECs are making a contribution to their communities to overcome some of the challenges presented by the existing transport system. This shows the value in a transport initiative developed with low-income communities at the centre, after decades of neglecting to acknowledge the needs of the poor, in transport planning and investments.

## **5.5 Opportunities for expansion of BECs**

The following statement in Cape Town's NMT Strategy has already been used to illustrate the job creation potential of bicycles: "Develop and support low cost mobility initiatives that includes bicycle service centres, bicycle shops, secure bicycle parking, bicycle deliveries, and tourism-linked NMT projects...Improve availability of low-cost bicycles to poorer communities." (City of Cape Town, 2005b). This statement also points to the many opportunities that have not been exploited, and therefore the possibilities that are available for BECs.

Based on the evidence provided by the focus groups, it is clear that there are numerous ways in which BECs have been instrumental in making a contribution to growing cycling in their communities. The BEC owners indicated that with time their shops have become more established businesses. The thinking communicated by the BEC owners shows that many of them have ambitious visions for their shops. Both owners and participants from the various communities shared their ideas on how to expand BECs. These are illustrated in Figure 11.

### **5.5.1 Improving bicycle and spare part supply to improve the performance of BECs**

Improving bicycle and spare part supply were the most frequently raised ideas for BECs to grow their businesses. This relates to an improvement in their existing business rather than expanding through new avenues, but is important as due to lack of capital, these are areas of their business that need to be addressed. There are also a number of other opportunities that were highlighted, that go beyond the existing services of BECs.

### **5.5.2 The role of BECs and bicycles in offering a desirable alternative to car-dependent mobility**

The neglect of low-income communities by transport planning in the past in South Africa (Kane, 2010), presents many opportunities for the work of BECs. Bicycle shops are present in very few South African townships. The BEC owner in Westlake Eyethu feels there is an opportunity for him to increase his influence, and open more bicycle shops in other townships. As the majority of those living in South African townships do not own cars and are not satisfied with the performance of the public transport, this presents a gap (Behrens & Schalekamp, 2010), and providing an alternative in these communities has the greatest potential of being well

received, compared to suburbs where private vehicle ownership is high. Whilst moving people from private vehicles to public transport and NMT is imperative in the transformation of Cape Town's transport network to support LCD, another component of the transformation is to incentivise people not to move from public to private transport. The term 'leap-frogging' refers to learning from progress that has been made, and instead of following a conventional path and repeating the same mistakes, skip the mistakes and follow an alternative route without the same negative consequences to get to a more beneficial end point. In the case of transport, the opportunity in South African townships, (and all suburbs regardless of income group), is to improve public transport and improve conditions for NMT; part of this is establishing more bicycle shops in townships. There is already evidence of increasing provision for bicycles on public transport. Improving the integration between transport modes and improving public transport, will go a long way to making public transport more convenient, and therefore desirable. BECs are well placed to play a role in this transformation through increasing the supply of affordable bicycles in townships, which will also strengthen their businesses. In order to expand BECs see forming partnerships with established bicycle shops to open up new shops in townships, as the most realistic way to expand.

### **5.5.3 The potential of working with employers and government**

The employee trip reduction programme as proposed in the ECAP is the City's way of encouraging companies to become involved in changing the travel behaviours of their employees (City of Cape Town, 2011b). Incorporating BECs into this programme would be one of the most effective ways of assisting BECs in up-scaling their businesses and incorporating the poor into the 'Optimum Energy Future' of Cape Town. The value in this idea is that it is a mutually beneficial relationship for BECs, employers and employees. Firstly, it provides business for BECs and can contribute to achieving the City's targets for an 'Optimum Energy Future'. For employers, subsidising bicycles is cheaper than car allowances, petrol allowances and parking bays (City of Cape Town, 2011b). It would also mean that employees would not need to rely on public transport which is often the cause for them being late for work, and would prevent employees who make use of private cars from getting stuck in traffic. It would also create a healthier work force, arguably resulting in fewer sick days being taken. BECs indicated their will to become suppliers of government projects, in order to increase the scope of their businesses. Incorporating BECs in the employee trip reduction would be a good starting point for including BECs in government projects. The BEC in Mitchell's Plain Alphine Park demonstrated the potential BECs being involved in ride-to-work schemes by the involvement with the

construction company, and supplying bicycles to ten of its workers. This is more informal than a ride-to-work scheme but is based on the same concept, and illustrates how BECs can be effective in this role, for even bigger schemes.

Another example of a government project in which BECs could be incorporated is the Shova Kalula Programme. The BEC owners indicated that they are not involved in Shova Kalula but feel it represents a good opportunity. Including BECs would contribute to meeting the major objectives of the programme by supplying affordable bicycles, and BEC owners providing safety training for school children. The programme also aims to develop bicycle micro businesses. BECs are examples of these, and becoming involved in the project, potentially as bicycle suppliers would significantly increase the scale of their business. One obstacle to this goal is that Shova Kalula is aimed at rural and peri-urban communities, which is not the current focus of BECs.

#### **5.5.4 Opportunities in diversification of income streams**

One of the determining factors of a BEC's success appears to be the ability of BECs to develop diverse income streams. Some of the BEC owners demonstrated they have visions to develop their business into one that is more than simply selling and repairing bicycles. These included running townships tours by bicycle for tourists, getting involved with ADT and the post office to supply and repair their fleets of bicycles that are part of their business services, and setting up a bicycle rickshaw at the airport. The wife of one of the owners is also running a tuckshop at the BEC and hopes to ultimately develop it into a restaurant. There are other opportunities that exist, as indicated in the NMT Strategy such as bicycle deliveries and secure bicycle parking (City of Cape Town, 2005b). In order for BECs to maintain a profitable business and to expand, these untapped opportunities represent valuable additional business avenues. As indicated some BECs have already shown the ability to do this. Ideas such as secure bicycle parking has potential, but location is fundamental to this idea. If BECs were to be located at stations and taxi ranks – the necessary volumes of traffic would make such an idea possible. It also shows the potential of developing a public transport system as an integrated network of multiple modes of transport. According to (Efroymsen & Rahman, 2005), bicycles are used in other parts of the world for a variety of functions for businesses. In South Africa there is little evidence of this. However the focus group participant described a number of ways in which bicycles are being used for business purposes by small pockets in their communities. These include food delivery, by street vendors, and by gardeners to get them, and their equipment to different places of work.

These examples show that for services that do not require long distances, operating by bicycle can yield numerous benefits. Opportunities do exist, but it is up to individuals, businesses and government to identify these by rethinking how business services have conventionally been provided – and where the introduction of bicycles could deliver benefits. The postal service as example of the usefulness of bicycles for delivering a service has been cited. Any business that is based on delivering a service over a short distance could use bicycles as a way of delivery. The CBD in particular is suitable for such an intervention as the distances required are not far. BECs can position themselves in this space to capitalise on such opportunities, and therefore diversify business services.

From the ideas that surfaced in the interviews and focus groups, it is clear that there is a wide range of ways in which BECs can expand their businesses. It is also evident that the most frequently raised ideas, are those related to improving or expanding the current business activities associated with existing BECs. The ideas that were less commonly raised are those that are not directly linked to the current business activities of BECs, but rather represent innovative ideas of particular individuals with big ideas and aspirations for their businesses. The owner of the BEC in Westlake Eyethu is the most prominent in this regard. His ability to identify innovative approaches for his business, is indicative of the success of his current business. His BEC is the oldest out of all the BECs and appears to be the most profitable. He has established a business that is running well, and he is now looking for ways to transform his successful micro-business into something bigger. Because his business is running well it allows him to invest time into exploring new avenues and opportunities. He is also located close to the affluent suburb of Tokai which exposes him to a market with more buying power, whereas the rest of the BECs are bordered by low-income communities with limited buying power. Contrastingly, the other BECs are not as well established and are still finding out how to make their businesses run well and build a customer base. Hence, their circumstances are less conducive to creative thinking about alternative income-generating avenues; their primary objective is to develop a profitable business from their existing business activities.

### **5.6 Evidence of change in Cape Town**

Policy plays an important role in laying a platform for change. But as change cannot only be present in policy this research judged it necessary to investigate evidence of change occurring on the ground in Cape Town.

The first impression is that there are a number of NGOs, shops and other organisations that have become active in promoting commuter cycling. They have been responsible for starting events such as moonlight mass, critical mass, and crowd commuting. Moonlight mass is a ride that happens every full moon from the inner city out to Sea Point and back into the city. Critical mass is a global event that happens on the last Friday of every month, and has started in Cape Town in the last few years. Crowd commuting happens every Friday and is for people who commute by bicycle from the southern suburbs to the CBD. All these events are aimed at increasing the awareness around cycling as a commuting mode and they have started to create a community of people all bound by a common involvement in commuter bicycling.

Ciclovia is an initiative that started in Bogota in Colombia. Certain streets are closed off on Sundays and can only be used by non-motorised forms of transport. This initiative has significantly increased the prevalence of NMT use in Bogota and created a culture more accepting of these transport modes. It has caught on in other parts of the world and on the 21<sup>st</sup> of October 2012 the City of Cape Town launched an initiative based on Ciclovia called Open Streets. The first edition of open streets closed off Victoria Road in Grassy Park from 9am to 2pm, only accessible by NMT. The vision is for Open Streets to continue to grow and make a contribution to changing the attitude towards NMT in Cape Town.

To assist increased bicycle use maps have been created that show the routes around Cape Town that are most suitable for cycling, and those that are less so. In the inner city there is further evidence of a growing bicycling culture shown by places like coffee shops putting up bike racks in their shops to support bicycle use with their customers. In turn the growing bicycling community is ensuring that they support these shops.

There is also evidence of increased political will and support for bicycle use. Helen Zille<sup>4</sup> was involved in a ride from Plettenberg Bay to Cape Town, and Fikile Mbalula<sup>5</sup> participated in the Cape Argus. Making this political support visible to the public is an important part of promoting bicycle use.

### **5.7 Factors hindering the progress of bicycle use in Cape Town**

An important component of mobility is choice (Bryceson et al., 2003). As represented in Figure 1 modal choice is complex and based on a range of objective and subjective factors which

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<sup>4</sup> Helen Zille is the Premier of the Western Cape and leader of the political party the Democratic Alliance

<sup>5</sup> Fikile Mbalula is the Minister of Sport in South Africa

include journey characteristics, and spatial, socio-demographic, and socio-psychological factors (De Witte et al., 2013). In order to move towards sustainable travel understanding modal choice is imperative. Much of this study has concentrated on how bicycles are being used to address inadequacies in the transport system, and hence why people choose to use them. However as a modal choice is not only based on the positive attributes of a transport mode, it is also important to draw attention to the reasons why people choose not to use bicycles, as these need to be addressed in order to increase the prevalence of cycling in Cape Town.

The review of the City of Cape Town's NMT Strategy (2005), reflects that there has been progress in policy that if implemented, would go a long way to improving conditions for NMT users. In Cape Town, the challenges are evident in the gap between policy and implementation. Whilst there has been significant progress at the policy level, it has been slow to translate to progress on the ground, particularly for marginalised communities where most of the BECs operate.

Through analysing the responses of participants, it is clear there are numerous factors that act as barriers to the use of bicycles. Regardless of the improvements in policy and programmes that are being introduced, if these barriers remain, people will continue to choose not to cycle. In order to make more progress on the ground, specific strategies addressing these barriers need to be introduced.

#### **5.7.1 Dangerous conditions for cycling**

Many of the barriers are reflected in factors that participants indicated influence their modal choice. The issue of safety is one that has emerged on numerous occasions; safety in terms of theft, hijackings, and being hit by cars. Infrastructural investments can address some of these issues. For instance, improved lock-up facilities, or employing security guards to watch over bicycles locked up at stations. Dedicated bicycle lanes, reduce the risk of being hit by cars. However a cultural shift and the way car drivers treat cyclists is also needed to improve the situation. For this law enforcement is key. The law of a 1.5 metre passing distance of car to cyclists has been introduced. Harsher penalties need to be imposed on offenders of these laws. Increasing the critical mass of cyclists will also help to bring about a change in culture. The lack of integration of bicycles with the public transport system, limits the use of bicycles and acts as a further deterrent to bicycle use.

### **5.7.2 The expense of specialised bicycles**

The expense of new bicycles supplied the majority of cycling shops in Cape Town, is prohibitive for most low-income households, or for anyone wanting to purchase a bicycle for transport rather than sport cycling. BECs provide a solution to this problem through supplying second hand, reasonably priced, utility bicycles.

### **5.7.3 The impact of culture on how bicycles are perceived**

The focus group participants indicated that because many people in their communities are not exposed to bicycles being used as a commuting mode, they do not view them as a transport mode for commuting purposes. Along with this, participants indicated that bicycles are not viewed as a status symbol because people want to drive cars. The predominant opinion that emerged from focus groups is that and as soon as members of their community can afford a car they buy one, and stop using public transport.

The focus groups and interviews also show that there is a cultural influence on the choice about whether to use bicycles or not. In some cases this is linked to changing cultures over time, whereas in others it is based along gender lines as expressed below.

*But the time change, there were a lot of guys riding bikes in my time, when I was at school. But at this moment everything has changed, the whole world has changed. People don't use bicycles anymore, the children don't use bicycles, they get into a car. Guys are taking children to the school it is more convenient for the parent, they don't have to drop their child and go to work. But now they are getting someone and paying someone to lift them. (Participant's approximate age, 45 years old)*

*When I am seen on a bike, it's just something hey, people can't believe their eyes. (referring to the acceptance of females on bicycles)*

Culture strongly influences the decisions people make and acknowledging its impact is important.

### **5.7.4 Lack of information about cycling and its benefits**

Lack of information about cycling and about the benefits of using bicycles, was raised in the focus groups. This is partly to do with the lack of a cycling culture in South Africa. A culture that

does not view bicycles as a transport mode, influences the perceptions of people and prevents them from using bicycles as a mode of transport. BECs act as important information nodes to their communities. Through increasing the prevalence of cycling a new culture can start to develop in Cape Town, which in itself will increase the availability of cycling. Government can be influential through incentives at the policy level, BECs are and continue to enhance accessibility of cycling to all income groups, and NGOs can play a role in advocacy.

### **5.7.5 The interaction between policy, policy-makers, and those on the ground**

Although communities are aware of some of the efforts of the City of Cape Town to improve conditions for cyclists, focus group participants feel that there is a lack of consultation with the public. And because of this decisions are being made that in the view of the BEC owners, will have a negative impact. The frustration is evident in the following statement from one of the BEC owners:

*I have recently encountered an Act that the Department of Transport are about to pass. This act will outlaw the use of bicycle trailers as they are seen as unsafe. But this is a huge problem for me. I use a bicycle trailer to get stock for my shop and for the tuckshop. I know a gardener who puts all his equipment on a trailer and cycles to all his places of work in Westlake and Kirstenboff. Outlawing the use of these trailers is taking away existing and potential economic opportunities from people. We are fighting like crazy to stop this Act from being passed.*

The participants indicated that people have begun to feel disillusioned by politicians. People do not understand who is making these laws and why laws like this are being proposed when they will do the opposite of what the NMT Strategy and other strategies are trying to achieve.

Considering that BECs have played roles in increasing cycling in their communities, the relationship between City and BECs is important for achieving goals set out in the NMT Strategy. The NMT Strategy places emphasis on the social and economic opportunities of bicycles as a transport mode, and makes mention of “small business linked to NMT support services” (City of Cape Town, 2005a). BECs also require support to expand the scope of their businesses.

In order for the poor to become better integrated in the LCD process, there needs to be an emphasis on how to incorporate the poor in strategies that align with the principles of LCD. The

NMT Strategy is an example of one and Table 5 shows how the City plans to include underprivileged communities.

The ECAP developed by the City of Cape Town like the NMT Strategy provides evidence that BECs and bicycles can play roles in achieving some of the objectives of the policy. The following four objectives set out in the ECAP are the most relevant to this study as they demonstrate where BECs and bicycles are already involved or could be in the future (City of Cape Town, 2011b).

Objective 4: Build a more compact, resource-efficient city

Objective 5: Develop a more sustainable transport system

Objective 10: Raise awareness and promote behaviour change through communication and education

It cannot be assumed that the poor will be included in these objectives. As discussed with the NMT Strategy specific strategies need to be formulated that place the poor at the centre. For instance BECs could be included as a core element of actively promoting bicycle use as part of the objective to develop a more sustainable transport system. The City and BECs could work together to work towards this objective.

In order for policy to be successful, people on the ground need to be involved. And for this to happen there needs to be interaction between government and the people that can play a part in implementation. From the interviews and focus groups it emerged that the BEC owners have had little to no interaction with the City of Cape Town. BEC owners feel that there is a lack of involvement of politicians on the ground. Most of the BEC owners expressed that they had never been approached by the City, and those that have, had negative experiences.

## **CHAPTER 6 – CONCLUSIONS**

### **6.1 What is the importance of transport for pro-poor low-carbon development in Cape Town?**

This study has shown the ways in which the current transport network in Cape Town presents numerous barriers to LCD. The low population density, dependence on private cars, and high emissions, as well as the level of disparities in mobility according to income group, are major causes for the transport sector being in direct contradiction with the objectives of LCD. Based on the evidence presented, bicycles and BECs do improve mobility and contribute to improved livelihoods. In doing so, they contribute to lifestyles associated with lower carbon dependence. The current contribution of bicycles and BECs to LCD is relatively minor, however if accompanied by other changes such as enhanced integration with an improved public transport network, densification of the city, investment in infrastructure to support the use of bicycles, and a general culture shift for the way bicycles are viewed; BECs and bicycles can make a more significant impact on changing transport in Cape Town, and a more meaningful contribution to LCD.

### **6.2 What is the potential of bicycles and BECs to improve mobility of the poor?**

The research shows that mobility is a multi-faceted concept and that the modal choices of low-income communities in Cape Town are based on a range of factors. Figure 1 illustrates the determinants of modal choice, which include journey characteristics, spatial, socio-demographic, and socio-psychological indicators. These have been identified and discussed throughout this study. Mobility in Cape Town is heavily influenced by income. For low-income communities the spatial layout of Cape Town, the performance of the transport system available to them, and the personal circumstances of individuals from these communities; hamper mobility. As a result mobility of low-income communities is time-consuming, a significant financial burden, and is multimodal, to cover the long distances that most people from underprivileged communities have to travel. Trips are predominantly made up of walking and public transport. Consequently mobility of low-income communities is below the level required to allow them to fully participate in the life of the city, and the ease with which people from different income groups move around the city, is one of the most defining characteristics of the varying levels of mobility throughout Cape Town.

In order for Cape Town to move towards a LCD path, fundamental changes in the transport system are required. The high level of inequality in mobility between users across different income groups, indicates that improvements in the transport system are an essential component of pro-poor LCD in Cape Town. The kinds of changes that are necessary have been highlighted in this study.

From the investigation it is evident that bicycles and BECs improve mobility for those that use bicycles, by addressing inadequacies in the current transport network, particularly for those dependent on public transport. Given the negative aspects of the public transport network as illustrated in Figure 8, bicycles provide an alternative to public transport by providing a solution to many of these issues. Bicycles provide flexibility and more direct travel, they are used for a variety of functions such as for business and social purposes. They also assist traders such as street vendors to transport more stock, more quickly, over longer distances. As mobility relates to the movement of people and their goods this is a key indicator of improved mobility. Furthermore it is evident that the number of trips of bicycle users is not constrained by finances, which improves access to the city and its opportunities, and addresses the issue of lack of coverage by the public transport network. Integrating bicycles with the public transport network, will further enhance the ability of bicycles to improve mobility, and evidence is presented, showing that bicycles are becoming more integrated with public transport. The financial and time savings delivered by bicycles are two of the most dominant findings of this study, and not only relate to improved mobility but also poverty alleviation.

Lastly BECs contribute to improving mobility by the core service they provide: supplying affordable bicycles and repairs. Through increasing the access to bicycles, BECs are making available the benefits of bicycles to more people in their communities.

### **6.3 What is the potential of bicycles and BECs to contribute to improved livelihoods and poverty alleviation?**

The ability of bicycles and BECs to improve mobility in itself makes a contribution to poverty alleviation. There are also a number of other ways in which bicycles and BECs have shown that they contribute to poverty alleviation and improved livelihoods.

Two of the most dominant features associated with mobility of low-income communities in Cape Town, is the financial burden and time consuming nature of mobility. Hence it is a valuable finding that the time and financial savings of using bicycles, are the two most frequently raised benefits of using bicycles, that emerged from the focus groups. The enjoyment of cycling and improving access to the city are also commonly cited benefits, and although not as direct a link with poverty alleviation as time and financial savings, these benefits do represent a contribution to poverty alleviation, that the current transport system does not.

In addition, the research reveals that bicycles are used for a number of business purposes. Gardeners are the most cited business activities in the communities that depend on bicycles to deliver their services. But a number of other informal business activities, such as street vendors are also highlighted as examples of business activities that make use of bicycles. Bicycles are used for these businesses to reduce the cost of transport, and to allow business owners to transport more stock, over longer distances in less time, and provide access to wider markets. BECs are the most established examples of micro-businesses that not only depend on bicycles for mobility, but the business of BECs is based on bicycles and more people cycling. Furthermore, BECs provide a range of services that increase the accessibility of cycling to their communities, such as the affordability of bicycles and repairs, acting as information nodes, and offering lay-by's. Tailoring their services to the low-income communities that they are situated in, is what makes their services unique, as these communities have been neglected as a market because of the popularity of high-end sport cycling in Cape Town. These and the many other ways that bicycles and BECs are improving livelihoods and contributing to poverty alleviation as highlighted by this study, show the potential that bicycles and BECs hold. Participants also expressed there are many more ways in which bicycles can be utilised and BECs expanded.

#### **6.4 How can the level of bicycle use be increased, and an expansion in number and scope of BECs be achieved?**

Despite the difference that BECs and bicycles are making in their communities, bicycle use is still not widespread in the communities of the BECs, or anywhere in Cape Town. The fundamental barriers to bicycle use in Cape Town that are revealed by this research include, amongst others: poor safety, lack of cycling infrastructure, expense of bicycles, and the long distances caused by the layout of the city. Because of these barriers the anticipated levels of growth in bicycling are still not present. Implementation is an issue in South Africa for most development initiatives. This study reveals that all the necessary prerequisites for a radical transformation of bicycling in

Cape Town are present. In order to utilise all these positive actors to their full extent, information and communication are most needed, to bring them together and create a coordinated approach.

Lastly, LCD is a term to which policy-makers have started to attach importance, as evidenced in the policy examples from Cape Town such as the NMT Strategy and ECAP, and South Africa's national policies such as the NDP and New Growth Path. Although bicycles and BECs were not introduced as LCD strategies, they have shown that they do assist with improving mobility and livelihoods – both important to development. They do so based on a low-carbon transport mode, the bicycle. Furthermore low-income communities have shown that they possess the skills for running BECs and other micro-businesses that can utilise bicycles. Providing support to initiatives that are in line with the principles of LCD, that are based on local skills, is an essential component of LCD gaining traction on a meaningful scale and improving the lives of the poor in cities like Cape Town. The following section puts forward a number of recommendations based on this research, to increase bicycle use and expand BECs.

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## CHAPTER 7 – RECOMMENDATIONS

The lack of integrated planning is evident in Cape Town's transport network. In the past there has been a tendency for different government departments to operate in isolation with little consideration for the work of other departments. The appreciation of the need for integrated planning has grown, and there have been efforts to improve the interaction and integration between departments. For a transformation in the transport network that supports the use of bicycles and their related micro-businesses, integration needs to be strengthened between different spheres of government, grass-root organisations, those involved in the bicycle industry, and the general public. Consulting the BECs would provide valuable insights into policy that is aimed at the communities of the BECs.

Much has been made of the spatial layout of Cape Town and how it is a significant barrier to the integration of the poor in the city. To address this, there is a pressing need for densification of the city and to integrate different land uses so that places of work and homes are closer together. Implementing the aims of the Densification Strategy and Spatial Development Framework should be treated as a priority.

Densification and mixed land use promote the use of NMT and public transport. Both are essential for encouraging a move away from car-dependent mobility. But NMT and public transport need to be transformed into attractive and desirable forms of mobility, in order to change travel behaviour in a city, where car-dependent mobility is the aspiration for the majority of the population.

For the communities that took part in this study one the most vital factors to promote bicycle use is supplying suitable bicycles. An adequate supply of affordable, utility bicycles like those provided by BECs will help to increase cycling in low-income areas around Cape Town.

Making cycling feasible for more communities, would create opportunities for existing and future BECs and other businesses. The use of bicycles in businesses is something that can help to improve the service and profitability of certain businesses, and in South Africa needs to be fully utilised as it is in other parts of the world.

BECs that do not have cycling clubs should consider introducing such clubs because, as the evidence suggests, it would most likely improve business by promoting cycling in their areas, and benefits the youth in the community.

The private sector can also play a role in increasing cycling. They have the resources and capacity to play a part and can start with changing behaviour of their employees. Developing ride-to-work schemes can do this. In cities such as London companies in the private sector are involved in such schemes, and there is the potential for these schemes on a much smaller scale; such as the example of the ten workers working for a construction company who sourced the bikes from a BEC in Mitchell's Plain. If BECs could be involved in big schemes it would provide an additional income-generating avenue.

Due to their location in low-income areas, the lack of disposable income of customers is a constraint on the business of BECs. Organising events to bring people from all income groups to the communities of the BECs, would be a good way of exposing other markets to the services of BECs, and has the potential to bring in customers from areas beyond the immediate community of BECs.

Information, communication and support are essential for facilitating an increase in cycling across the board in Cape Town, and to expand the scope of BECs. Particularly for BECs that are showing innovative approaches to expand their businesses, these ideas require support to get off the ground. It is important that these factors are the focus of attention in order for bicycling to become an empowering mechanism on a meaningful scale in Cape Town. The necessary ingredients for a radical transformation in bicycling in Cape Town are present and evidence of this is growing. It is imperative that all actors are brought together to form a coordinated effort, that will radically alter mobility in Cape Town.

Lastly although the main focus of this study is the role of bicycles and BECs in improving mobility and livelihoods of the poor, the study is framed within the LCD framework. To add to this investigation, it would have been interesting to quantify the fuel consumption or emissions savings participants are achieving from using bicycles, rather than their former modes of transport. Given the time frame this was not possible, and the benefits are assumed on the basis that bicycles produce zero emissions at the point of use, and therefore contribute to LCD by

improving mobility and livelihoods, and at the same time reducing emissions. A more detailed look into emissions savings would be an appropriate focus area for future research.

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## APPENDIX 1

### Meetings

Saul Roux, Environmental Resource Management Department, City of Cape Town, 17 January 2012

Teuns Kok, Transport Department, City of Cape Town, 19 January 2012

Andrew Wheeldon, Managing Director, Bicycle Empowerment Network, 26 January and 16 April 2012

Marianne Vanderschuren, Centre for Transport Studies, University of Cape Town, 20 February 2012

Trevor Knowlden, Outreach Manager, Bicycle Empowerment Network, 16 April 2012

Beverley Roode, Training Manager, Bicycle Empowerment Network, 16 April 2012

### Interviews

Fagodien Campher, Owner, Bicycle Empowerment Centre, Lavender Hill, 16 April and 31 July 2012

Meshack Nchupetsang, Owner, Bicycle Empowerment Centre, Westlake Eyethu, 16 April and 16 July 2012

Ishmael Cassiem, Owner, Bicycle Empowerment Centre, Mitchell's Plain, Rocklands, 19 April and 14 August 2012

Vyvan Bean, Owner, Bicycle Empowerment Centre, Mitchell's Plain, Alpine Park, 19 April and 14 August 2012

Andrew Williams, Owner, Bicycle Empowerment Centre, Grassy Park, 23 April and 31 July 2012

Phumlani Dlongwana, Owner, Bicycle Empowerment Centre, Masiphumelele, 26 April 2012

Olaf Klostermann, Cross Town Cycles, 12 July 2012

### Focus groups

BEC Westlake Eyethu, 28 July 2012

BEC Lavender Hill, 7 August 2012

BEC Grassy Park, 14 August 2012

BEC Mitchell's Plain, Alpine Park, 27 August 2012

## APPENDIX 2

### Guiding questions for interviews and focus groups

#### **Bicycle Empowerments Centres Owners**

How long have you worked here for?

Do you have another job? Is this your workshop your primary source of income?

What is the main source of business for you? (Bicycle repairs, spare-part supply, selling bicycles)

Do many people in the community buy bicycles from you? What do they use them for (work, commuting to work, recreation)?

What age group mainly use bicycles in the area? Why is it this age group that use bicycles the most? What do they use them for?

What are the benefits for people in your community using bicycles?

What is the most common form of transport for people in your area to get to work and school?

Why do more people in your community not use bicycles?

What are the problems you have encountered whilst running your business?

What do people in your area think of bicycles? Do people want to own and use them?

Are bicycles mainly ridden by women or men in your community?

What do you see as the opportunities for your shop to grow in the future? What do you think you need to do to utilise these opportunities?

Do people in your area use bicycles as part of their businesses? What are the examples of these?

Can you think of potential uses for businesses that are not being used at the present?

How can cycling be increased in your community?

Are you aware of any work the City of Cape Town is doing to promote cycling? Are there efforts helping to increase cycling in your community? What do the city need to do?

Is there any infrastructure supporting bicycle use?

How did members of your community get bicycles and parts before you started your shop?

#### **Focus groups**

How do you get to work? And how do your children get to school?

How do you get around for non-work related activities?

How much do you spend on transport a month?

How long does your trip take? And how far do you travel for work?

Do you own a bicycle? If yes – why? If no –why? If no, would you like to own a bicycle to ride to work on?

How do your parents get around?

If you had a bicycle what would you use it for? Would you like a bicycle? And how do you think it would benefit you?

Are bicycles a common form of transport in your community?

What is the most common form of transport in your community? Why do people choose it?

Why do you think more people do not use bicycles to get to school or work?

Do you think that bicycle use had disadvantages? What are these?

Do people in your area use bicycles as part of their businesses? What are the examples of these?

Can you think of potential uses for businesses that are not being used at the present?

How have the services offered by the BECs differed from the bicycle services previously accessible to you?

Before the BEC in your community did you own a bike? And how do you get hold of a bike and parts?

Do people in your area use bicycles as part of their businesses? What are the examples of these?

Can you think of potential uses for businesses that are not being used at the present?

How can cycling be increased in your community?

Are you aware of any work the City of Cape Town is doing to promote cycling? Are there efforts helping to increase cycling in your community? What do the city need to do?

Is there any infrastructure supporting bicycle use?

## APPENDIX 3

### List of participants by occupation

#### Westlake Eyethu

BEC owner

Self-employed

Security Guard

Shop attendant

Owner of a bee business

Builder

Teacher

#### Lavender Hill

BEC owner

Gardener

School learner

School learner

School learner

School learner

School learner

Unemployed

#### Grassy Park

BEC owner

Sales representative

University student

School learner

#### Mitchell's Plain

BEC owner

Self-employed

Assistant welder

Driver (school shuttle service)

Self-employed

Business owner – welding service

Unemployed

Mechanic