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Sustainability and infrastructure planning in South Africa: a Cape Town case study

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ABSTRACT This paper highlights the importance of considering ecological sustainability issues in any city's infrastructure plans and investments. It reviews the South African government's current and planned investment in urban infrastructure, both to enhance economic growth and to contribute to poverty reduction, and what this implies for Cape Town. It highlights the lack of attention given to ecological issues and the dangers of assuming that the resources will be available to support it, and that prices for fresh water, fossil fuels and food will not rise. It also points to Cape Town's large ecological footprint (comparable to that of Canada, per person) and its heavy dependence on non-renewable resources, especially oil – which means that every oil price rise transfers money from the Cape Town economy to national and global financial circuits. Housing lower-income groups in conventional housing with no attention to a more compact, less automobile-dependent city form exposes them to high water and energy costs. The paper ends by pointing to the advantages for the city and for lower-income groups of including ecological issues, and outlines the possibilities for doing so.

KEYWORDS ecological footprint / infrastructure planning / poverty / South Africa / sustainable cities / sustainable development

I. INTRODUCTION

Since 2003 or 2004, the South African government has emphasized investment in urban infrastructure as a key strategic objective of the country's economic growth and social development policy (although attention to this area actually dates back to the birth of democracy in 1994). The underlying assumption is that public investment in infrastructure has a positive impact on economic growth because it triggers and stimulates related private sector investments, and that it contributes to poverty eradication by providing the foundation for social development. Although this nexus between infrastructure and growth has received attention in the international literature,⁽¹⁾ the linkage to sustainability has yet to receive the attention it deserves.

The South African government has created at national level a new mega-fund called the Municipal Infrastructure Grant (MIG) programme, with a mandate to facilitate the investment of over R15 billion in municipal infrastructure over a three-year period starting in 2004/2005. An influential policy framework, namely the National Spatial Development Perspective (NSDP), which was formulated and disseminated by the Office

1. See Arimah, B (2005), "What drives infrastructure spending in cities of developing countries?", *Urban Studies* Vol 42, No 8, pages 1345–1368.

of the President, will determine the spatial focus of these investments. The aim of the NSDP is to ensure that infrastructure investments stimulate economic growth and meet social needs by targeting areas where growth potential is highest and social needs are greatest. These become the priority areas for future investment.

As in the case of urban theory and policy in general,⁽²⁾ there is no evidence that either the policy approach underlying the MIG programme nor the NSDP have taken into account the underlying sustainability of the ecosystem services that urban infrastructures depend on.

This paper starts with a brief description of the MIG programme, focusing in particular on the type of infrastructure that the programme will fund. This is followed by a general discussion of urban infrastructure investments within the wider context of state economic policy, in particular the main patterns of fiscal expenditure. The absence of a national sustainable development strategy is presented as the reason why South Africa's infrastructure planning has not taken sustainability into account. The consequences of this within the context of Cape Town will be demonstrated, with extrapolations to the national level. Alternatives will be discussed that derive from a range of local emerging pilot projects that could have citywide and national applications.

II. INFRASTRUCTURE AND THE DEVELOPMENTAL STATE

There is little doubt that the language of political debate in South Africa changed at the beginning of the second decade of democracy. Whereas the first decade (1994–2004) was dominated by the language of reconciliation and neo-liberal “macroeconomic stabilization”, the second (2005 onwards) is dominated by the challenge of poverty and the somewhat obfuscating notion of the “two economies” – at best a polite euphemism for inequality. What was common to both decades, however, although admittedly more prominent in the second, was the search for the elusive “developmental state”.⁽³⁾

Market fundamentalism and right-wing politics present us with a veritable arsenal of stratagems and techniques to effect “change”. Fortunately, these have been slated by the South African government as inappropriate in meeting our needs and development priorities. In his address to the National Assembly on the occasion of his 2004 Budget Vote, President Mbeki unequivocally endorsed a “left” project. Quoting the public intellectual, William Hutton, he said:

“Western democracies have been characterized by one broad family of ideas that might be called left – a belief in the social, reduction in inequality, the provision of public services, the principle that workers should be treated as assets rather than commodities, regulation of enterprise, rehabilitation of criminals, tolerance and a respect for minorities – and another broad family of ideas that might be called right: an honouring of our inherited institutional fabric, a respect for order, a belief that private property rights and profit are essential to the operation of the market economy, a suspicion of worker rights, faith in the remedial value of punitive justice, and the distrust of the new.”⁽⁴⁾

He said further:

2. See Swilling, M (2004), “Rethinking the sustainability of the South African city”, *Development Update* No 5, April.

3. The notion of a “developmental state” refers in general to the type of state that emerged in the Asian Newly Industrialized Countries (NICs) during the last three decades of the twentieth century, but which also came to be associated with any state that developed the capacity to drive and manage economic development strategies that fundamentally modernized what were previously un(der)developed economies.

4. Mbeki, T (2004), Address of the President of South Africa on the occasion of the Budget Vote, National Assembly, Cape Town, 23 June, accessed August 2004 at <http://www.gov.za>.

“[T]here can be no doubt about where we stand with regard to this great divide. It is to pursue the goals contained in the ‘broad family of ideas that might be called the left’ that we seek to build the system of governance. The obligations of the democratic state to the masses of our people do not allow that we should join those who ‘celebrate individualism and denigrate the state.’ We would never succeed to eradicate the legacy of colonialism and apartheid if we joined the campaign to portray ‘the social, the collective and the public realm . . . as the enemies of prosperity and individual autonomy . . . opposed to the moral basis of society, grounded as it should be, (in terms of right-wing ideology) in the absolute responsibility of individuals to shoulder their burdens and exercise their rights alone.’ This is precisely what we meant when we said in the May State of the Nation Address that: ‘The advances we must record demand that we ensure that the public sector discharges its responsibilities to our people as a critical player in the process of the growth, reconstruction and development of our country.’”⁽⁵⁾

5. See reference 4.

So the components of the “left” project and the agenda of the developmental state are ostensibly about a vision-driven, enterprising and empowered performance-oriented government, active citizen participation, reducing inequality, and providing public services.

The most revealing sentence in the Presidency’s Ten-Year Review was this:

“From an assessment of the various themes, it can be seen that the government’s successes occur more often in areas where it has significant control and its lack of immediate success occurs more often in those areas where it may only have indirect influence.”⁽⁶⁾

6. Republic of South Africa (2004), *Ten Year Review*, The Presidency, page 75.

This sentence is the cornerstone of the analytical framework that has been used by the Presidency to make sense of the first decade of democracy. It also captures the underlying mindset that informs the “developmental state” strategy. Many senior policy makers and politicians refer (often with concern) to the rising levels of centralized control exerted by the Presidency. Although there is nothing wrong with centralized control in and of itself (and it is by no means unusual for state systems across the world, especially in fast-growing developing countries like South Africa), much depends on whether it impoverishes or enriches the intellectual and strategic content of policy-making. Evidence of this way of thinking goes back to late 2001, but gathers momentum in the lead-up to the writing of the Ten-Year Review and breaks out publicly in the president’s speeches during and after the 2004 general election. Building the “developmental state” is now official government policy, and with this comes an interventionism across the board that is premised on the assumption that greater state control means greater success. This has started to create tensions between the Executive and the Reserve Bank, tensions which have now broken out into the public domain and which have been commented on in the press.⁽⁷⁾

7. *Mail and Guardian*, 18–24 March 2005.

The key characteristic of the current phase is the all-pervasive emphasis on state-led public sector investments, which is reflected in a remarkable turn away from privatization in favour of a strategy to use the parastatals to lead massive increases in physical and economic infrastructure investments. Together with state controlled financial institutions

such as the Industrial Development Corporation (IDC), the Development Bank of Southern Africa (DBSA), state pension funds (PIC) and the special funds, there is clearly a new-found commitment to demonstrating what state-controlled investment can achieve. The approach is also reflected in the merging of various funds to create the MIG mega-fund for managing investment in municipal infrastructure. This is reinforced by strategies to build the capacity of local governments to deliver rather than just assuming that contracting out to the private sector will work.

The intention behind the MIG Fund is to coordinate the investment of over R15 billion in infrastructure over a three-year period starting in 2004. This is coupled with aggressive strategies to break white control of investment decision-making via BEE (Black Economic Empowerment), BBEE (Broad-based Black Economic Empowerment) and the Charters, a renewed commitment to community-based capital mobilization via increased support for SMMEs (small, medium-sized and major enterprises), the creation of a new framework for supporting the growth of microfinance institutions, and a return to policies that are supportive of community-based rather than purely private sector-led delivery mechanisms, for example, in the housing sector. Last, but by no means least, is the rising giant in development finance, namely the National Skills Fund and the various Sector Education Training Authorities that have, to date, accumulated billions of rand via the skills levy on employers.⁽⁸⁾ But due to widely reported managerial incompetence, corruption and strategic myopia, these potentially revolutionary structures have not had the intended impact. These are problems, however, that are solvable.

One of the more remarkable features of post-1994 economic policy-making is the fact that, despite rhetorical commitments to fiscal restraint, fiscal expenditure has steadily increased in real terms. This runs contrary to what many analysts have assumed. For example, the United Nations Development Programme (UNDP) argued that the implications of the adoption after 1996 of neo-liberal economic policy for service delivery were as follows:

“First, attempts to reduce the budget deficit from about 5 per cent to less than 3 per cent within a five-year period entailed severe restrictions on expenditure, the impact of which was felt most forcefully in government’s capital investment, and thus most noticeably in social and economic infrastructure development.”⁽⁹⁾

Although there are many statements in the polemical, academic and policy literature that equate the adoption of neo-liberal economic policies with expenditure cutbacks, the above quote from a respected and renowned UNDP report captures a general consensus that spans a range of ideological perspectives, from those who think that cutbacks are evidence of state withdrawal in line with a commitment to “sensible” market-based economics, to those who see withdrawal as evidence of the perpetuation of economic apartheid disguised as “neo-liberalism”. The evidence does not support these perspectives.⁽¹⁰⁾

The reduction in the budget deficit is one of the key features of government finance over the last ten years. Between 1994/95 and 2004/05 the budget deficit as a percentage of GDP was reduced from 5.6 per cent in 1994/95 to a low of 1 per cent in 2002/03 (Table 1). After remaining at between 5 and 6 per cent until 1997/98, it declined

8. The National Skills Fund and the Sector Education Training Authorities were set up to manage the skills development and training of all South Africans, with special reference to the human skills required for further economic growth. These structures are funded by a special tax on all businesses.

9. United Nations Development Programme (2000), *UNDP South African Development Report 2000*, UNDP, South Africa, accessed at <http://www.undp.org.za/sahdr2000/sahdr20002.html>, Chapter 3, page 3.

10. The rest of this section draws entirely on commissioned research compiled by Albert Van Zyl, from the Sociology Department at the University of Stellenbosch; this research forms part of a wider project coordinated by Mark Swilling. Swilling, M, F Khan, J Van Breda and A Van Zyl (2006), “Economic policy-making in a developmental state: review of the South African government’s poverty and development approaches, 1994–2004”, Research Report, Durban: Centre for Civil Society, University of Kwa-Zulu Natal.

dramatically after the introduction of neo-liberal macrostabilization measures in 1997. After the 2002/03 low, it was allowed to move up in a controlled and purposeful manner, in order to fund additional infrastructure investment.

During this same period, revenue as a percentage of GDP reached a high of 26.9 per cent in 1997/98, after which it declined to a low of 24.6 per cent in 2000/01. It was also allowed to drift upwards to reach a projected 25.7 per cent of GDP in 2004/05. Since 1998/99, the reconstituted South African Revenue Service has consistently over-collected on its targets. This has allowed systematic reductions in, especially, personal income tax rates without affecting the levels of revenue collected. Over this same period, expenditure reached a high of 31.7 per cent of GDP in 1996/97 before declining to a low of 26.6 per cent in 2000/01. Expenditure too was allowed to drift back up to 28.6 per cent of GDP in 2004/05. As mentioned above, this increase in expenditure was largely applied to increased investment in infrastructure.

In summary, the general picture is of rising revenue, expenditure and deficit levels until roughly 1997/98. With the introduction, in 1996, of a new national economic development strategy called the Growth Employment and Reconstruction (GEAR) strategy, all three showed rapid decline and, except for expenditure, remained at lower levels. Expenditure increased overall as a percentage of GDP from 1998/99 onwards. Over the period 2003–2005, expenditure and deficit levels have shown further increases, while revenue has remained steadily below 26 per cent of GDP. It is therefore possible to conclude that while the budget was generally less expansionary between 1994/95 and 2002/03, the deficit was not reduced by cutting expenditure, as is commonly believed.

Social services expenditure increased by an average of 6.4 per cent over this period. In fact, real growth in the sector outstripped overall expenditure growth by 1.9 percentage points. The result is that the relative share of consolidated expenditure given to social services increased from 45.4 per cent in 1995/96 to 50.9 per cent in 2004/05; and while all four social services functions benefited from these increases, increases to education and welfare account for more than two-thirds (69 per cent) of the growth.

Over the same period, allocations to economic services increased by an annual average of 7.9 per cent in real terms. These increases have been primarily in allocations to transport and communications and other economic services and, together, these two account for 63 per cent of growth in expenditure on economic services. Expenditure growth on economic services also outstrips total real expenditure growth. As a result, its share of expenditure is expected to grow from 10.5 per cent in 1995/96 to a projected 12.8 per cent in 2004/05. It is, however, important to note that its share of expenditure only started increasing in 2001/02, after dropping to a low of 8 per cent in 2000/01.

The only sector growing more slowly than overall expenditure is protection services, the share of which declined to a low of 14.5 per cent in 1999/00 before recovering. Despite the decline in its share of expenditure, this sector still shows real growth.

The resurgent commitment across state structures to building a developmental state, the virtual disappearance of talk about privatization, and constant references to state-led investment, raises the obvious question as to the spatial dimensions of investment strategies. This is

TABLE 1
National fiscal framework, 1994/95–2004/05

R (million)	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05
Revenue	112,200	126,058	146,519	163,492	184,328	207,181	223,687	257,460	290,500	314,468	342,356
Expenditure	137,000	151,831	176,291	190,607	201,534	222,645	242,239	271,157	301,800	341,606	381,280
Deficit	-24,800	-25,773	-29,772	-27,115	-17,206	-15,464	-18,552	-13,697	-11,300	-27,138	-38,924
GDP	444,900	497,295	556,206	606,973	754,729	821,144	910,500	1,007,810	1,124,000	1,223,198	1,331,796
Deficit/GDP	-5.6%	-5.2%	-5.4%	-4.5%	-2.3%	-1.9%	-2.0%	-1.4%	-1.0%	-2.2%	-2.9%
Expenditure/GDP	30.8%	30.5%	31.7%	31.4%	26.7%	27.1%	26.6%	26.9%	26.9%	27.9%	28.6%
Revenue/GDP	25.2%	25.3%	26.3%	26.9%	24.4%	25.2%	24.6%	25.5%	25.8%	25.7%	25.7%

SOURCE: National Treasury Budget Review, various years.

TABLE 2
Consolidated national and provincial expenditure

R (million)	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	% total real change	Average annual change	Total change	% share of increase
	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Revised estimate	Budget				
Protection services	26,673	27,952	31,214	34,075	32,520	40,975	46,893	53,335	58,327	63,247	33.5%	3.7%	36,574	15.8%
Social services	70,294	86,650	99,230	103,168	102,634	116,577	129,560	153,341	177,330	196,685	57.5%	6.4%	126,391	54.61%
Education	34,214	42,140	44,997	45,348	47,841	52,764	55,395	62,757	69,824	75,862	24.8%	2.8%	41,648	18.0%
Health	16,078	24,815	23,001	24,663	29,928	27,195	31,713	34,940	39,677	42,586	49.1%	5.5%	26,508	11.45%
Welfare (incl. social security)	14,737	16,089	23,640	25,418	19,674	30,412	34,082	41,966	51,486	59,936	128.9%	14.3%	45,199	19.53%
Housing	5,265	3,606	7,592	7,739	5,191	6,206	8,370	13,678	16,343	18,301	95.6%	10.6%	13,036	5.63%
Economic services	16,218	18,785	18,123	19,013	19,040	19,589	26,993	36,242	44,999	49,413	71.5%	7.9%	33,195	14.34%
Water schemes & related services	1,157	1,968	2,469	2,894	2,338	3,051	3,555	4,540	5,832	6,150	199.2%	22.1%	4,993	2.16%
Fuel and energy	29	638	479	291	393	207	859	1,508	2,264	2,461	4,676.2%	519.6%	2,432	1.05%
Agriculture, fishing & forestry	2,975	2,652	3,682	3,950	3,516	4,499	5,292	5,729	6,636	7,109	34.5%	3.8%	4,134	1.79%
Mining, manufacturing & construction	1,250	190	1,087	1,262	224	1,401	1,358	1,503	1,506	2,053	-7.6%	-0.8%	803	0.35%
Transport & communications	7,203	8,706	7,315	7,789	9,168	7,609	10,012	13,825	16,285	17,329	35.4%	3.9%	10,126	4.38%
Other economic services	3,604	4,631	3,091	2,827	3,401	2,822	5,917	9,137	12,476	14,311	123.5%	13.7%	10,707	4.63%
General government services & unallocated expenditure	10,992	21,952	17,020	12,290	24,887	22,276	20,981	20,063	23,483	23,987	22.8%	2.5%	12,995	5.62%
Total allocated expenditure	124,177	155,339	165,587	168,546	179,081	199,417	224,427	262,981	304,139	333,332	51.1%	5.7%	209,155	90.38%
Interest	30,661	33,160	38,820	42,669	44,483	46,186	47,515	47,250	47,326	50,432	-7.4%	-0.8%	19,771	8.54%
Unallocated									0	2,500			2,500	1.08%
Consolidated expenditure	154,838	188,499	204,407	211,215	223,564	245,603	271,942	310,231	351,465	386,264	40.4%	4.5%	231,426	100%

SOURCE: National Treasury Budget Review, various years.

TABLE 3
Consolidated national and provincial expenditure as % share of total

	1995/96	1996/97	1997/98	1998/99	1999/00	2000/2001	2001/02	2002/03	2003/04	2004/05
	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Revised estimate	Budget
Protection services	17.2%	14.8%	15.3%	16.1%	14.5%	16.7%	17.2%	17.2%	16.6%	16.4%
Social services	45.4%	46.0%	48.5%	48.8%	45.9%	47.5%	47.6%	49.4%	50.5%	50.9%
Education	22.1%	22.4%	22.0%	21.5%	21.4%	21.5%	20.4%	20.2%	19.9%	19.6%
Health	10.4%	13.2%	11.3%	11.7%	13.4%	11.1%	11.7%	11.3%	11.3%	11.0%
Welfare (incl. social security)	9.5%	8.5%	11.6%	12.0%	8.8%	12.4%	12.5%	13.5%	14.6%	15.5%
Housing	3.4%	1.9%	3.7%	3.7%	2.3%	2.5%	3.1%	4.4%	4.6%	4.7%
Economic services	10.5%	10.0%	8.9%	9.0%	8.5%	8.0%	9.9%	11.7%	12.8%	12.8%
Water schemes & related services	0.7%	1.0%	1.2%	1.4%	1.0%	1.2%	1.3%	1.5%	1.7%	1.6%
Fuel and energy	0.0%	0.3%	0.2%	0.1%	0.2%	0.1%	0.3%	0.5%	0.6%	0.6%
Agriculture, fishing & forestry	1.9%	1.4%	1.8%	1.9%	1.6%	1.8%	1.9%	1.8%	1.9%	1.8%
Mining, manufacturing & construction	0.8%	0.1%	0.5%	0.6%	0.1%	0.6%	0.5%	0.5%	0.4%	0.5%
Transport & communications	4.7%	4.6%	3.6%	3.7%	4.1%	3.1%	3.7%	4.5%	4.6%	4.5%
Other economic services	2.3%	2.5%	1.5%	1.3%	1.5%	1.1%	2.2%	2.9%	3.5%	3.7%
General government services & unallocated expenditure	7.1%	11.6%	8.3%	5.8%	11.1%	9.1%	7.7%	6.5%	6.7%	6.2%
Total allocated expenditure	80.2%	82.4%	81.0%	79.8%	80.1%	81.2%	82.5%	84.8%	86.5%	86.3%
Interest	19.8%	17.6%	19.0%	20.2%	19.9%	18.8%	17.5%	15.2%	13.5%	13.1%
Unallocated	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%
Consolidated expenditure	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

SOURCE: National Treasury Budget Review, various years.

where the remarkably influential National Spatial Development Framework (NSDF, sometimes also referred to as the National Spatial Development Perspective) comes in. Written by a group in the Presidency, this document cuts right across the well-established but badly organized rural agenda within the African National Congress (ANC) by articulating a commitment to an urban bias for state-led investments, in particular infrastructure investment. Based on the argument that investment should target spaces where there is a combination of highest social need (i.e. poverty) and greatest potential for growth, this document concludes that most rural areas have low potential and most inner-city areas don't have high enough needs. The result is the targeting of new growth areas within certain non-core parts of metropolitan areas and in core areas of growing secondary cities. If one could map the state's vision of where investments in fixed assets will land up and who will benefit, then a map of the NSDF's "priority areas" would reveal the state's vision as to where investments in fixed assets will be placed and who will benefit. Whether the private sector follows the state into these areas will depend heavily on the influence of BEE (Black Economic Empowerment) interests and whether key financial directors can reconcile quarterly reporting of profits with long lead times between investment and breakeven points.

A key challenge is how to manage the growing tensions between the Executive (in particular the Ministry of Finance and its department) and the Reserve Bank over the inflationary consequences of rising fiscal expenditures, while the Reserve Bank aims to keep inflation low. To use the language of macroeconomics, this is about the emerging tension between monetary and fiscal policies. The Reserve Bank's robust narrow-minded monetarist focus on inflation will come up against the ambitious desire by the Executive – and the Ministry of Finance in particular – to ramp up investment levels via the investment strategies of state-related institutions and structures. This could translate into increased borrowing on local capital markets, using the substantial asset base available to state structures, with the resultant upward pressures on interest rates, which may, in turn, increase pressures on private sector borrowers to search for more off-shore funding. It could also stimulate foreign direct investment, thus increasing money supply, with implications for the exchange rate (and therefore exports). These events could lead to the Reserve Bank's number one enemy – inflation.

Mistimed over-reactions could contradict what the Executive is trying to do. Greater coordination would be the solution, but senior Reserve Bank officials complain they are being shut out of economic policy-making in the Executive. There is evidence, for example, that the old practice of passing Cabinet memos through the Reserve Bank for comment before going to Cabinet is no longer generally applied. This may be one example of over-centralization of control impoverishing rather than enriching the policy-making process. Conversely, senior state planners complain that the Reserve Bank has insulated itself from social and political pressures, and that the governor's policy paradigm is out of step with global thinking that has gone beyond an obsessive focus on inflation.

It remains to be seen where the current strategy will lead. However, the scenario that underpins medium-term economic policy-making is therefore a combination of the following:

- state-led increases in total investment to at least 25 per cent of GDP, with public sector investment in urban infrastructure leading the way – hence the importance of the MIG programme within the framework of the NSDF;
- continued rising level of fiscal expenditure;
- the breaking of white control of investment decision-making via even more aggressive BEE (Black Economic Empowerment), BBEE (Broad-based Black Economic Empowerment) and the Charter movement to increase private sector investment levels to at least the same level as public sector investment levels (including foreign direct investment) – BBEE has a greater potential to reduce inequalities and therefore trigger the virtuous cycle and should, therefore, have preference (but only if the BBEE Board members and shareholders have real strategic value to add);
- rising levels of state-supported less usurious community-based capital mobilization, so that this sector can contribute a few percentage points directly to total investment (and more, indirectly) but, more importantly, can foster an entrepreneurial revolution in the poorest communities via reinforcement of social solidarities that prevent leakage of intra-community circular cash flows into institutions (i.e. all the major banks) that reinvest savings in non-poor localities;
- increased foreign direct investment (following the now oft-repeated slogan that foreign investment never leads, it “follows growth”);
- restrictions on speculative investments by foreign investors in short-term liquid assets (thus reducing the upward increase in values this creates which, in turn, sucks in local investors, which means local investors stay away from fixed investments as well);
- a focus on fixed asset investments, which will have to include a judicious mix of investments in “Blue IQ”-type industries (which require small quantities of high-skilled labour), mega-investments (with a high cost-to-labour absorption ratio) and a vast array of investments in SMMEs and middle-sized listed companies (which absorb more labour at lower cost);
- increased exports if global unfair trade can be broken via effective negotiating in the WTO and bilateral fora;
- bilateral agreements with organized labour and civil society with respect to key strategic issues such as wage levels, dual labour markets, training, state assets and job losses in order to ensure that the global capitalist drive to reduce labour costs and environmental costs in so-called “emerging markets” is fiercely resisted; and
- agreement across the different state sectors on the final formulation of the National Sustainable Development Strategy, which is going through a policy formulation stage from June 2005–June 2006, and in particular the success of this policy framework in embedding economic policy in a sustainable resource use framework.

If this all combines in mutually reinforcing ways, it could trigger the much dreamed about quantum shift from the vicious to a virtuous cycle of rising growth levels, coupled to reduced inequalities and, ultimately, poverty eradication. The centrality of infrastructure investment makes sense, but the failure to acknowledge and incorporate sustainability is a critical failure. This will be demonstrated through a case study of Cape Town.

III. PROFILING CAPE TOWN

a. The primary data

- total population: 2.8 million, and growing at 2.6 per cent;
- race breakdown: 48 per cent classify themselves as coloureds, 32 per cent as black Africans, and 20 per cent as whites – the black African population is growing at the fastest rate, with in-migration from the Eastern Cape being a major cause of this growth;
- total number of households in 2001: 759,765, and growing at 3.3 per cent, which means that the city needs to plan for 25,000 new households each year;
- of a total of, at most, 800,000 households in 2005, approximately 265,000 require access to formal housing;
- the number of people with access to basic services is much higher than the number who have formal houses – 90 per cent of households have access to piped water on site, electricity and a flush toilet;
- 35 per cent do not have access to formal houses; and
- 29 per cent are formally unemployed (with many of these people employed in the informal sector), which means around 1 million Capetonians are very poor.

What these figures do not reveal is the spatial distribution of Capetonians across the suburbs of Cape Town. There are nearly 800,000 households (or 760,000 at the time of the census) spread out across ten suburban types (Table 4). Based on various cross-tabulations from the Knowledge Factory's ClusterPlus database, it was possible to calculate the number of households for each category.⁽¹¹⁾

Table 4 would suggest that the Cape Town elite comprises 16 per cent of households, the middle class 31 per cent and the poor and working class 51 per cent. Significantly, over 100,000 households, comprising 15 per cent of the households that make up the city, live in shack settlements. These strata are located geographically in Figure 1.

For many of the poorest neighbourhoods (located in the last four cluster categories), sustainability means, in the first instance, investments in decent housing, more and better services, and neighbourhood facilities and infrastructure (both built and natural). However, limited household incomes mean residents need to be protected from service systems that will be a constant drain on their finances, such as energy systems that are dependent on oil or grid electricity, transport systems that will become increasingly expensive as the oil price goes up, and sanitation options that become increasingly costly to maintain. Solar water heaters and LPG stoves solve, to a large degree, the first problem; rail and taxis that run on biogas or hydrogen resolve the second problem. Both are technically feasible, cheaper to operate and cost less on the capital account. The only scarce commodity is the imagination that is required to make it happen.

IV. CAPE TOWN'S FOOTPRINT⁽¹²⁾

It has been estimated that Cape Town's ecological footprint is 4.28 hectares per capita (ha/cap). If everyone lived in accordance with this average, 2.3 planets would be required. This compares to Canada's 4.3 ha/cap, the USA's 5.1 ha/cap, India's 0.4 ha/cap, and a world average

11. The Knowledge Factory is a private business that collects huge quantities of data for use by the private sector, in particular the marketing sector. It provides a database that categorizes every household in South Africa according to socioeconomic and consumption level. Tables 4 and 6 use the descriptions used by the Knowledge Factory partly because these terms and related descriptions reveal the class prejudice of the marketing industry. Households divide roughly into three bands: the urban elites, the middle class and the urban poor. Within each category there are distinctions based on lifestyle and consumption.

12. The section on Cape Town's footprint that follows is almost entirely based on a report by Gasson, B (2002), "The ecological footprint of Cape Town: unsustainable resource use and planning implications", Paper presented at the National Conference of the South African Planning Institution, 18–20 September, Durban.

TABLE 4
Cape Town's suburbs clustered in class categories

Cluster group	Key characteristics	% of suburbs	Number of households	% of total households
Silver spoons	Elite, largest consumers, getting richer	14	54,630	7
Upper-middle class	Established, mature, conservative, professionals, gated	19	68,129	9
<i>Sub-total</i>		33	122,759	16
Middle suburbia	Tight budgets, mid-level jobs, bargain hunters, big spending on educating children	20	77,380	10
Community nests	Mixed, Afro-cosmo, shifting, small spaces, stylish, café culture, dense	1.5	17,564	2
Labour pool	High-density family neighbourhoods, stable jobs, secondary education, struggling	9.5	42,404	6
New bonds	New SA families, youngish, targets of the developers	13.5	101,638	13
<i>Sub-total</i>		44.5	238,986	31
Township living	Old places, few jobs, youth culture, soul of the new SA, buzzy, vulnerable	4.5	80,980	11
Towering density	Teetering, high hopes, few options, the educated leave as soon as possible, limited reinvestment	13	170,752	22
Dire straits	Old places, overcrowded, services collapsing, high unemployment, decaying	2	26,108	3
Below the breadline	Shack settlements, desperation, insecurity	3	111,770	15
<i>Sub-total</i>		22.5	389,610	51

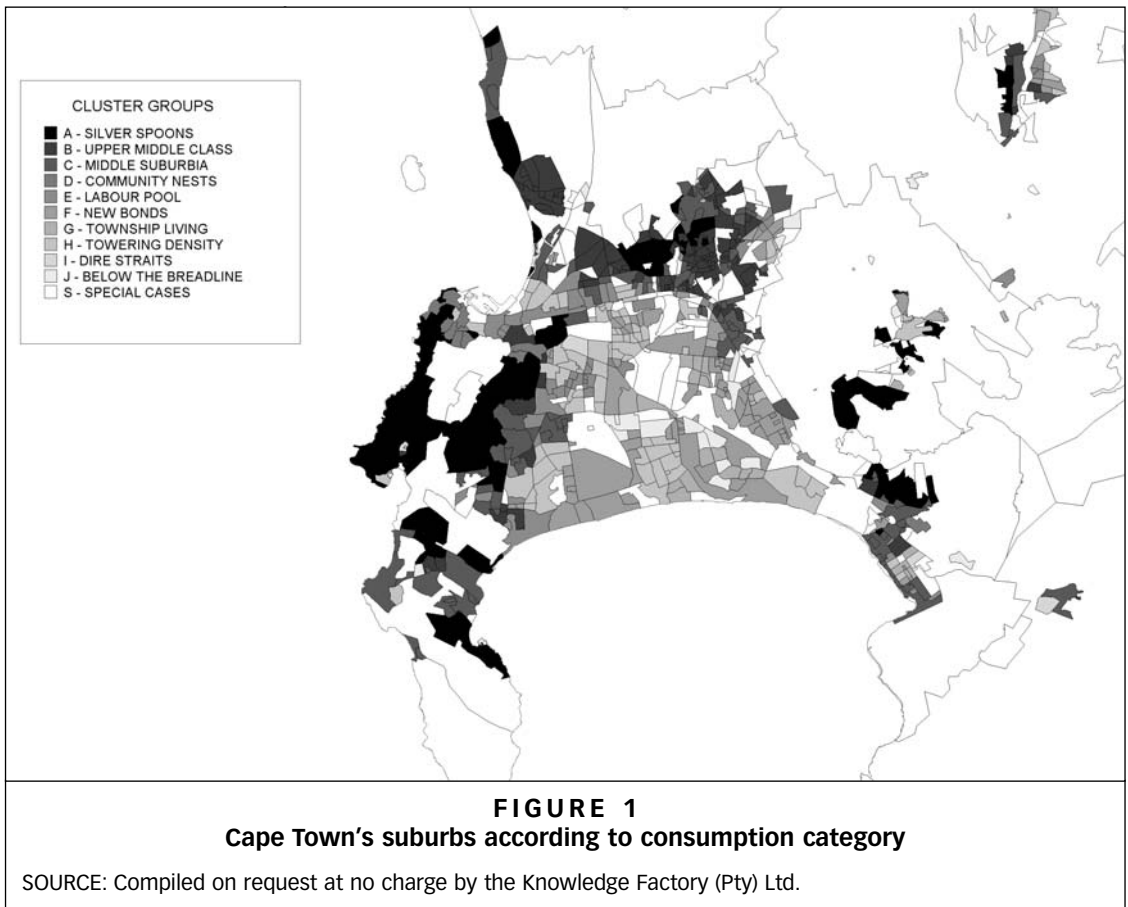
SOURCE: Calculated from database commissioned from The Knowledge Factory (Pty) Ltd. This database integrates data from the census, living standard measurements, and various national statistical databases.

of 1.8 ha/cap. Gasson arrived at these estimates by following the generally accepted methodology to calculate “ecological footprints”, i.e. calculating the inputs and outputs and reducing these to land area equivalents (Table 5)

This estimate resulted in a total ecological footprint of 128,264 square kilometres – of which the large majority (112,349 square kilometres) is for food.⁽¹³⁾ With an estimated population of 3 million people, Cape Town's per capita footprint is 4.28 hectares.

The most significant consequence of this input–output model is that it demonstrates how resource-intensive the Cape Town urban system really is. Every oil price rise corresponds to net increases in the amounts of cash transferred from the Cape Town economy to national and global financial circuits. This means that less cash is available in the local economy for households and businesses to circulate. A similar situation exists for water, building materials, coal-based energy and, in particular, food supplies (whose prices are directly linked to the oil price due to the chemically dependent nature of our non-organic food production

13. This figure excludes the massive 2.5 billion tonnes/year of seawater used to cool the Koeberg Nuclear Power Station (input), and the return to the sea of heated seawater (output).



system). If future planning ignores the fact that the costs of these inputs are going to rise, as the consequences of ecosystem thresholds ripple through the urban economy, agreed outcomes will never be achieved.

Even though Cape Town's existing water supply capacity is projected to reach its limit by 2025, the city manages water in an extremely inefficient and inequitable manner. Households used thirty-seven per cent of all water used in Cape Town in 1998. Of this, 21.3 per cent was used to irrigate gardens and fill swimming pools. In 1990, high-income households consumed 59 per cent of domestic water, middle-income households 30 per cent, and low-income households 11 per cent. While in 1998, the highest income bracket used nearly 60 per cent of all domestic water, in 2000, 20 per cent of all Capetonians had no piped water supply.

The ecological inefficiency of the existing water system is reflected in the fact that 61 per cent of all water used by households in Cape Town was used to flush toilets and transport sewerage. This is potable water that has been purified at a costly water purification plant. However, 11 per cent of the population had no waterborne sewerage. To make matters worse, of the 550,000 tonnes of sewerage per annum, only 5 per cent is recycled. This raises an obvious question: if the sewerage were productively re-used, would this generate enough savings (of purified water) and

TABLE 5
Cape Town's footprint

Inputs	Tons	Land area equivalent (sq.km)
• Fresh water	327,500,000	1,430
• Coal	378,732	1,326
• Oil	1,138,097	6,359
• Gas	21,816	95
• Wood	108,492	660
• Building mats	5,994,113	31
• Timber	69,844	425
• Paper	395,000	3,091
• Food	1,327,301	112,349
Outputs	Tons	Land area equivalent (sq.km)
• Liquid wastes	200,300,000	13
• Solid wastes	2,050,800	49
• Gaseous wastes	5,209,200	2,480

SOURCE: Gasson, B (2002), "The ecological footprint of Cape Town: unsustainable resource use and planning implications", Paper presented at the National Conference of the South African Planning Institution, 18–20 September, Durban.

revenues (from the productive re-uses) to cover the cost of providing sanitation to the unserved?

Cape Town generates a total of 2 million tonnes of waste per annum, or nearly 6,000 tonnes per day. In 1998, residential waste accounted for nearly half of this, at 895,000 tonnes/year. The remainder was mainly industrial and commercial waste. Significantly, 60 per cent of industrial waste is recycled, but only 6.5 per cent of residential and commercial waste. This is very low by international standards – some European cities recycle up to 40 per cent of residential and commercial wastes. The bulk of this unrecycled waste goes to landfills located on the Cape Flats. There is evidence that toxins leaching into these landfills are polluting the aquifers located below the Cape Flats. In addition, these landfills will be filled within five years, and the city council is struggling to find alternative sites close enough not to push transportation costs up too high. It is unlikely that they will succeed, which means that either they adopt a new approach or they force up a cost for a service that mainly benefits the middle and richer households. Of the 895,000 tonnes of residential waste generated in 1998, no less than 492,967 tonnes (over 50 per cent) were generated from the high- (excluding the middle-) income residential areas. This translates into 1.3 kilos of waste/person/day for high-income areas, 0.7 kilos/person/day in middle-income areas and 0.35 kilos/person/day in low-income areas. This means, in effect, that the large poorer communities on the Cape Flats host rubbish dumps that absorb wastes generated by a tiny minority of rich Capetonians who have one of the highest waste levels and lowest recycling rates in the world. This is eco-inefficiency that is subsidized by nature and the poor (who often live in

areas where litter is not collected often enough because the municipality “lacks the funds”).

Between 40 and 60 per cent of the domestic waste stream is organic waste, from kitchens, garden cuttings, etc. This is a rich source of nutrients that could be composted and ploughed back into urban agriculture. Instead, it is combined with all other wastes and dumped into toxic landfills. In the meantime, 1.3 million tonnes of food are imported from a land area equivalent to 112,000 square kilometres that stretches across the whole of South Africa, and beyond. Middle- and high-income households may be able to afford prices that include the cost of transporting all this food (fuel, cold storage, packaging, energy, etc.), but this is certainly not the case for poor households. Imagine the beneficial consequences for poor households if food could be made more affordable by re-using composted urban organic wastes in local urban agricultural undertakings and then selling the product at local neighbourhood retail markets. (Irrigation requirements could be reduced if organic farming practices are followed and more extensive use of on-site rainwater supplies is made.) In one stroke, the costs of long-distance transport, packaging, cold storage, middlemen costs (wholesalers, packagers, retailers) and chemical treatments can be eliminated from the cost of each item of fresh produce. Given that some estimates put these combined costs at as much as 80 per cent of the final cost before the final markup (which averages 20 per cent), the consequences for the much talked-about need for “food security”, improved dietary health intake and the need to reverse declines in expenditure on food in poor communities become obvious.

As far as energy consumption is concerned, petrol and diesel (both

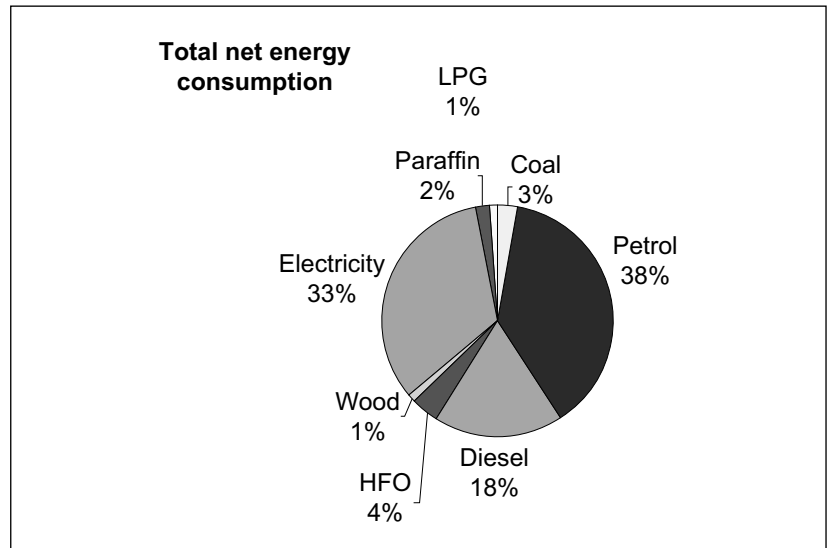
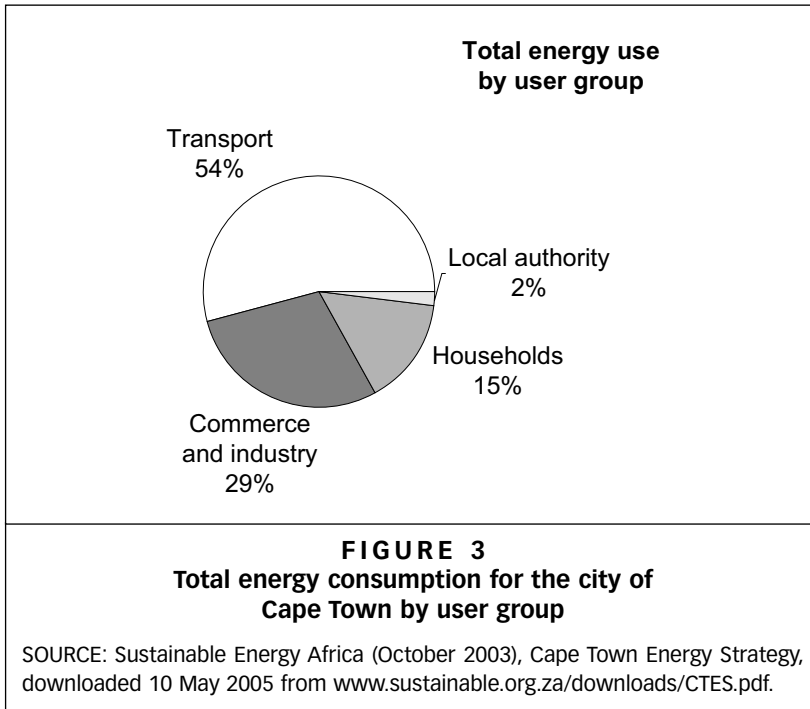


FIGURE 2
Total energy consumption for the city of Cape Town by energy source

SOURCE: Sustainable Energy Africa (October 2003), Cape Town Energy Strategy, downloaded 10 May 2005 from www.sustainable.org.za/downloads/CTES.pdf.



derived from imported oil) provide no less than 56 per cent of total net energy consumed; grid electricity accounts for only 33 per cent. Transportation consumes 54 per cent of all energy, compared to 15 per cent for households and 29 per cent for businesses. These figures reveal how extremely vulnerable the Cape Town economy really is with respect to future oil price increases, and clarifies the urgent importance of reducing oil consumption by changing the transport system, densification in order to reduce travel distances, and building mixed use settlements comprising residential, work and consumption spaces. If this is not done, Capetonians will end up working harder and harder in order to cover the costs of moving people around an increasingly fragmented city.

Cape Town's ecological footprint of 4.28 hectares/person is an average for all suburbs. Using databases provided by the Knowledge Factory, in conjunction with in-depth interviews with a sample of households drawn from the different cluster groups, it was possible to calculate footprints for the different suburb categories with a web-based data-processing facility provided by www.earthday.org. The factors that were taken into account were: diet (in particular the quantity of meat in the diet); the amount of processed and/or packaged food bought by the household; the amount of waste disposed of relative to that of others in the neighbourhood; size of family; size of house; type of house (including whether or not the house has a water supply); electricity supply; distance travelled by public transport each week; distance travelled by car each week; flying time; litres of fuel consumed by car per 100 kilometres (if the family owns a car); and frequency of travel with/as a passenger. The result was a calculation of the footprint in terms of hectares and how many planets would be required if everyone lived in the same way as the

people in a given suburb. This was followed by a second calculation, whereby the footprint of the same family with the same income in the same area was worked out with the following adjustments: the house built in accordance with a “green design” (i.e. proper north–south orientation, low-impact building materials, efficient use of energy and water, proper insulation, etc.); use of more energy efficient devices; reduced quantity of waste (via separation for recycling); more energy efficient cars used (for those who could afford a car); greater use of public transport; a “walking distance” approach to planning the densification and the location of facilities and shops; and a programme of basic services delivery for those who previously lacked in-house water and electricity supply. The results of this “before-and-after” exercise are captured in Table 6.⁽¹⁴⁾

14. See reference 11.

Table 6 reveals the impact of eco-efficiency interventions. These interventions rely on a combination of private decisions (e.g. flying time, type of car, amount of meat eaten), but are also dependent on sustainability interventions at neighbourhood level, e.g. provision of improved and safer public transport, a “walking distance” approach to neighbourhood planning, by-laws governing house design and energy efficiency, the provision of a waste separation and recycling service, and even investments in food markets to encourage reductions in the consumption of meat and reductions in the purchase of processed or packaged food. Although further research is required, based on experiences in other cities, it has been assumed that eco-efficiencies translate into savings for households, businesses and the municipality. The argument is no different to the argument that Telkom’s high charges should be decreased to reduce the cost of doing business or running a household in South Africa.

An ecologically oriented city development strategy for Cape Town

TABLE 6
Footprinting Cape Town’s suburbs

Cluster group*	% of total households in Cape Town	Planets required before/after eco-efficiency	
		Before	After
Silver spoons	7	14.8	2–3.8
Upper-middle class	9	5.8	2
Middle suburbia	10	4.7–5.2	1.7
Community nests	2	2.4–2.7	1.1
Labour pool	6	1.5	1
New bonds	13	1–2	1
Township living	11	1	1
Towering density	22	1	1
Dire straits	3	1	1
Below the breadline	15	1	1

* For the key characteristics of these cluster groups, see Table 4.

SOURCE: Calculated from database commissioned from The Knowledge Factory (Pty) Ltd. This database integrates data from the census, living standard measurements, and various national statistical databases.

should address the enormously costly resource inefficiencies that clearly make sustainable living choices at the household and neighbourhood level in Cape Town extremely difficult. Furthermore, it is difficult to see how poverty eradication in Cape Town is a realistic goal if scarce financial resources and free services from nature (water, absorption of wastes in landfills and water sinks, etc.) are wasted on maintaining an ecologically unsustainable system that works in financial terms for the middle- and high-income communities (although maybe uncomfortably for those who feel guilty), but tends to be too costly for those poor households that are lucky enough to be serviced.

It is often the engineering profession that has a monopoly on the knowledge about infrastructures that have the most significant impact on sustainability. The Lynedoch EcoVillage model⁽¹⁵⁾ now exists and it questions the standard assumptions.

V. DEVELOPMENTAL STATE OPTION FOR CAPE TOWN

Using the Palmer Development Group model,⁽¹⁶⁾ it is possible to provide projections for the cost to the city of meeting infrastructure backlogs and future ongoing demand for the ten-year period 2004–2014. The following assumptions have been made in the model:

- Number of users (or what the model calls “customer units”):⁽¹⁷⁾
 - 676,740 in 2004
 - 704,190 in 2009
 - 720,012 in 2014
- Average annual economic growth rate for the period: 3.5 per cent
- Average annual inflation rate for the period: 6 per cent
- Cost increases for key inputs such as oil, water and food: rate of inflation.

The infrastructure targets have been set as follows:

- Water: in-house water supply for all by 2014
 - Projected progress:
 - 2004: 78 per cent of formal houses, 12 per cent informal houses
 - 2009: 76 per cent of formal houses, 40 per cent of informal houses
 - 100 per cent of all houses
- Sanitation: full waterborne sewerage for almost all houses by 2014
 - Projected progress:
 - 2004: 98 per cent of formal houses, 56 per cent of informal houses
 - 2009: 97 per cent of formal houses, 39 per cent of informal houses
 - 2014: 96 per cent of all houses
- Energy: 60 amp energy supply to all houses (assuming incandescent globes)
 - Projected progress:
 - 2004: 26 per cent formal houses, 8 per cent informal houses
 - 2009: 67 per cent formal houses, 55 per cent informal houses
 - 2014: 100 per cent all houses

15. The Lynedoch EcoVillage model . . . to be published in *Environment & Urbanization*, October 2006 issue.

16. This refers to a sophisticated infrastructure and financial planning model developed by the Cape Town-based Palmer Development Group, a development consulting company. Palmer Development Group, 254 Main Road, Kenilworth, Cape Town, info@pdg.co.za

17. This is not synonymous with the number of householders, e.g. an old age home may be one user, or a business.

18. Upgrading and new developments will require the extension of the road network. The bullet points below refer to the extension of the length of different types of roads in percentage terms, i.e. how much longer these roads will be relative to their current length.

- Roads: the rate of development of new and upgrading of existing roads has been pegged to household growth rates resulting in the following:
 - Projected progress⁽¹⁸⁾
 - Well-developed tarred metro roads will be extended by 0.1 per cent
 - Well-developed tarred district (surburban) roads will be extended by 0.25 per cent
 - Minor tarred streets will be extended by 1 per cent
 - Minor untarred rural roads will be extended by 0.25 per cent
- Solid waste: door-to-door solid waste removal service for all houses by 2014.

All the above projections assume that there will be no policy on eco-efficiency and sustainable resource use with respect to infrastructure planning. The following assumptions underpin the above estimates:

- Water: no household water-saving devices to save water consumption by household; no household or neighbourhood-based water treatment and re-use systems; no rainwater harvesting; and limited densification. The cost of resolving the problem of limited supply of water has not been factored in. It assumes that the costs of an effective bulk storage and leakage management system have been included.
- Sanitation: conventional treatment systems; continuation of existing limited biogas production for limited use; and limited densification, i.e. no major biogas alternatives or neighbourhood-based alternatives such as the Biolytix treatment system. Environmental costs are externalized.
- Energy: no energy efficient systems such as solar water heaters, photovoltaics, compulsory use of compact fluorescent light bulbs or wind power, and no changes to building by-laws requiring insulation, north-south orientations, overhangs, certain kinds of building materials, etc. Also, energy price rises pegged to inflation.
- Roads: limited densification and continuation of existing public transport policy. Also assumes that oil price will rise with inflation and therefore no major impediment is envisaged to private and oil-based public transportation systems.
- Solid waste: this assumes the continuation of the existing system, i.e. limited recycling of residential waste, with the top 16 per cent of households responsible for 50 per cent of the solid waste stream.

The financial investments and costs are shown in Table 7.

In order to reflect the impact of the ongoing operating costs of extended infrastructure and of borrowing, the Palmer Development Group model reduced the municipal operating budget to an amount payable per “customer unit” (i.e. user) per month. These figures are reflected here as an average, although in reality the model splits the charges between a “low-income” and a “high-income” charge. The revenue column is what each customer unit will be expected to pay. It is clear that the increase is just over R300 per month in real terms. In reality, low-income households will pay less, and increasing the payments payable by high-income customer units and businesses can lower their rate of increase.

TABLE 7
Investments and costs of upgrading infrastructure in Cape Town

Total capital requirement (millions South African Rand)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Water	128	166	176	168	134	103	101	101	101	102	1,280
Sanitation	124	106	120	128	127	122	107	93	88	88	1,103
Electricity	85	88	93	98	100	101	97	91	85	79	918
Solid waste	0	0	0	0	0	0	0	0	0	0	0
Roads	178	201	211	209	178	147	145	143	146	34	1,592
Total	539	596	648	659	592	519	481	447	432	315	5,228
Grants and subsidies	285	346	384	391	331	281	258	233	220	210	2,940
Borrowing	254	250	264	268	261	238	223	214	212	105	2,288

SOURCE: Calculated from database provided by the Palmer Development Group, 254 Main Road, Kenilworth, Cape Town, info@pdg.co.za.

TABLE 8
Increases in operating costs of upgraded infrastructure in Cape Town

Operating costs	2004 actual		2009 model		2014 model	
	Expenses	Revenue	Expenses	Revenue	Expenses	Revenue
Rand/cu*/month	1,062	1,062	951	1,010	1,362	1,385
Number of customer units	676,740		704,190		720,012	
Total expenses	718,657,221		669,751,795		980,845,597	
5% saving for eco-efficiency	35,932,861		33,487,590		49,042,280	

*cu = customer units.

SOURCE: Calculated from database provided by the Palmer Development Group, 254 Main Road, Kenilworth, Cape Town, info@pdg.co.za.

19. Lichtman, R (2003), "Sustainable development: from action to concept", E-Systems Foundation, Geneva, unpublished mimeo submitted to *Development Dialogue*, Uppsala, Sweden.

20. This is a lead housing project co-driven by the national, provincial and local government authorities, and it is intended to deliver 22,000 formal houses by late 2006. It is the single largest housing project in the country and is located on the outskirts of Cape Town.

21. These estimates change all the time. This is not the final, officially approved budget, however, any changes will be a matter of detail and will not affect the order of magnitude.

The obvious question is what savings will be generated by eco-efficiency interventions? A rule of thumb proposed by Lichtman⁽¹⁹⁾ is a conservative 5 per cent of regional geographic product, and this with respect to engineering services only (i.e. water, sanitation, energy and solid waste). These amounts are reflected in Table 8, but this excludes the flows that benefit households and businesses that, in turn, realize value in the local economy.

As far as housing is concerned, the current backlog is assumed to be 260,000: 110,000 in shack settlements, 50,000 in backyards, 25,000 in serviced sites, 60,000 in overcrowded areas, as well as 15,000 households that could build formal houses if they had access to credit. The N2 Gateway project,⁽²⁰⁾ aimed at building 24,000 units, will make an important but relatively small dent in this enormous backlog. At a price tag of R2.6 billion, this would suggest a rounded-off cost of R100,000 per unit for bulk, link and site infrastructure, plus top structures, i.e. a total of R24 billion to meet the backlog only. At current rates of delivery, this will take ten years, and will not meet the new needs created by in-migration, natural increase and the increase in the number of households as larger single households split into multiple units.

Table 9 presents the current estimated budget for the N2 Gateway project, i.e. for only 24,000 units (excluding professional fees, various preparatory measures, community development, etc.)⁽²¹⁾ By far the greatest proportion will be financed by national government grants.

Whereas the ongoing operating costs of this project are included in the budget, the cost of operating and maintaining the rental stock is not. It has been assumed by state planners that rental income will cover the costs of operation and maintenance and that if it does not, the difference will be cross-subsidized by the metropolitan tax base. It is possible to envisage this for the first phase of 24,000 units but difficult to imagine for subsequent phases. Furthermore, the models are extremely sensitive to slight fluctuations, in particular to a drop in economic growth rates, a rise in the unemployment rate and, in particular, to rises in operating costs. (The direct and indirect impacts of oil and water price increases have not been factored into any of the models.) Once again, this brings into focus eco-efficiency factors, in particular what rising energy and

TABLE 9
Estimated costs of housing construction programme for 2005/06 in Cape Town

	Units	Cost/unit	Budget
Bulk and link engineering services			
Water		n.a.	52,910,000
Transport/roads		n.a.	232,442,000
Electricity		n.a.	97,135,000
Community services		n.a.	165,377,000
Regional facilities		n.a.	187,586,000
Sub-total bulk and link engineering services			735,450,000
Housing			
Multi-storey units			
Site infrastructure	16,727	4,500	75,272,400
Top structures	16,727	75,600	1,264,576,320
Single residential units			
Site infrastructure	7,169	15,108	108,309,765
Top structures	7,169	25,510	182,875,063
Sub-total housing			1,631,033,548

SOURCE: Personal correspondence with Firoz Khan, Policy Advisor to the Department of Housing, 2 June 2005.

water costs would do to the local economy (and therefore employment levels) and to household economies that might, in turn, result in a steadily increasing financial burden on middle- and high-income households. If the barriers to entry into the middle class are hamstrung by high household costs, this has both negative political and economic implications, given that these households should be leading the expansion of the local market for various categories of consumer goods.

In summary, there are three distinctive features of the developmental state option that envisages the extension of the "consumption neighbourhood" model to all Capetonians over the next ten years:

- the enormous impact on everyday life, as nearly half the population moves from living in a shack to living in a formal house, ideally in formally planned neighbourhoods;
- the limits to affordability for households (transport, service costs) and the tax base if densification fails to take place due to failures to release the large chunks of state-owned inner-city land, resulting in further outward sprawl;
- the extremely negative medium- to long-term impact of conventional infrastructure technologies (to build the "consumption neighbourhood" in ways that suit the professionals, developers and contractors) on capital budgets, operating budgets, households and businesses due to the constrictive consequences of leakage out of the local economy (mainly for energy, food and water) and the diversion of disposable income into transport and services rather than into assets and consumables.

BOX 1

Financial assumptions for the N2 Gateway mass housing project in Cape Town, May 2005

- The key financial assumptions of the N2 Gateway are as follows:
- Housing typology is based on an allocation of a 70:30 multi-storey units to stand-alone units.
- Multi-storey units retained (in the short/medium term) by the city as rental stock.
- Unit cost: within subsidy band (for stand-alone unit).
- Top structure cost: R 75,600 per multi-storey unit (36m² x R 2,100/m²).
- The total current subsidy for stand-alone housing units is R 40,618 per unit for all households with a monthly income of less than R 1,500 per month.
- Serviced sites: state grant funds are received as housing subsidies for people who earn below R 3,500.
- Stand-alone top structures: state grants are received in the form of housing subsidies for the top structures of stand-alone units.
- Multi-storey unit top structure: state grants are received for the top structures of multi-storey units (grant = cost of unit).
- Rental charges will, for the purpose of equity, be based on the current council-approved rental charge structure.
- All city-retained rental units can access a special grant for people who are unemployed and cannot afford their monthly rent payments.

SOURCE: Personal correspondence with Firoz Khan, Policy Advisor to the Department of Housing, 2 June 2005.

The weak point of the developmental state option is the impact on businesses, households and the Cape Town economy as a whole of rising oil, water and food prices. Most of the models being used by planners in government and in the consulting industry assume that these costs will rise with inflation. There is little evidence to support this, with oil price rises over the past year being a case in point. The consequences are that growth will be less and unemployment higher than most models suggest, which calls into question the decisions being made based on these models.

VI. SUSTAINABLE DEVELOPMENT OPTION

A “sustainable development” option would aim to build “sustainable neighbourhoods” as the building blocks for a sustainable urban future. By reducing the ecological footprint of the over-consumers, without fundamentally altering their lifestyles, and by investing in infrastructure and housing that is designed to protect poorer houses from future ecological and economic challenges that could undermine their struggle for a better life, an urban system starts to emerge that reduces the cost of doing business for businesses and the cost of living for middle- and lower-income households. To this extent, the “sustainable development” option is profoundly rooted in the dynamics of the real economy.

Specifically, it differs from the “developmental state” option in four important respects:

- First, the massive expenditures over the next decade that will be spent on professional fees, social learning at community level, infrastructure and house building should be creatively channelled into an imaginative programme to build “**sustainable neighbourhoods**” that are child-centred, mixed, safe, healthy, accessible via public transport and within walking distance of local food markets and other commercial and public facilities.
- Second, in order to densify and make public transport viable on a mass scale, **poorer households are brought back into the city** and integrated into socially mixed ecologically designed inner-city neighbourhoods in a way that boosts the inner-city economy, thus outweighing the short-term financial “devaluation” of these properties.
- Third, like cities around the world that have made sustainability a cornerstone of the future, long-term partnerships are established with **knowledge institutions** that are mandated to focus on building the transdisciplinary knowledge base that will be required to make the transition from the “consumption city” to the “sustainable city”.
- Fourth, the **economics of sustainable resource use** is factored into all planning, in particular the costs of known constraints such as finite water supplies and rising oil prices, the economic job-creating potential of eco-efficient technologies such as waste recycling, the renewable energy economy and urban agriculture (including food markets).

As far as expenditure is concerned, the size of the city’s capital budget for the “sustainable development” option would be much the same as that for the developmental city, although eco-efficiencies would result in lower operating costs. However, this would not necessarily translate into lower charges for middle- and high-income areas but rather, a 5 per cent “eco-efficiency dividend” could be used to cross-subsidize the operating costs of the approximately 20,000 new rental units that the city would be responsible for. A 5 per cent saving on the operating budget for basic residential engineering services alone, for example, is worth R35 million annually which will be more than enough to cover the operating costs of the new rental stock.

A “sustainable development” approach would discourage the building of exclusive low-income suburbs. Besides all the social reasons why the continuation of social apartheid is a bad idea, the economic reason is simple: by investing R75,000 to create a serviced house for a poor family in a uniformly poor neighbourhood, the value of that asset is the same – if not less – after occupation and/or sale. The same house constructed in a mixed neighbourhood where there is a more active housing market could have a market value three to five times the value of the initial subsidy without any cross-subsidization. Simply by being creative with space, zoning, by-laws and planning instruments, the same investment could generate much greater returns for poor households. This, when coupled to eco-efficiencies, could contribute significantly to local economic growth, stimulated by a virtuous cycle of access to credit, more disposable income, higher re-investment levels back in the neighbourhood, reduced leakage as the benefits of

eco-efficiencies kick in, and as local food markets reduce the costs of healthy eating.

A “sustainable neighbourhoods” approach would not be limited to the “new neighbourhoods” that would emerge at both the lower-income and upper-income ends of the property development market. Instead, it is an approach that could be made applicable to all neighbourhoods, including existing middle- and upper-income neighbourhoods by providing both knowledge inputs and goods such as approved compact fluorescent lighting, rainwater tanks, solar water heaters, insulation, geothermal heating and cooling systems, on-site or neighbourhood-based sewerage treatment systems, water-conserving irrigation systems, organic garden treatments, etc. As in New Zealand and other places, incentives could be provided to disconnect from the sanitation system and the grid, thus saving on capacity upgrades and reducing operating costs as households take over some costs.⁽²²⁾

Once the city is reconceptualized as a patchwork quilt of “sustainable neighbourhoods”, the following checklist could be used for designing interventions at the household, neighbourhood and citywide levels:

- **Transition to renewable energy alternatives and energy efficiency.** Following many examples elsewhere,⁽²³⁾ investments in the renewable energy economy emerge as a result of a massive demand for new household items required by new by-laws: solar water heaters, compact fluorescent lighting (and related fittings), windmills, photovoltaic systems (connected to the grid), low pressure (LP) gas stoves and automobile retrofits, hydrogen gas storage and transport systems, building retrofits to take advantage of passive heating and cooling systems, massive industry-wide retrofits to replace air-conditioning and lighting systems in commercial/industrial buildings, and a much wider range of cheaper insulation systems.
- **Zero waste via re-use of all waste outputs as productive inputs.** Waste separation at source across all households and businesses creates a new recycling industry. Although one-third of all registered recyclers in South Africa are in Cape Town, this suddenly mushrooms to three-quarters, creating 3,000 new permanent jobs overnight.
- **Sustainable transport, with a major focus on public transport.** The transport sector is united around a range of new multi-billion rand investments to halve the dependence on oil by 2014. These include biogas, hydrogen, LP gas, rail transport connected to as much renewable energy as possible, eco-efficiency cars, etc. Reduced expenditure on roads and increased expenditure on efficient and safe public transport systems make it possible to grow the city economy without losing all the gains to massive leakages as the oil price rises.
- **Sustainable construction materials and building methods.** The Netherlands has developed a sophisticated user-friendly, computer-based tool for assessing the building materials selected for constructing a particular building. It is a massive database of all the materials used in construction, plus suppliers and technical specifications. Each material is given a rating, which means that the ecological and social cost of a building can be calculated in advance. This immediately reinforces the local economy because the easiest way to reduce the ecological footprint of your building is to source local materials. It

22. Author's personal experience.

23. See Beatley, T (2000), *Green Urbanism*, Island Press, Washington DC.

also improves accountability (by, for example, revealing whether hardwoods come from sustainable forests or not) and the health impact of materials (such as paints, most of which have a toxic release).

- **Local and sustainable food.** Cape Town's dependence on long-distance food supply chains from non-organic agricultural sectors results in a massive footprint. This makes all Cape Town households extremely vulnerable from a food security point of view in the medium to long term. These long-established supply chains also undermine land reform in the Western Cape. They are oil- and water-intensive and therefore food price increases are inevitable. The obvious solution is the relatively low-cost regulatory and investment strategy to create neighbourhood-level spaces for food markets where farmers and growers can sell directly to households. This reduces prices for the consumer and increases the returns for farmers. It also stimulates the growth of local small-scale growers who tend to be much less dependent on oil and are more efficient users of water. Although the success of this approach has been proven countless times in the developed and developing world, Cuba is the world leader in this regard.⁽²⁴⁾
- **Sustainable water use and re-use of treated sewerage.** Neighbourhood-level interventions include ensuring local retailers supply water-saving devices (low-flush systems, aerated tap nozzles, etc.) and rainwater harvesting systems. Grey water re-use systems are viable at household and neighbourhood levels, and neighbourhood-level sewerage treatment systems are also viable, with the treated effluent feeding into nurseries, orchards or back into the houses to flush the toilets. These systems can be coupled to better management of the commons such as wetlands, recreational spaces, etc. Biogas digesters are being used all over the world, including in hi-tech centres like Stockholm where 150 city buses and 200 cars in the municipal vehicle fleet are fuelled by biogas captured from biogas digesters that process sewerage and organic wastes.⁽²⁵⁾ At a citywide level, improved leakage management and long-term access to an affordable bulk supply are key priorities. In this regard, the well-researched option of sustainable management of aquifers needs to be included into long-term planning, and further dam construction de-emphasized due to its cost and low-level efficiencies. Sustainable aquifer management is a new global trend, with Namibia setting the lead.⁽²⁶⁾ Why can't the Western Cape follow this lead?
- **Enhancing biodiversity and the preservation of natural habitats.** Although under-emphasized in this paper due to the need to emphasize aspects of sustainability that are rarely discussed, it is obvious that natural biodiversity is a key asset of the city and must be cared for in every possible way.
- **Valuing authentic cultural diversity, community and citizen participation.** These aspects are always included in developmental strategies at all levels, but their significance gets buried by the logic and force of the values that sustain the "consumption neighbourhood" – the mall, the movie theatre, the fast-food chains, mainstream global music, clothing brands, the video stores and most TV. What about all the other things that happen? For example, community-building via shared problem-solving at policing fora; the

24. Funes, F, L Garcia, M Bourque, N Perez and P Rosset (2002), *Sustainable Agriculture and Resistance: Transforming Food Production in Cuba*, Food First Books, Oakland, CA.

25. Copy of personal communications between Rob Lichtman and Mr Boisen from the Stockholm municipality.

26. Personal correspondence with Dr Ricky Murray, Groundwater Africa, Lynedoch EcoVillage, Stellenbosch, who is an hydrologist and consultant to the Namibian government.

development of a musical culture via the thousands of choir groups; the high levels of participation in religious activities; youth sub-cultures around certain kinds of music and styles; women's savings clubs; and community-based house-building. These also take place, but in discrete disconnected ways, and these activities become crucial when it comes to building sustainable neighbourhoods.

- **Equity and fair trade at all levels** (global, regional and local). Although increasingly common across many value chains at the local and global levels in many other parts of the world, there is little evidence that the local Cape Town discussion about ways of growing the economy have factored in a value chain approach that takes into account equity and fair trade issues. The approach to microenterprise development remains fixated on the traditional concerns of this sector – namely microentrepreneurs and how to secure finance and opportunity for them. An equity and fair trade perspective looks at value chains and how these can be restructured to advantage smaller players and build local economies. Local credit systems and sophisticated ways of linking waste streams from certain industries to the input streams of others are examples of ways that employment is created without depending purely on new investment. Local food markets could well become the key locus for an equity and fair trade focus because they represent a key shift from a “fast-food” culture to a “slow-food” culture, whereby buying and eating food slowly, with others, becomes part of building solidarity, community and therefore safety.
- **Health, well-being and soulfulness.** The positive side of the HIV/AIDS pandemic is that it has stimulated a social and cultural movement that is starting to change the way we understand health, diet, sexual practices, and care of the sick and dying. This, in turn, should reinforce community-building, “slow-food” movements and child-centred planning, and validate the “deep ecology” connection to nature, beauty and soulfulness.

VII. CONCLUSION: MANIFESTO FOR SUSTAINABLE NEIGHBOURHOODS

The ten points discussed in the previous section are, in effect, the key elements of a “sustainable neighbourhood manifesto”. They provide the basis for imagining a sustainable Cape Town in 2025. They express in practical do-able ways the well-worn principles of equity, integration and sustainability that have informed the analysis of this paper. They are, ultimately, ways of achieving the goals of the developmental state without falling into the trap of denying the resource constraints that the sustainable development perspective forces us to think about.

It is extremely difficult for progressive political forces that capture a strong state in the global South to find ways of using the state to realize genuine pro-poor objectives without alienating powerful global economic interests and institutions. There is little room to manoeuvre, but if recent trends in Venezuela, Brazil, India and China are anything to go by, pathways that are independent of US interests are becoming increasingly viable. As this paper has shown, South Africa has tried to avoid debt traps, increase fiscal expenditures, and (more recently) pursue state-led

investment strategies to create sustainable livelihoods. However, the South African government has yet to realize that, as it redoubles its efforts to stimulate economic growth and continue with rising levels of fiscal expenditure, these efforts can be undermined by a failure to take into account the ecological footprint of cities in general, and urban infrastructure in general. Unless urgent efforts are made to re-engineer urban infrastructure in a way that takes into account sustainability issues, the strategy to make conventionally designed urban infrastructure the vanguard of South Africa's growth and social development strategy will, ultimately, have the opposite effect. Sustainable urban infrastructure as the basis for building sustainable neighbourhoods is the only long-term hope for South Africa. It should be the only option worth considering.