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# **Sustainable transport indicators for Cape Town, South Africa: Advocacy, negotiation and partnership in transport planning practice**

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## **Abstract**

*This paper charts the emergence of and the movement towards new thinking on sustainable transport in the City of Cape Town, South Africa, and the adoption of a set of indicators for sustainable transport. The paper centres on two themes. It reviews the sustainable transport concepts debated and later adopted by the City of Cape Town. It then examines the day-to-day practice of developing sustainable transport indicators in Cape Town over a 14-year period, from the advent of democracy in 1994 to the present day, with a particular focus on the 2007 to 2009 period. The paper tries to shed light on the process by which ideas of sustainability get translated into indicators in the midst of many constraints including limited staff resources, uncertain politics, and changing policy priorities.*

*Keywords:* Sustainable transport indicators; Equity; South Africa; Story-telling; Case study.

## 1. Introduction

How does a city in South Africa move towards sustainable transport? What are the arguments for sustainability that “stick” in a South African city? How do ideas of sustainability get translated into indicators in the midst of so many constraints, including: limited staff resources, uncertain politics, and changing policy priorities? What lessons can be learned from this case study for other cities?

This paper charts the emergence and push towards new thinking around sustainable transport in the City of Cape Town municipality and the adoption of a set of indicators for sustainable transport. The paper centres on two themes. The first is substantive: the explanation of sustainable transport concepts that were debated and later adopted by the City of Cape Town. The theoretical constructs used at the time, and the connection between these and sustainable transport indicators, are explained and discussed. The tensions between notions of sustainability versus notions of job-creation or pro-poor development, and the state of local government planning for sustainability, are also discussed in relation to the literature. In particular, the difficulties of developing indicators for the previously unmeasured dimensions of energy, emissions and urban quality are explored. Thus, the first theme is about substantive content and “stickiness”: the conceptual content of sustainable transport indicators and the indicators that appear to have stuck in Cape Town.

The second theme is procedural and presents a case study from the perspective of the author, who was involved in the process of developing sustainable transport indicators in the City of Cape Town as a freelance advisor to the non-governmental organization Sustainable Energy Africa. The indicator development was part of a three year programme funded by the British High Commission called “Tran:SIT” — Transformation towards Sustainable Integrated Transport. The development of the indicators is traced over a 14-year period, starting at the advent of democracy in 1994 to the present day, with a particular focus on the 2007 to 2009 period. This latter period is when the indicators were included in the draft Cape Town Integrated Transport Plan, which was finally published for public comment in June 2009. It is far from a neat case study story. There are coincidences, long periods of inactivity, many meetings, papers, tensions, alliances, negotiations and advocacy. What matters in all of this? In reality, how do existing practices shift towards something different? What does it take? And what lessons, if any, can be taken from such stories? Although the focus of the paper is in the presentation of the case, some reflection on broader questions is also included.

The two themes of “concepts” and “practice” are interwoven in the paper. This way of writing reflects the author’s experience of the project process, whereby theory was developed in the course of day-to-day communication and practice. Case study work in science and technology studies has also found, through close attention to case study material, that theory is developed in the context of shared, tacit, forms of practice (Knorr-Cetina, 1981). Practice stories of transport planning are rarely told, although there are exceptions (Flyvbjerg, 1998; Garb, 2004), but there are good and long-standing arguments as to why they should be told

more or better. The third part of the paper discusses practice stories and the knowledge that could be gained from more stories of the practical reality of transport planning practices (Wachs, 1985; Forester, 1993; Watson, 2002; Sandercock, 2003; Flyvbjerg, 2004).

## **2. Sustainable transport concepts in practice in South Africa**

### *2.1. What is meant by “environment” and “sustainable”?*

Discussions of sustainability in Cape Town transport planning during the 1994 to 2009 period have tended to follow the classic Brundtland definition: as meeting "the [human] needs of the present without compromising the ability of future generations to meet their own needs." (WCED, 1987; DEAT, 1997). Sustainability has tended to be equated with environment but away from transport planning. Meanwhile environmental and sustainability conceptualizations have undergone a noticeable shift, from a definition of environment that mainly focused on bio-physical aspects to a more all-encompassing one.

The contemporary definition of sustainable development for South Africa is defined in the National Environmental Management Act of 1998 (NEMA) as “the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations”, which confirms the progress from a purely bio-physical consideration of environment in planning towards something more all-encompassing within a sustainability concept.

Sowman and Brown (2006) have described sustainability and environmental management as significant elements in development discourse and policy in South Africa, but they have noted that the translation of such principles, in particular into local integrated planning, has not been forthcoming. Some of the reasons given for this tardy practical application are the historical legacy of planning physical, racially segregated forms, rather than procedural ones; and the previous use of environmental management as a covert mask for forced displacement and for creating facilities for the elite. Sowman and Brown also identify professional antipathy between those in the environmental sector and planning professions as problematic, and they argue for recognition of the long, complex and conflicted local government restructuring processes which, according to Pieterse, have resulted in “deep organizational trauma” (Pieterse, 2004). Swilling (2006) expresses similar views, and highlights the lack of attention given to ecological issues in Cape Town, even in the context of high expenditure on municipal infrastructure over the 2004–07 period in South Africa and expansionary, state-led economic investment.

### *2.2. What is meant by “transport”?*

Many of the present day practices of transport planning can be traced back to the 1950s and 1960s (Creighton, 1970; Weiner, 1999), a period of relative prosperity in the global North. The practices were developed to facilitate the large-scale construction of the inter- and intra-city freeways and arterial roadways, which were perceived to be prerequisites for the efficiency,

economy and safety of private vehicles. The cultural emphasis was on suburbanism and individual freedom to travel. The planning that took place, exemplified by the early planning exercises using computer models of Chicago and Detroit in the 1950s, concerned the efficient movement of private cars in comfort (high levels of service) and at speed (high efficiency). The needs of public transport and pedestrians or cyclists received little or no attention. This American style of planning was exported across the globe, including to South Africa (Taylor, 1956).

In the North, this status quo was progressively challenged, as growing environmental awareness resulted in policies focusing on the improvement of air quality while also requiring the transport planning process to pay greater attention to social, environmental and economic impacts of transport. In the UK, a conference on “Transport: the New Realism” in 1991 (Goodwin *et al.*, 1990) and the publication of a report by the Standing Advisory Committee on Trunk Road Assessment (SACTRA) in 1994 on the traffic impacts of road capacity lead to a watershed change in how future traffic patterns were forecast. Cairns called this “the formal demise of predict and provide” (Cairns, 1998), which was a label then given to conventional transport planning (Owens, 1995).

As the North moved away from predict and provide, South Africa was edging towards democracy, which finally came in April 1994. Post-1994 was a period of intense policy and legal shifting, as the old apartheid-driven policies gradually made way for a more democratic focus. Following South Africa’s first democratic elections in April 1994, transport planning practice and the definition of what was meant by “transport” came under increasing scrutiny, as the needs of the poor and middle-classes rose up the political agenda.

In 1999, the National Department of Transport developed a new policy paper: Moving South Africa. This marked a change in discourse, which could be summarized as shifts in attention from supply-side to demand-side; from commuter-based to customer-based; from private car to public transport prioritization; from deregulated to regulated public transport (with competition for routes rather than on routes). The reference to *commuters* reflected the apartheid policy of providing for the transport of black commuters to economic centres, while the *customer* focus flagged a re-orientation to black travelers as being more than only workers for an economy. In addition, there was a greater emphasis on integrated planning (within legal frameworks requiring Integrated Transport Plans).

It is easy to argue, with reference to policy texts, that policy and discourse shifted substantially post-democracy but, as Sowman and Brown have also argued, the story is rather more complex, since at the practical level, little changed in the 1990s. Transport planners and traffic engineers were not immediately re-educated as post-apartheid planners, and major shifts in transport implementation and spending trends were not evident. At a political level, Thabo Mbeki’s second term reflected some frustration with lack of change on the ground.

### 2.3. What is meant by sustainable transport?

In discussions on sustainable transport, the issue of *greenhouse gases* tends to have a high profile. However, on an international scale, and similar to other developing countries, the South African transport sector is a relatively minor contributor to greenhouse gases. In addition to the well-known energy, pollution and safety impacts of transport, there are other, less obvious, but arguably as important impacts of transport on sustainability in a Southern context. The structure of transport infrastructure in an urban area fundamentally impacts its spatial form and the quality of its living environment. At a macro scale, an orientation towards private cars at the expense of walking and cycling results in a sprawling conurbation, which is relatively less fuel efficient and more polluting. A more compact urban form encourages shorter trips and is universally more accessible, which in turn affects not only economic efficiencies but also, arguably, increases social interaction. Transport infrastructure dominated by cars is particularly space inefficient (Tolley and Turton, 1995).

In addition to spatial problems, transport is unique in the urban utilities in the way in which it has an impact on the temporal budget of urban inhabitants. Simply put, an effective transport system can reduce travelling time and provide travellers with additional time resources. It is debatable how this additional time would be spent, but in the South African context it is difficult to argue against the position that time spent travelling by the urban poor is enormously costly, both financially and in terms of loss of time in family life. Research in the Pretoria area indicates that short (10–15 km) commuters have up to 3.5 hours more free time per day than long distance (60–130 km) commuters (Fourie and Morris, 1985). One survey indicated that low-income household members took on average less than 2 trips per day, compared with almost 3.5 trips per person per day in a high income household. In high income households, 94% have access to a motor car; whereas in a low-income household, 97% are without access. The poor spend more time travelling, with a typical commute to work taking more than three-quarters of an hour, as compared with less than half an hour for the high-income (Behrens, 2001), raising issues of the intrinsic inequity in South African transport systems (Vasconcellos, 2001). Such findings are not unique to South Africa, as the poor choose to live peripherally, even in the absence of formal apartheid, for affordability reasons (Gwilliam, 2003).

Although the rhetoric in favour of sustainability and the environment is well established, many competing agendas and interests prevent it from being a policy priority. While Vasconcellos (1997) argues that road safety is an appropriate focus for developing countries, an argument which is supported by international data, the larger competing discourse locally in the transport sector is that of economic growth. Urban planners and environmental managers are familiar, from their training and practice, with the tensions inherent in multiple aims of “green, growing and just” cities (Campbell, 1996), but for engineers working as transport planners, this is far less familiar territory.

South African cities have been politically characterized as dual economies, with one economy serving the needs of the formal and affluent, while the other economy serves the needs of the

informal and disadvantaged.<sup>1</sup> Transport planning in South Africa has traditionally allocated money on high quality roads and public transport for formally employed commuters. The unemployed, the poor and the informal were traditionally marginalized, either in the informal taxi sector or in the unmaintained pedestrian spaces on the edge of roads or in poorly maintained, sometimes non-existent roads in townships and informal settlements. There are, therefore, two pressing arguments for redressing traditional transport patterns: the equity and social justice argument in the light of a democratic, post-apartheid South Africa, and the energy and climate argument. Presently, neither is high on the local political agenda, which is dominated by a discourse of basic service delivery and economic growth.<sup>2</sup> In this context, how can we move towards sustainability in the transport sector and at the same time address the issues of inequity and poverty?

In 2002, at the beginning of the case study described in section 3 of this paper, these topics were even less prominent in a Southern context, and the intellectual resources attending to transport and sustainability issues were extremely sparse. The resources available were mainly in the form of “grey”, non-academic literature, found in reports online or through word-of-mouth, supplemented by academic literature where available. The sustainable livelihoods framework, developed by the Department for International Development (DfID) in the UK, but also used by the World Bank and others (Carney *et al.*, 1999), attempted to address the parallel needs for addressing inequities, poverty alleviation and improved sustainability.<sup>3</sup> The sustainable livelihoods framework is now well known in development circles and so a detailed description is not given here. Suffice it to say, the principles were adopted as a framing device for the sustainable transport indicators, with one adjustment. To the classic five types of capital: natural, human, social, physical and financial, time was added as a sixth type. It is the ability of transport interventions to deliver time savings to the poor that distinguishes transport from other infrastructural improvements; and thus, time was included in early thinking for the project around sustainable livelihoods and transport.

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<sup>1</sup> Data on carbon footprints, however, suggest multiple economies in Cape Town, with the top 20% income earners currently having a carbon footprint of 5–15 planets, while the poorest 20% have lifestyles which are sustainable on the one planet available. The median income earners have lifestyles which are creeping beyond a one planet footprint, but Swilling (2006) suggests that they could be sustainable with some efficiency adjustments. These data present the inherent inefficiency of Cape Town infrastructure in stark terms, and given that transport accounts for on average 54% of the City energy use, it is clear that the road infrastructure and spatial configuration of the City is problematic (SEA, 2006).

<sup>2</sup> Swilling (2006) argues that while the growth–infrastructure nexus has received some attention in the literature, the growth–infrastructure–sustainability nexus has not received the attention it deserves. Boschmann and Kwan (2008) argue that both the urban sustainability and the social dimensions of sustainable urban transport are areas that are insufficiently researched, even in the USA, and certainly the literature on the social equity–sustainability nexus for the South is sparse.

<sup>3</sup> According to its developers, the sustainable livelihoods approach differs from other approaches to development by putting people (rather than the resources they use, or governments) at the centre of development; building on people’s strengths rather than needs; incorporating all relevant aspects of people’s lives; and emphasizing links between policy and household decisions (Institute of Development Studies, 2009).

#### *2.4. Indicators for sustainable transport: a proliferation of possibilities*

Sustainability can be evaluated using a set of measurable indicators to track trends, compare areas and activities, evaluate options and set performance targets. At the time of the project, the literature already presented many possible indicators (see the indicators specifically related to sustainable urban transport, developed by the Centre for Sustainable Transport, 2002; Jeon and Amekudzi, 2005; and Litman and Burwell, 2006). South African specific indicators have been suggested by Sweet (1981); Ringwood and Mare (1992); DoT (1999) and Krynauw and Cameron (2003).

Inevitably, international programmes also attend to indicators. In the 2000–05 period when indicators were reviewed for the project, UN-HABITAT's Global Urban Laboratory had an urban indicators programme that had two transport indicators (travel time and transport modes used), and data for four transport indicators are collected under its urban inequity survey (IFRTD, 2004). Also in 2004, the Sub-Saharan Africa Transport Programme (SSATP) published details of their SSATP Transport Indicator Initiative project, which aimed to coordinate and promote efforts to establish a common set of key transport sector performance indicators (SSATP, 2004). Meanwhile, Gilbert and Tanguay (2000) had written a "Brief Review of Some Relevant Worldwide Activity and Development of an Initial Long List of [sustainability] Indicators". The list contained more than 150 indicators.

When Paul Barter (2005) asked "measurement matters but do we measure what really matters?" he captured the essence of the problem facing those choosing indicators: how do we decide what really matters? Section 3 of the paper examines this question in light of the Cape Town experience.

### **3. Choosing sustainable transport indicators in Cape Town, South Africa**

This part of the paper offers a short practice story of a period of transport planning practice spanning seven years, through different projects but with one recurring theme: assessment and indicators.

One version of the story is this: it began with a phone call, in 2002 between a university professor with links to the World Summit on Sustainable Development, due to be held that year in Johannesburg, who had discovered via an internet search a young lecturer with a nascent interest in transport and the environment (Kane, 2001). American funders were looking for a new paper, an input for the summit from South Africa, although the funding could possibly stretch beyond 2002, and this could be a "legacy" project. Did the lecturer have any ideas? Some more chance encounters, or what social scientists call contingencies, occurred: the author; some availability of time; and an interest in tensions between Cost Benefit Analysis and the full impacts of transport, particularly as they relate to the urban poor in South Africa. The funder was interested in new assessment practices, perhaps something sustainable? And so the idea of a project developing an assessment framework for Integrated

and Sustainable Transport (ISTAF) was born. “Integrated”, was a strong theme at that time in South Africa and internationally. “Sustainable” was there because of the funder, the upcoming World Summit and the mood of the moment. “Assessment Framework” was used because, given the critique, something more than cost–benefit analyses seemed necessary (Pearce and Nash, 1981; Vasconcellos, 2001). This is how projects work: a compromise is reached between the demands and agendas of the funder, the interests and availability of the consultant and the contingencies of the moment. If any of these things had been different, then the outcome, too, could have been different. This initial project ran from 2002 into 2003 as a collaboration between the Urban Transport Research Group and the Environmental Evaluation Unit at the University of Cape Town. The project plan, created through a series of meetings between the funder and the project team, was to develop a practical framework for the assessment of policies, programmes and projects in the South African transport sector which would address the environmental and integrated planning requirements of policy and legislation, work with local and national government and develop teaching material on integrated and sustainable transport assessment frameworks.

Literature review work on sustainability, integrated planning, sustainable transport and indicators took place throughout the project duration. The project also included a Current Practice review of local and international transport planning and environmental practice (Kruger *et al.*, 2003). The Current Practice review found that “integrated” transport planning was not being undertaken in the manner intended by legislation and that environmental concerns were frequently seen by transport planners and engineers to add to the cost (time and money) of development initiatives and, as such, were not a high priority in the early stages of the planning and decision-making process (Barbour and Kane, 2003). The interviews seemed to indicate a need for guidelines for integrated sustainable transport planning.

The agenda of the initial project was to take up the call from practitioners for a fresh approach to transport assessment. Although the original intention had been to develop a full assessment framework, it was clear that this would not be possible in the duration of the project, and a compromise was struck: the development of a checklist of criteria. The development of this list, the Integrated and Sustainable Transport Checklist (ISTC), was informed by the information collected from practitioners, a review of additional literature on transport planning in the context of the developing world, and numerous discussions and debates between the members of the project team and the US consultants on the project.

The ISTC consisted of a set of tables which asked a series of questions about both *the planning process* being undertaken and *the specific project intervention* being planned. These questions are based on: the so-called Bellagio principles for sustainable transport (Hardi and Zdan, 1997); South African legal principles in force in September 2003; and concepts from the sustainable livelihoods framework described above. The final checklist was divided into four components (see Appendix for a presentation of the complete checklist).

- Part 1: a checklist of the *issues* to be considered when defining the proposed transport intervention. This was based on South African environmental sector scoping work (Booz-Allen and Hamilton, 2003).
- Part 2: a legal checklist for the *transport planning process*. This checklist was divided into five components, namely open and transparent decision-making process; cooperative governance; integrated planning; public participation and a summary of the constitutional rights relating to sustainable development. This work was based on a review, undertaken by research lawyers, of the relevant legislation related to the environment and sustainability. An example of the referencing used is given for the sustainable development section.
- Part 3: a checklist for identifying and assessing the resources which may be impacted by the *intervention*, comprising natural, physical, human, social, financial capitals and time.
- Part 4: a summary of the whole checklist.

The intention was that the practitioner could use the tables to inform the design of the transport planning process (the starting point for a decision-making process); as a check for an existing or proposed plan, programme or project; or as a tool for the discussion of a project within professional teams. In all cases, it was intended to raise awareness regarding sustainable development. This ISTC was not field tested due to insufficient project time.

### *3.1. From checklist to computer tool*

In 2005, more money became available to further develop the checklist into a full computer assessment tool, through a partnership between the University of Cape Town and an NGO, Sustainable Energy Africa (SEA). This stage of the work involved research into the availability of data for use in the tool and the development of benchmarks. The gaps between the ideals of the checklist and the paucity of the data available became clear during this stage and several criteria were adapted to the data that were available or were expected to become available in the future. Towards the end of the process, the work on the computer tool was made available online and was presented and discussed with local government actors, who almost universally saw the need for such a tool but who expressed some doubt about its practicality given their time constraints. At this stage of the process, the reality constraints of local government confronted the desires of the funder, consultants and NGO. Despite robust conceptualizing undertaken earlier in the project, use of the best data available and the input of many strong minds, the reality of under-resourced local government trumped the other factors. Although the computer tool was publicized through a roadshow and was widely acknowledged, it has not to date been formally adopted. The message was that sustainability was not seen as a priority by transport planners, and additional processes would not be followed unless they were regulated, legalized or better promoted.

### *3.2. Transformation towards Integrated and Sustainable Transport (Tran:SIT)*

During 2006, the issue of sustainable development and sustainable assessment for the City of Cape Town again came under the spotlight with the launch of a new project funded by the British High Commission called Tran:SIT. This project was intended to follow the successful “SEED” model whereby the NGO Sustainable Energy Africa (SEA) partners with the local government sector in capacity-building and in projects aimed towards improving the sustainability of the energy sector. Under the SEED approach, SEA helps local governments to recruit and employ professional staff; these staff are trained in concepts and practices related to sustainable energy and then placed, with financial support from a Danish funder (DANCED/DANIDA) via the NGO, in local government. These professionals act as agents of change within government but are also welcomed as additional resources for their host departments. In time, the employment contracts are transferred onto the local government payroll (SEA, 2006).

For the Tran:SIT project, SEA employed the author as an advisor on transport related matters and as a mentor to the young “sustainable transport professional” (STP) in the City. The project was initiated with some debate between the partners about the meaning of sustainable transport in the South African context. The knowledge gained from earlier projects was used to establish some shared conceptual understanding within the NGO–advisor–STP team. Meanwhile, partnership was developed between the team and the City of Cape Town staff more generally through feedback and discussion on the existing City sustainability policies and a review of the existing Integrated Transport Plan. These discussions were normally responses to requests from the City or the STP and generally were not pre-planned by the NGO. They tended to emerge organically throughout the project in response to regular meetings on site between the City managers and the NGO project manager. (Jennings and Covary, 2008) One of the activities that the Tran:SIT programme initiated was a review of the first draft of the 2006 Integrated Transport Plan through a sustainability lens, which fed into the debates about transport policy and planning focused on sustainability.

Part of the Integrated Transport Plan review process undertaken towards the start of the Tran:SIT project was a review of the City’s existing indicator set. This set of nineteen indicators in use at the City at the beginning of Tran:SIT (see Appendix Table A1) were a substantial shift towards sustainability from what had been used for project assessment in the past. They were considerably less comprehensive in their scope than the criteria and indicators developed in the earlier ISTC and computer model work described above. This was a watershed moment for the Tran:SIT team — should they push for a more comprehensive, probably more conceptually robust set of indicators, as developed as ISTC and for the computer tool or adopt a pragmatic approach and work with the City’s existing indicator set? Given the experience of non-adoption of the earlier checklist and computer tool and the SEA *modus operandi* of working from within and fully engaging with the reality of the local government partner, the decision was straightforward. The existing City indicator set was taken as the starting point for further work, and this is reproduced without edits in Table 1.

**Table 1. Sustainable transportation indicators for Cape Town city**

<b>Indicator</b>	<b>Unit</b>
<i>Environment</i>	
Energy use for transport	Consumption of Non-renewable resources
Greenhouse Gas Emissions	Total GHG emissions (Megatonnes of CO <sub>2</sub> equiv.)
Per Capita Expenditure on Roads, and parking supply services	Rands per inhabitant of Cape Town
Commuters using NMT as Main Mode	Percentage
Population living within 500 m of nearest public transport facility and service	Percentage
Public right of way (+ public parking) per capita	m <sup>2</sup> /capita
<i>Economic</i>	
Average Total Journey Time	Time Unit
No. of Job Opportunities, commercial services and educational facilities within 5 km of residents	Number
Modal split	NMT: mass transit: Private Transport
Ratio of No. of Daily Passenger trips by public transport: Public transport standee + seating capacity	Utilization: Capacity
Generalized cost of Movement of goods and services	Percentage of total cost of goods and services to the customer
Condition of transport infrastructure	Visual Condition Index of 70+
<i>Social</i>	
Portion of household income devoted to transport	Percentage
Per capita Accident Cost for Fatal and Serious Accidents only	Rands/persons involved in accidents
Accessibility of infrastructure by mobility disadvantaged, children, elderly	Survey. During typical week day trip on a typical journey, count the number of inaccessible locations. Sum all and determine average
Car and bicycle ownership per 1,000 population	Number of Cars and Bicycles per 1,000 population

Transport impacts on the Livability of Community	Survey: converted to a scoring unit
Public participation	Structured sessions with civil society and other transport stakeholders

*Source: City of Cape Town (2006), p. 27.*

Towards the end of 2007, a Change Management workshop was held with staff from the City of Cape Town’s Transport, Roads and Stormwater Directorate. All staff with a role impacting the sustainability of the transport sector in the City were invited and approximately 20 attended. There were multiple purposes of the workshop, but the indicators in place at the time (Table 1) were used as a tool for discussing the meaning of sustainability and the best means of measuring progress towards it. The discussion focused on the appropriateness of the criteria, the best means of measuring and the availability of data. One of the decisions taken at the meeting was to review and refine these Sustainable Transport Indicators.

Following the workshop, data availability for the indicators was assessed through interviews with staff at the City. A visit from the Brazilian author and transport planner Eduardo Vasconcellos reinforced the findings of the interviews — that data availability was insufficient or non-existent and not in line with international standards for urban transport data. This reflected the South African approach to transport planning, modeling and attendant data collection, which has tended to reflect the US concerns of the 1980s and 1990s: private vehicle efficiency, road safety, and more recently emissions. The approaches attended mainly to car drivers or commuter traffic. Hence, the data collection was most often focused on the central business areas, at peak times and with a vehicular rather than person lens (Behrens, 2004). Post-1994, the data collection on public transport has improved significantly, and there has been more focus on non-commuter trips, off-peak and walk or cycle trips. Despite additional staff resources, this is not as yet mainstreamed in Cape Town at the city level. Changes in staff and lack of resources for data collection were cited as reasons for the poor data availability during the project. The data situation was considered in depth, and the sustainable transport indicator set was adjusted accordingly, to reflect the reality of data availability.

In the last year of the project, the City was required to update its Integrated Transport Plan and awarded a consultancy project to assist with that process. Hence, at a relatively late stage in the partnership between SEA and the City, a third party came in, with substantial influence over the form of the indicator set. The indicator set again proved to be a sticking point, and several discussions were held between the City, SEA and the consultants to uphold and justify the choices which had been made in adjusting the indicator set. At this time, the SEA–City partnership formally ended, due to the funding cycle ending, although the sustainable transport professional was by now a full-time staff member at the City, and SEA continued an informal linkage with the City staff.

### *3.3. End of the SEA process: adjusted sustainable transport indicators*

In the last months of the project, SEA elected to focus on finalizing the indicators. The final eleven indicators recommended to the City by SEA for inclusion in their transport assessment computer programme, and for use as strategic indicators, are shown in Table 2.

Table 2: “Key performance indicator summary” adopted in 2009.

1. Energy use	5. Congestion on major freight routes
2. Emissions	6. Congestion on peak hour commuter routes
3. Full modal split	7. Loss of life and livelihood
4. Public transport use	8. Urban quality
4.2 Public transport coverage	
4.3 Public transport service quality	
4.4 Public transport security	

Source: City of Cape Town (2009), p. 21.

These were a negotiated indicator set, chosen in the context of historical precedent, including the knowledge gained during the ISTC process; the state of current understanding of the meaning of sustainable transport; and constraints on data availability at the City of Cape Town. They were discussed at length between the City, the ITP review consultants and SEA representatives. In this section the rationale for each indicator is outlined and discussed.

An *energy use* indicator was easily acceptable to SEA, since the energy use of transport in South African cities (estimated at more than 50% of total energy use (SEA, 2006)) provided SEA’s original motivation for developing the Tran:SIT project. For this city’s work, energy use data was calculated using urban petrol and diesel data from the South Africa Petroleum Industry Association and trip and distance travelled data from the local rail census data, which enabled an energy use calculation to be made. There is a certain amount of error in the fuel indicator due to long-distance travellers who may fill tanks in a city but travel inter-city. This was accepted as an inevitable error, and the correction that would be possible by surveying the long distance sector was not considered cost-effective given other gaps in the data. Bus and taxi energy use were estimated using data from the Current Public Transport Record surveys.

*Emissions* were estimated using a fuel-emission relationship, calculated using emissions factors of CO<sub>2</sub> for fossil fuels and electricity. In this way, changes in the emission indicator will mirror changes in the fuel indicator, but the importance of highlighting emissions as an issue to decision-makers justified the separate inclusion of this indicator in the set.

The Current Public Transport Record survey requires regular data collection on the public transport fleet, resulting in annual public transport records, a comprehensive survey of boardings and alightings. Public transport plays a key role in Cape Town’s existing transport system but, like many cities, has an overall declining market share, a development which has

not escaped the notice of local transport planners. The Provincial government had as a by-line “Public Transport First”. Substantial Bus Rapid Transit projects are under way in both Johannesburg and Cape Town, with others in the planning stages. Given the relatively low urban densities of South African cities and the apartheid policies of the 1960s–1980s that relocated black and coloured residents to the urban periphery, public transport retains a key social and environmental role. The high subsidies paid to public transport operators to service the dispersed population and the sometimes volatile nature of the mini-bus taxi industry mean that public transport is often high on the political agenda. Through support for public transport, SEA believed the sustainability agenda could also be served. The original modal split indicator was thought to be insufficient on its own to reflect a move towards sustainability, as increased use (or the slowing of the rate of decline in use) could mean many things: increased poverty, increased congestion and not necessarily a change due to the transport work activities of the City.

*Coverage* of the public transport system and *quality* of the same were added as indicators that more directly monitored the efforts of the City towards a system that would serve the needs of the travelling public. The final indicator for public transport, *security*, is the issue often raised by car drivers as their reason for not considering public transport and is an aspect the City has attended to in recent years, with some success reported.

Throughout the process of considering public transport indicators, a balance was sought by SEA between the understandable wish of the City to shift people from cars to public transport and the evident trend in the middle classes of a move to car ownership, often for the first time. Attention to shift implies attention to the wealthy, existing car-owners, who live and also tend to work in different spaces from the aspirant car-owning middle classes. A policy focus on retention implies a different set of strategies, more focused on the poorer end of the population. Given the relatively low resource base, it was felt necessary to focus on the most likely “wins” for sustainability: with the middle classes.

Full *modal split* was included as a place for monitoring the role of walking and cycling in the City. Walking is obviously a key accompanying mode for public transport trips, but is also an important mode in its own right in the poorest communities and has traditionally been under-resourced and only in recent years has a non-motorized staff member been allocated at the City government level. Cycling is a high profile leisure activity, and cycle infrastructure has been added alongside all the new Bus Rapid Transit lines in the City, but traditionally, walking and cycling have not been included in survey indicators or assessment processes (Behrens, 2004).

The original City set of indicators included two focused on congestion. SEA made a case against the inclusion of a generalized congestion indicator, arguing that congestion alleviation was not the focus of a sustainable transport policy. Some of the measures under discussion (increased attention to public transport) could, in theory, lead to an alleviation of congestion, but this would not necessarily be the case (due to the possibilities of induced traffic infilling any capacity which may be gained) (Behrens and Kane, 2004). Instead, *congestion on major*

*freight routes* was inserted as an attempt to ensure and capture the role that transport plays in the efficient operation of the macroeconomy, particularly given Cape Town's role as a port, although the actual importance of congestion on these freight routes was not researched during the project. Finally, *congestion on peak hour commuter routes* was included in an attempt to capture the widely held view that excessive commuter congestion also impacts on the economy.

The traditional "accident" indicator was re-worded into *loss of life and livelihood* in order to bring attention to the outcome of road-based fatality and injury and to humanize a statistic which has lost some of its gravitas due to its familiarity. In vulnerable, poor communities the impact of death is, arguably, disproportionately high and South Africa has a particularly poor record on road safety.

All team members saw the importance of bringing into the indicator set some attention to the role that transport and street infrastructure plays in the *quality of urban life*. The lobbying of Enrique Penalosa, who had visited the City several times and the work of the Dignified Urban Places project in Cape Town (Southworth, 2003) had been particularly influential in this respect. The engineers sought a measurable indicator for urban quality that could be included alongside the others, and many alternatives were discussed: amount of time spent on design per kilometer; number of design staff; audited assessments of new work; people (particularly children) on the street; and value of properties after improvements. SEA believed that the shift towards urban quality would mean a shift in practice towards a better engagement between the urban planning and design staff in the City and the engineering sections responsible for transport, and they initiated meetings between them to discuss the urban quality indicator and to co-develop a suitable measure for inclusion in the ITP.

#### **4. Concluding remarks**

Even after more than ten years of democracy, South Africa remains "one of the most consistently unequal countries in the world" (Bhorat and Van der Westhuizen, 2010). Income inequality, apart from the obvious moral implications, has been linked to unstable and poor quality democracy and high crime rates. The need for strategies targeted towards different income groups, also suggested by the footprint data discussed earlier, implies a need for more disaggregated strategies and also more disaggregated data. Unfortunately, the need for more disaggregated data does not fit with the reality of resource constraints; the outcome is a poor dataset, struggling to represent a highly complex, disaggregated and rapidly changing context. The same argument applies to the choice and use of indicators. More complexity calls for more representation and a set of indicators ideally collected by gender, income and age for a fuller appreciation of the context, but this need is in tension with the realities of planning practices in the City.

In November 2009, the latest Integrated Transport Plan was published, but in this version, the earlier indicator set of nineteen had been replaced with outline headings for the indicator set and a statement: "The City is working on the development of a set of indicators that can and

will be measured and monitored continuously to check progress towards a more sustainable transport system. Values for some of these indicators, such as road fatalities and injuries, and average travel speeds on certain network segments during different operating periods are already available. Others require work to obtain and are to be developed in future updates of the ITP.” (City of Cape Town, 2009, p. 21) So the story of developing sustainable transport indicators at the City of Cape Town does not have a neat ending. It remains a messy, complex work in progress.

We now come back to the questions posed at the beginning of the paper, in light of the case described. How do ideas of sustainability get translated into indicators in the midst of so many constraints? The experience of the Tran:SIT project suggests that any partnering organization needs to be sufficiently aligned with the work of the City such that they can see moments of leverage that the City may not always see. This has been theorized (see, for example, Meadows, 1999) while for SEA it appeared to be a skill acquired through many years of earlier experience working on the SEED project and on other local government projects. They were able to see moments of leverage in the form of a consultancy meeting, a staffing budget discussion or an informal chat with a politician. In this way, big progress could be made in seemingly small encounters. The set of skills needed for doing this is not part of traditional engineering, planning or environmental training, although all work with branches of it. While engineers concern themselves with material and technological complexity, planners focus on social complexity and environmental planners with bio-physical complexity. All overlap, none are comprehensive, nor can they be. Law (1987, 2000) and others have noted the ability of change agents to be “heterogeneous engineers”, able to work across material, physical and social boundaries in situations of dynamic emergent complexity. SEA’s work appears to be able to straddle boundaries, sectors and scales in this way.

What are the arguments for sustainability which can stick in a South African city? The conceptual approach, followed by the author and the NGO, to blend sustainability concepts with an overt poverty alleviation agenda in a comprehensive framework, may seem a neat marriage but it was met with some initial skepticism by the City’s professionals. Upon reflection, this was probably a case of too much new information for those staff. Over time, the consensus and focus on the City team did appear to shift, from a position where attention was focused mainly on ensuring efficiency while reducing emissions to a more balanced triple bottom line approach with poverty alleviation given due attention, although this did not emerge strongly in the indicators published. The efficacy of a multi-pronged policy approach was highlighted to the City professionals when they were asked to present the Integrated Transport Plan to politicians and unions in the final stages of the project; they were met with questions primarily about job creation and poverty alleviation through basic service delivery. What had stuck initially with the engineers, both at the City and in the consultancy, was a sustainability which could coexist with transport engineering concerns for efficiency, economy and safety, as encapsulated in cost–benefit analysis. What stuck for the consultants was a transport sustainability which was not an extreme shift in practice. What was more appealing to the political wing was a transport sustainability which met broader political agendas of job creation and poverty alleviation.

The lesson is clear. In the short term, I would argue that there will be not be significant shifts towards sustainable transport in Cape Town, in South Africa and most likely in Africa more generally, unless strategies can be found that both acknowledge the efficiency–safety paradigm within which transport planners and engineers operate and work within the existing political context of pro-poor job creation and basic service delivery. The challenge for practitioners is to find such win–win strategies, knowing that new foci towards walking, cycling, and public investment for the poor are counter to mainstream planning thinking, tools, and data collection.

The story of the indicators for the City of Cape Town told here is a bumpy one and contrasts strongly with the anaesthetized versions of transport planning processes found in engineering text books, which suggest that the transport planning process is neat, linear and progressive. Watson (2002) has shown that the telling of detailed practice stories is important, as a source of learning which can inform better practice, but what can be learned from these practice stories by those in an active role? In Tran:SIT, SEA took the pragmatic route, acknowledging all role players and intuitively working with the realities of the power structures in place. In so doing, they were able to create partnerships and to influence from within. The missed opportunity in doing this, however, is that the less powerful, “quieter” agendas which are not mainstreamed in either transport politics or transport engineering are lost. Gender, for example, has been raised as a key issue in poverty alleviation efforts in the transport sector (Grieco and Turner, 1997) but, according to Seddon (2003), relatively little attention has been given to gender in transport planning and development. Equity has been similarly highlighted (Vasconcellos, 2001). Analysis of urban transport through an equity or gendered lens implies attention to detailed data, which resource constrained local government cannot readily afford. As a consequence, the picture reflected by the available data is partial and distorted towards traditional priorities and not towards progressive policy and legal frameworks. While already stretched local government agencies may argue that this attention to detail is burdensome and unrealistic, failing to address it results in leaving the question of Vasconcellos (2003): “whose sustainability are we pursuing?” unanswered.

Theoretical understanding of the role that transport infrastructure investment may play in the informal urban economy, and in supporting the livelihoods of the poor, is sparse. This means that arguments for a more holistic look at transport investment, which pushes its role beyond the traditionally conceived support for the formal economy, are difficult to make. Progressive policy, legal frameworks and tools enacting these are insufficient mechanisms on their own for effecting change. The experience of this case suggests that under-resourced and organizationally traumatized local governments are not easy grounds for change towards sustainable transport. The support of partner organizations, as in house partners-in-practice rather than consultants, was essential in enabling the day-to-day support and knowledge input needed.

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## Appendix

**Table A1. Sustainable transport checklist.**

<b>Integrated Sustainable Transport Checklist</b>
<b>Part 1: Identification of needs and applicability of intervention</b>
<b><i>Has the policy/plan/project identification and planning process taken into account:</i></b>
<ul style="list-style-type: none"> <li>• The level of intervention of the proposed policy/plan/project and size of the affected area/s.</li> <li>• Social and economic characteristics of the affected area/s, including political, institutional, religious and cultural characteristics.</li> <li>• Current land-uses (formal and informal) and economic (formal and informal) activities in the affected area/s.</li> <li>• Current location of community facilities, such as schools, hospitals, police stations, clinics, libraries, community halls, churches and crèches in the affected area/s.</li> <li>• Current type and location of transport infrastructure and modes, including non-motorized transport modes such as pedestrians, bicycles, horse drawn transport modes in the affected area/s.</li> <li>• Current operating hours and costs associated with public transport modes.</li> <li>• Current transport user groups and their needs, with specific reference to vulnerable groups such as women, children, elderly and the disabled in the affected area/s.</li> <li>• Current economic development needs in the affected area/s.</li> <li>• Vulnerable social and economic groups in the affected area/s and their economic development and transport needs?</li> <li>• Existing/proposed transport, land-use planning and economic development policies, plans and initiatives for the affected area/s?</li> <li>• Predicted future transport and economic development needs in the affected area/s.</li> <li>• Transport alternatives, including infrastructure, location and modal alternatives in the affected area/s.</li> </ul>
<b>Part 2: Legal requirements affecting transport planning in South Africa</b>
<b><i>Does the project identification and planning process take into account the following legal requirements:</i></b>
<b><i>Open and transparent decision-making</i></b>
<ul style="list-style-type: none"> <li>• The need to uphold the constitutional right of individuals and the public to administrative action that is lawful, reasonable and procedurally fair.</li> <li>• The need to foster transparency in public administration by providing the public with timely, accessible and accurate information.</li> <li>• The need to promote accountable public administration.</li> <li>• The need to ensure the provision of information to those affected by the laws, procedures &amp; administrative practice relating to land development.</li> <li>• The need to enable public access to information and 'records'.</li> <li>• The need to promote open and transparent decision making.</li> <li>• The need to provide adequate written reasons for decisions taken.</li> <li>• The need to promote procedural fairness in administrative decision-making that affects individuals as well as the public.</li> </ul>

<ul style="list-style-type: none"> <li>• The need to ensure that administrative action is based on ‘adequate’ reasons.</li> </ul>	
<ul style="list-style-type: none"> <li>• The need to ensure that issues considered in the decision-making process and the manner in which they are considered can be explained and justified.</li> </ul>	
<ul style="list-style-type: none"> <li>• Co-operative governance</li> </ul>	
<ul style="list-style-type: none"> <li>• The need to give effect to the principle of co-operative governance.</li> </ul>	
<ul style="list-style-type: none"> <li>• Integrated planning</li> </ul>	
<ul style="list-style-type: none"> <li>• The need to undertake 'development-orientated' planning.</li> </ul>	
<ul style="list-style-type: none"> <li>• The need to promote ‘efficient and integrated land-use planning and development’ by – <ul style="list-style-type: none"> <li>• Promoting the integration of the social, economic, institutional and physical components of land use planning and development, and;</li> <li>• Promoting integrated land use planning and development in rural and urban areas in support of one another.</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>• The need to integrate land use planning and development with land transport planning. (where the relevant planning authority is a municipality, the transport component of the municipality’s integrated development plan (IDP))</li> </ul>	
<ul style="list-style-type: none"> <li>• The need to ensure integration within land transport planning, including the integration of the transport related plans required in terms of the NLTTA, namely the: National Strategic Framework; Provincial Land Transport Framework; Current public transport records; Public Transport Plans and Integrated Transport Plans.</li> </ul>	
<ul style="list-style-type: none"> <li>• The need to ensure the integration of the different modes of land transport.</li> </ul>	
<b>Public participation</b>	
<ul style="list-style-type: none"> <li>• The need to encourage and promote public participation (including participation by vulnerable and disadvantaged persons, including women and youth) in policy-making transport planning and environmental governance.</li> </ul>	
<ul style="list-style-type: none"> <li>• The need to take into account the interests, needs and values of all interested and affected parties (this includes recognizing all forms of knowledge, including traditional knowledge).</li> </ul>	
<ul style="list-style-type: none"> <li>• The need to inform the public and respond to (basic) public needs.</li> </ul>	
<ul style="list-style-type: none"> <li>• The need to encourage, and create conditions for, the involvement of the local community in local governance matters.</li> </ul>	
<ul style="list-style-type: none"> <li>• The need to ensure that local authorities have consulted with the local community regarding municipal services to be provided.</li> </ul>	
<b>Sustainable development</b>	
<b>Does the project identification and planning process take into account:</b>	<b>Reference</b>
<ul style="list-style-type: none"> <li>• The need to “...heal the divisions of the past...” and “... improve the quality of life of all citizens”.</li> </ul>	Constitution preamble
<ul style="list-style-type: none"> <li>• The need to uphold the right to an environment that is not harmful to health and well-being.</li> </ul>	Constitutions 24(a)
<ul style="list-style-type: none"> <li>• The need to promote justifiable economic and social development while securing ecologically sustainable development and use of natural resources.</li> </ul>	Constitution s 24(b)(iii)
<ul style="list-style-type: none"> <li>• The need to ensure socially, environmentally and economically sustainable development</li> </ul>	NEMA s 2(3)
<ul style="list-style-type: none"> <li>• The need, at local government level, to promote a safe and healthy environment.</li> </ul>	Constitution s 152(1)(d) &
<ul style="list-style-type: none"> <li>• The need, at local government level, to promote social and economic development.</li> </ul>	Constitution s 152(1)(c) &

### Part 3: Checklist for sustainable lives

Geographical area of check?

Impact Group to be checked? Gender:(Male/ female) Income: (High/middle/low) Age: (Child/adult/elderly) Other: (Eg able/ disabled)

#### Natural Resources/Capital

*(which are the natural stocks (soil, water and air etc) and the environmental services (hydrological, nutrient cycle) from which resources useful for 'livelihoods' are derived)*

Checklist criteria <i>Does the proposed intervention have the potential to:</i>	For example, through.
Promote or impact on the biophysical quality and natural resources of the area?	Reduction/improvement in local air quality eg through changes in CO, NOx, particulates, smog, odour and particulates
	Reduction/improvement in regional and global air quality eg through changes in CO <sub>2</sub> , SO <sub>2</sub> and ozone
	Induced traffic, which in turn could overall increase levels of air pollutants?
	Mode shift to public transport or non-motorized modes, which could lead to overall reductions in pollution
	Reduction/improvement in noise levels
	Reduction/improvement of aesthetic and landscape values eg where a transport route passes through areas of natural beauty
	Reduction/increase in the consumption of fossil fuels
	Impact on flora and fauna
	Impact on water quality and supply (surface and groundwater)
	Impact on high potential agricultural land

#### Social Resources/Capital

*(which are the social resources on which people draw in their lives: for example relationships and membership of social networks)*

Checklist criteria <i>Does the proposed intervention have the potential to:</i>	For example by:
Promote or weaken community structures?	Promoting access or increasing severance between community members, groups and facilities
Promote or reduce interaction between social groups?	Promoting or reducing access for local political gatherings, support groups, religious activity etc
Reduce or promote the vulnerability of vulnerable groups?	Reducing or promoting access and safety for women, children, elderly and the disabled
Promote or reduce knowledge in the community?	Promoting or reducing access to libraries, schools and other educational facilities
Promote or reduce kinship and cultural ties?	Promoting or reducing access to family and friends

Reduce or create social problems?	Promoting or reducing access and exposure to alcohol, drugs, crime and disease
Promote or reduce the power of individuals or groups?	Promoting or reducing access to physical, financial and human resources
Increase or reduce personal fear?	Promoting or reducing access and safety and opportunities for crime related activities
<b>Human Resources/Capital</b> <i>(which are the skills, knowledge, ability to work, and good health, which enable people to pursue life differently)</i>	
<b>Checklist criteria</b> <i>Does the proposed intervention have the potential to:</i>	<b>For example by:</b>
Reduce or increase the loss of life?	Reducing or increasing the potential for fatal accidents
Reduce or increase disabilities?	Reducing or increasing the potential for serious accidents
Reduce or improve health levels?	Reducing or increasing access to health facilities such as parks, sports fields, public open spaces, gyms etc, Improving or reducing air quality in the area
Promote or reduce the level and standard of education?	Promote or reduce access to education opportunities such as schools, colleges, universities, crèches
Promote or reduce food security?	Promote or reduce access to markets, finance and land
<b>Financial Resources/Capital</b> <i>(for example, savings, credit, remittances, and pensions)</i>	
<b>Checklist criteria</b> <i>Does the proposed intervention have the potential to:</i>	<b>For example by:</b>
Promote or reduce economic development and diversification?	Promoting or reducing access to existing markets and opportunities for investment and the establishment of new markets etc
Promote or reduce productivity?	Reducing or increasing transport costs, travel times, vehicle maintenance and operating costs
Promote or reduce financial independence?	Promoting or reducing transportation costs and access to and the provision of markets and credit facilities
Promote or reduce employment opportunities?	Promoting or reducing access to the job market, education and training
Promote or reduce job creation?	Promoting or reducing opportunities for labour-based construction and other project related jobs during the construction and operation phase
Promote or reduce the ability to trade informally?	Promoting or reducing availability and access to land for informal traders and access to informal markets
<b>Physical Resources/Capital</b> <i>(the basic infrastructure: transport, shelter, energy, communications and production resources)</i>	
<b>Checklist criteria</b> <b>Does the proposed intervention have the potential to:</b>	<b>For example by:</b>

Promote or reduce access to schools, hospitals etc?	Promoting or reducing access to schools, hospitals etc
Promote or reduce access to water supplies?	Improving or reducing access to or the provision of water supplies
Promote or reduce access to energy?	Improving or reducing access to or the provision of energy sources, such as electricity, firewood, pa etc
Promote or reduce access to waste collection services?	Improving or reducing access to or the provision of waste collection services
Promote or reduce access to sanitary services?	Improve or reduce access to or the provision of sanitary service
Promote or reduce communications?	Improving or reducing access to public telephones, post offices, radio, television and news papers
Impact on land ownership and tenure?	Changing landownership and tenure rights by expropriating land
Impact on rights-of-way?	Cutting or disrupting existing access routes and rights of way
<b>Time Resources/Capital</b> <i>(that is, the time available for discretionary activity)</i>	
<b>Checklist criteria</b> <i>Does the proposed intervention have the potential to:</i>	<b>For example by:</b>
Increase or reduce the free, non-work time available for individuals?	Reducing or increasing the travel time to work
Increase or reduce the free, non-work time available for families?	Reducing or increasing the travel time to work for parents and education facilities for children
Increase or reduce the free, non-work time available for communities?	Reducing or increasing the travel time to community facilities, shops, and other basic physical need and water
Promote or reduce child independence on parents and elders. (This, in turn, contributes to changes in time resources available to parents and other care-givers)?	Promoting or reducing access to public transport and walking/ cycle routes to school etc.
<i>Promote or impact on other resources?</i>	