

Tackling Urban Energy Poverty In South Africa



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Contents

LIST OF ACRONYMS AND ABBREVIATIONS	3
1. INTRODUCTION	5
2. NATIONAL CONTEXT	6
3. URBAN CONTEXT.....	8
3.1 Urbanisation.....	8
3.2 Poverty.....	12
3.3 Informality.....	14
3.4 Universal access to electricity and backlogs in delivery	17
3.5 Household Energy Use Patterns	19
4. POLICY FRAMEWORKS	26
4.1 The White Paper on Energy for the Republic of South Africa.....	26
4.2 Integrated National Electrification Programme (INEP).....	26
4.3 Free Basic Electricity Policy	29
4.4 Free Basic Alternative Energy Policy	33
4.5 Inclining Blocked Tariff (IBT)	35
5. CONCLUSIONS AND RECOMMENDATIONS.....	36
Analysis	37
Recommendations	39
REFERENCES.....	41
Appendix 1	47
Appendix 2	48
Appendix 3	49

LIST OF ACRONYMS AND ABBREVIATIONS

ANC	African National Congress
ARI	Acute Respiratory Infection
DoE	Department of Energy (formerly known as Department of Minerals and Energy – DME)
DCOG	Department of Cooperative Governance (formerly known as Department of Cooperative Governance and Traditional Affairs – COGTA)
DHS	National Department of Human Settlements
EPP	Electricity Pricing Policy
FBE	Free Basic Electricity
FBAE	Free Basic Alternative Energy
FBS	Free Basic Services
GDP	Gross Domestic Product
GEAR	Growth, Employment and Redistribution
HDI	Human Development Index
NDP	National Development Plan
IBT	Inclining Block Tariff
INEP	Integrated National Electrification Programme
kWh	Kilowatt-hour
LGES	Local Government Equitable Share
LPG	Liquefied Petroleum Gas
LPGSASA	LPG Safety Association of South Africa
MDGs	Millennium Development Goals
MIG	Municipal Infrastructure Grant

NDP	National Development Plan
NERSA	National Energy Regulator of South Africa
NT	National Treasury
PASASA	Paraffin Safety Association of Southern Africa
RDP	Reconstruction Development Programme
SALGA	South African Local Government Association

1. INTRODUCTION

South Africa is an emerging economy, and while the economy has grown and energy consumption has increased accordingly, the country remains challenged. Our human development indices are low, South Africa is ranked 110 out of 169 (UNDP, 2010) and our Gini coefficient¹ of 0.7 is high by international standards. Unemployment remains a substantial concern – 25.6%² of the total population were unemployed in the second quarter of 2013. The rate of urbanisation is growing with currently 64% of the South Africa's population living in urban centres, and estimated to rise to 70% by 2030³ with most of that growth occurring in the informal and low income sectors.

Since 1994 Government has introduced many laudable and strong pro-poor policies notably the 1998 White Paper on Energy, the policy for Free Basic Electricity (FBE) and the policy for Free Basic Alternative Policy (FBAE) and an impressive national electrification and housing programme. Yet despite these enormous efforts the country still struggles with energy poverty issues. 2014 marks the 20th anniversary since South Africa's democracy. President Zuma recently announced that the intent of the ANC's 2014 manifesto is to build jobs, create an inclusive economy, transform rural areas, ensure decent living conditions and sustainable human settlements and that this will include a focus on the provision of basic services and electrification.

However, if the country is to achieve a reduction in energy poverty and reach its goal of 100% electrification, then policy and regulatory frameworks and resources to support energy service delivery and implementation need to be urgently and constructively reviewed.

The purpose of this short piece of research was to consider the challenges and opportunities for energy access at local government level with a particular focus on electrification and issues relating to urban energy poverty.

To this end the project undertook:

- Desktop research and data analysis to deepen the understanding of the energy consumption patterns as well the energy burden of poor urban households and the urban poverty/energy linkages;
- A review and assessment of the impact of energy related policies on urban poor household livelihoods which explores key themes, including: universal access to energy (physical infrastructure as well as economic access – tariffs and subsidies) and livelihood resilience (the energy burden impact of housing and spatial form);

¹ The Gini coefficient, used widely to measure the distribution of income across a society, ranges from 0 indicating perfect equality where everyone earns the same income to 1 indicating perfect inequality, where one person earns all the income (UNDP 2003)

² This is a conservative or narrow figure – with a broader definition of unemployment the figure is closer to 40% (Towards a Fifteen Year Review, The Presidency)

³ NPC Diagnostic Overview, 2011

- A half day meeting with National Treasury and the National Department of Energy to engage on the issues pro-poor urban energy development;
- Recommendations for a way forward in ensuring that the provision of electricity to the urban poor in South Africa through this research paper which will be widely disseminated.

2. NATIONAL CONTEXT

South African policy development since democracy in 1994 has focussed on the huge challenge of redressing the injustices of the apartheid regime. The country's development objectives were encapsulated in the Reconstruction and Development Programme (RDP) White Paper⁴ of 1994 which promoted development through the expansion of infrastructure in poor communities with a central focus on the delivery of basic services (Office of the Presidency, 1994). This led to an impressive national electrification programme, the building of close to 3 million homes to address the massive housing backlog, job creation and land redistribution amongst others. However, to a large extent the macroeconomic policies which have emerged since then, have in fact placed adverse pressure on the socio-economic developmental agenda in the way that they have promoted competitive growth beginning with the GEAR policy of 1996 (which promoted growth, employment and redistribution). Such policies were based on the idea that economic growth within a market driven environment would result in job creation and the kind of transformation needed to overcome the legacy of apartheid. In many respects these policies have not challenged the status quo; the systemic social and economic exclusion, established under apartheid continues to prevail, as manifest in the rise of inequality since 1994 (Habib 2013).

The country's first National Development Plan 2030 was adopted by government in 2012. It provides an overarching Plan for the country and advocates the need to create jobs, grow the economy and substantially reduce inequality and poverty. It promotes achieving the 'peak, plateau and decline trajectory' of greenhouse gas emissions and the concurrent need for a move to a less carbon intensive electricity sector.

South Africa's economy for the past 100 plus years has been built around a mineral-energy complex that continues to dwarf all other areas of economic activity (Fine & Rustonjee, 1997). South Africa abounds in cheap coal and a range of minerals, which form the bedrock of the country's economic advantage. The power sector⁵, reliant on mining of coal, has, in turn, been built to support further mining of minerals, notably gold and platinum and associated smelting production. Much of the country's manufacture and service activity is horizontally linked to the mining sector, so that the contribution of these sectors to national wealth (GDP) can often not be divorced (decoupled) from the primary economic activity of mining.

While it is broadly recognised that the South African economy has grown since 1994 at an annual growth rate averaging 5.4% per annum between 1999 and 2008, with a drop following the global financial crisis of 2009 and recovering slightly by 2010 (DEA, 2011; Camco & TIPS, 2010; Hanival &

⁴ Reconstruction and Development Programme was the overarching ANC socio-economic policy framework introduced in 1994

⁵ Coal accounts for 70% of primary energy consumption, 93% of electricity generation and 30% of petroleum liquid fuels (Eberhard, 2011)

Maia, 2008), the country continues to face a particular set of fundamental development challenges (NPC, 2011). Growth has not produced the desired degree of change and social development.

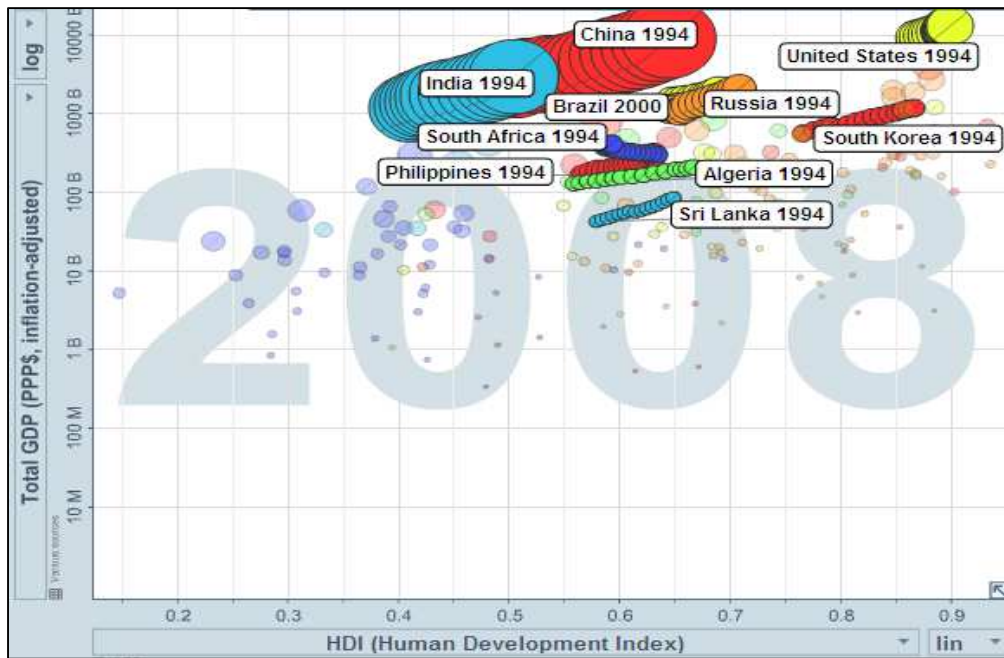


Figure 1: Graph illustrating Human Development versus Gross Domestic Product of BRIC (Brazil, Russia, India & China) and other countries from 1994 -2008

(Source: data sourced from World Bank, WHO, Medical Research Council: graph generated by www.gapminder.org)

Thus 20 years on and despite government’s firm commitment to poverty alleviation and to advance development, the problems remain deeply rooted whereby, apartheid spatial form and poverty persist and inequality has deepened (Turok, 2011; FFC, 2001; Ewing & Mammon, 2010; Biermann & Van Ryneveld 2007; Adelzadeh, 2006; Hoogeveen & Ozler, 2004). Figure 1 above illustrates the progress of social and economic development of South Africa relative to BRIC (Brazil, Russia India and China) and other countries over the period 1994 to 2008. It is apparent from this graph that the actual HDI levels for South Africa have progressively declined over this period in stark contrast to other countries shown. This could largely be attributed to the commitment to poverty alleviation being fundamentally hampered by the systems and macroeconomic policies in place, which are not aligned with the developmental agenda and to this end perpetuate an unequal system despite all good intentions. In fact these policies have continued to fuel a system that maintains the inequality constructed under apartheid – largely supporting an extractive mineral industry, private property and formal municipal service delivery, locking the country into the poverty cycle. The role of municipalities is to deliver services and promote local economic development without compromising their financial security – this results in municipalities often having to focus on cost recovery over the provision of services. (Habib 2013)

South Africa’s economy is extremely energy intensive (energy used per unit of economic production) even by global standards and such energy intensity is generally associated with growth, employment and high human development indices. Despite consistent economic growth since 1994, this has not been accompanied by increasing wealth across the country (Leibbrandt et. al 2010).

The economic trends in developed countries have seen a shift from being primary extractive or industrial to manufacturing and service driven leading to an increase in the wealth of the society in relation to energy inputs. In South Africa we have remained trapped in a primary extractive economy, where wealth remains concentrated amongst a very few. In looking at the South African picture, final energy consumption per sector in 2000 shows 45% consumed by industry, 20% by transport and 10% by residential sector of which most is urban and falls into the mid to high income group (Winkler, 2008). South Africa is ranked among the world's top 15 largest carbon dioxide (CO₂) emitters⁶, largely due to our heavy dependence on coal which supplies 92% of our electricity (DME, 2005b; Eberhard, 2011; CDIAC, 2012). This plentiful cheap coal is what led to our developing an energy-intensive industry sector which includes producing liquid fuels from coal. Furthermore our cities demonstrate high carbon emissions per capita (on par with those cities of industrialised countries such as Europe and elsewhere - London, Berlin and Tokyo) relative to our level of development (SEA, 2011). Between 30-40% of national energy consumption takes place in our largest cities, those forming the economic backbone of our country (SEA, 2006; SEA, 2011). The spatial form and structure of cities play a crucial and overarching role in the productivity of urban economies, the energy demand patterns and the long-term financial soundness of city governments. It also has a significant influence on the welfare of urban residents, patterns of human interaction, social inclusion and efficient use of resources in a city, particularly with regard to energy for mobility and distribution of services, which is why this research focuses on our cities.

3. URBAN CONTEXT

3.1 Urbanisation

South Africa continues to experience rapid urbanisation, with approximately 64% of the country's population currently residing in urban areas (Figure 2 below) of which 40% are located in the metropolitan municipalities. Urban populations are forecasted to reach 70% by 2030 and 80% by 2050 (NDP, 2011; SACN, 2011, DCOG, 2013). The national census data of 2001 and 2011 reveal that the metros (South Africa's largest cities) are growing in population size on average at a rate of 2% per annum, and the number of households is also increasing at a rate of 3% as is evident from Table 1 below. It is important to note that metros are home to over a third of South Africa's population. Table 2 below provides an overview of the change in the percentage of poor households between 2001 and 2011.

The urban landscape in South Africa mirrors the rest of the world cities, in that cities are at the heart of population growth, employment creation, wealth and economic growth and resource (energy) consumption. On the flip side of the coin, our cities are also centres of abject poverty, leaving large amounts of the urban populace without access to basic services such as modern forms of energy, or even the ability to afford a constant supply of this energy, similar to most of the developing world and the BRICS countries. Despite national government's enormous progress in universal access to free and basic services, municipalities are struggling to keep pace with the increasing demand of their fast growing populations. In response to these escalating urban development pressures, 20 years on into democracy, President Zuma in his 2013 State of the Nation address, declared the management of urbanisation a priority area for government and that an 'all of government' approach was needed to address the challenges of urbanisation. The ensuing discussion document on an Integrated Urban Development Framework, shows trends in developing countries where

⁶ 14th biggest carbon dioxide emitter in the world as a result of energy-sector emissions

urbanisation, if managed well will generate significant opportunities for growth, poverty reduction and environmental sustainability.

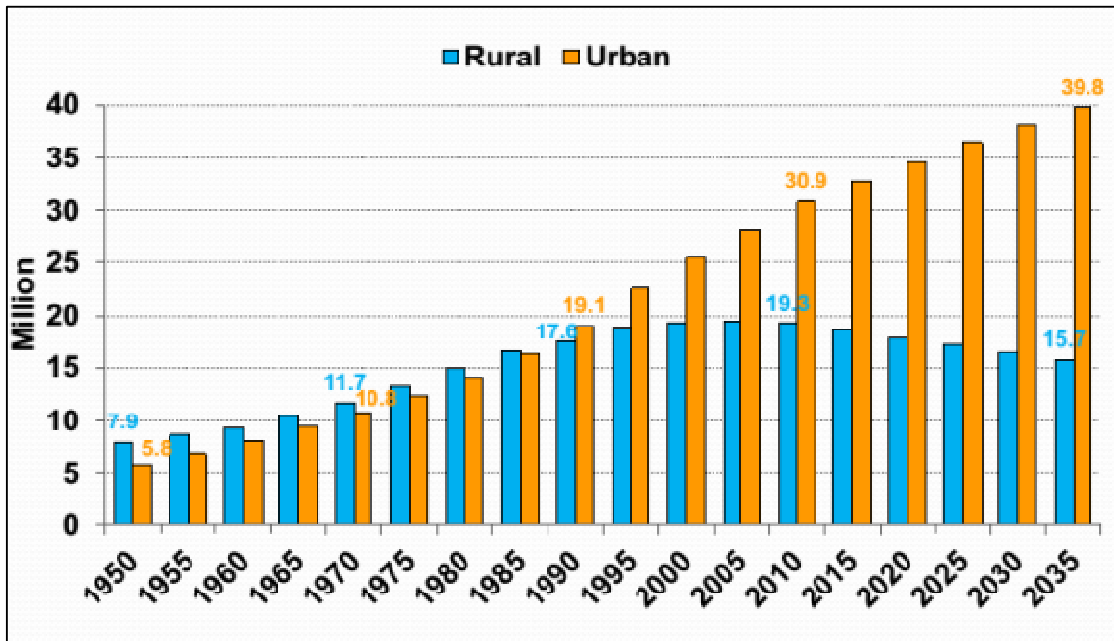


Figure 2: Urban versus rural population growth in South Africa from 1950-2035

(Source: Institute for Futures Research, University of Stellenbosch, 2013)

South African cities have historically developed along sprawling, low density suburban lines. This was rooted in Apartheid’s inequitable and segregated spatial-land distribution policies, but also a consequence of modernist planning, which emphasised suburban development, separation of urban activities of work and leisure as well as the prioritisation of technical efficiency over social and environmental imperatives (Biermann & Van Rhyneveld, 2007; Ewing & Mammon, 2010; FFC, 2011; SACN, 2011). The RDP housing programme gave rise to the building of almost three million houses for the poor. However because the success of the programme was measured by numbers (quantity) and the fact that it was driven by private companies whose central rationale was to make a profit, the houses were poorly built structures with no ceilings or other forms of insulation and located on the urban margins where land is cheaply available. As a consequence our cities are socially exclusive with the poor living on the distant margins experiencing persistently inadequate levels of service delivery and unable to access the opportunities of social resources and employment cities have to offer. While marginal locations provide an important point of access (relatively cheap and easy) in gaining a foothold in the city, the ‘locking’ in of the poor into these locations, and continuing low density suburban development of the rich, is socially, economically and environmentally unsustainable.

Low density cities also involve expensive service provision, with low volumes of rate paying households to support city revenues required to cover service level. In a low density city, the cost per capita of providing other services and infrastructure relating to water, electricity connections, sewage and solid waste removal and roads, is higher, placing financial strain on already cash-strapped cities, and compromising the ability to service residents (FFC, 2011).

An integrated approach to poverty reduction, looking at access to urban resources and mobility, was missing in this cornerstone RDP redress policy. Unaddressed spatial polarization with regard to access to resources and employment opportunities, will present enormous and severe challenges in the political stability functioning and management of cities. Thus contrary to government's intention to alleviate poverty, the problems have remained entrenched.

The National Development Plan (NDP), acknowledging the crucial role that cities and local government play in national economic growth (cities produce 80% of the national GVA) and poverty alleviation, has called for cities to improve on the highly fragmented spatial form, energy service delivery and social inclusion to name a few in addressing the challenges experienced by the poor. The current urban spatial form which locates the poor on the periphery of the city does not lend itself to accessibility for work, school, healthcare and other social amenities, making commuting times long and expensive and in turn placing a disproportionate energy burden on the poor. Inequitable forms of growth in urban areas results in the poor being further marginalised - factors which promote conflict and instability.

Rapid urbanisation (see Figure 2 above) is expected to continue to attract an increasing low income sector to cities in search of employment. Recent national census figures indicate that unemployment has in fact decreased in South Africa's largest cities, with the exception of Nelson Mandela Bay metro. As can be seen in Figure 3 (depicting levels of unemployment according to the narrow definition), levels of unemployment vary between municipalities, ranging from a quarter to a third of the population in most metros – consistent with the national level of unemployment - with the exception of Nelson Mandela Bay where close to half of the population experiences unemployment. The quarterly Labour Force Survey for the second quarter of 2013 shows the official unemployment rate stands at 25.6% while according to the broader definition (those who are unemployed but not looking for work) unemployment is 36.8%.

Since democracy, the government has planned for sustainable and economically viable cities. Trends in South African cities clearly show economic growth, improvements in housing delivery, with large successes in electrification. Despite these laudable efforts, spatial patterns remain largely fragmented and inequitable and the country's Gini coefficient has worsened leaving South Africa with one of the lowest ratings in the world (OECD Economic Surveys South Africa, 2013). In fact infrastructure investment since 1994, has as noted above reinforced the spatial status quo – “despite a massive redistributive fiscal thrust by government, deep class based segregation still characterises South African cities and towns” (DCOG, p 17, 2013).

Table 1: Population and household growth and the contribution to national GDP of South Africa's metros (largest cities)

(Data sourced from: StatsSA, 2001, 2011, SACN 2011)

Metropolitan Municipality	POPULATION					HOUSEHOLDS			ECONOMIC
	Number (2001)	% of national (2001)	Number (2011)	% of national (2011)	Annual growth (2001-2011)	Number (2001)	Number (2011)	Annual growth (2001-2011)	GDP % of national
Buffalo City	704 855	1.6%	755 200	1.5%	0.7%	191 958	223 568	1.5%	2%
City of Cape Town	2 892 243	6.5%	3 740 026	7.2%	2.6%	759 484	1 068 572	3.5%	11%
City of Johannesburg	3 226 055	7.2%	4 434 827	8.6%	3.2%	1 006 910	1 434 855	3.6%	14%
City of Tshwane	2 142 322	4.8%	2 921 488	5.6%	3.2%	606 025	911 535	4.2%	9%
Ekurhuleni	2 481 762	5.5%	3 178 470	6.1%	2.5%	745 576	1 015 465	3.1%	9%
EThekweni	3 090 122	6.9%	3 442 361	6.6%	1.1%	786 746	956 713	2.0%	9%
Mangaung	645 440	1.4%	747 431	1.4%	1.5%	185 014	231 921	2.3%	2%
Nelson Mandela Bay	1 005 779	2.2%	1 152 115	2.2%	1.4%	260 799	324 292	2.2%	3%
Total Metro	16 188 578	36.1%	20 371 918	39.4%	2.3%	4 542 512	6 166 921	3.1%	59%
National	44 819 777	100.0%	51 770 561	100.0%	1.5%	11 205 706	14 450 162	2.6%	100%

(Source: GDP data from "Towards Resilient Cities: A reflection on the first decade of a democratic and transformed local government in South Africa 2001-2011" by South African Cities Network, 2011.)

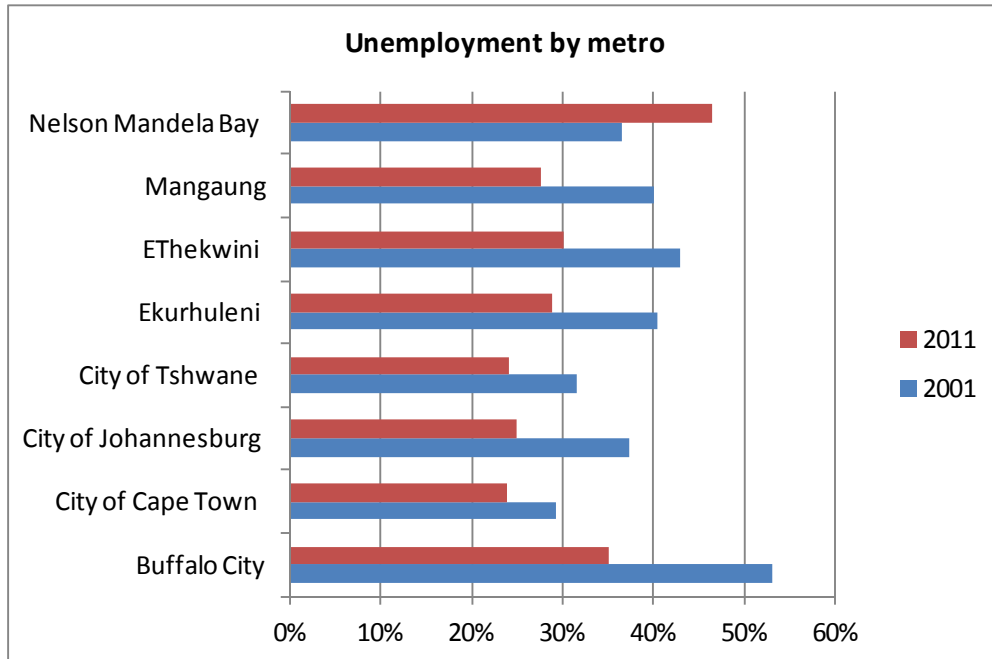


Figure 3: Levels of unemployment in South African metros
 (Source: StatsSA, 2011)

3.2 Poverty

There are a wide range of definitions of poverty currently in use in South Africa (The Presidency, 2008). Poverty is a multidimensional phenomenon and there are many competing and alternative approaches to defining and measuring poverty. This in part can be ascribed to poverty being manifest in living conditions that are dynamic, multifaceted in nature and therefore not easily quantifiable. An emerging consensus sees poverty in South Africa as being characterised as the inability of individuals, households or entire communities to obtain a minimum standard of living, measured in terms of consumption needs or the income essential to meet basic needs. Further it includes lack of opportunities and choices to advance human development i.e. it includes alienation from the community, food insecurity, crowded homes, usage of unsafe and inefficient forms of energy, lack of adequately paid and secure jobs, and fragmentation of the family (May 2000, Noble et al 2006).

With respect to the gender dimension of poverty, women are in a relatively deprived position in relation to income and other indicators (such as land ownership, employment, education, as well as control over household resources and decision-making) (UNDP 2003). The proportion of women-headed households has increased. In 2005, more than half of the individuals considered poor, lived in female-headed households (The Presidency, 2010).

The poverty line, a widely used measure of poverty is a cut-off point in income or consumption below which an individual or household is defined as poor. In South Africa, numerous poverty lines have been calculated. According to the Financial and Fiscus Commission’s report to Parliament in 2013, if an income level of R2400 per household per month (the equivalent of 2 old age state

pensions) is used as a benchmark, then 59% of the population would be classified as indigent⁷ i.e. eligible to receive free basic services such as Free Basic Electricity (FBE)⁸ or Free Basic Alternate Energy (FBAE), amongst others. At present, it is difficult to determine the level of poverty in the country as each national department and municipality use a different set of criteria to establish indigent numbers such as electricity consumption levels, per capita and household income, property value, plot size and ownership and location. (DPLG, 2005)

In the absence of an official poverty line, the two lines used in Table 2 (below) define poor households according to an upper bound poverty line of R3200 (amounting to R949 per capita per month in 2008 rand values) and a lower bound poverty line of R1600 (amounting to R515 per capita per month in 2008 rand values). These are widely accepted poverty thresholds used in South Africa and defined by Leibbrandt et.al (leading poverty and development economists of South Africa) in line with international recognised poverty line measures (See Appendix 3). Table 2 below shows a decline in the percentage of poor households in the metros as well nationally over the last decade. Households living in metros below the lower bound poverty threshold of R1600 per month and the upper bound poverty threshold of R3200 per month have declined by 15% and 13% respectively during this time period. This decline can be largely attributed to the government's social grants programme as shown by various research studies (The Presidency, 2008). More than 12 million South African are beneficiaries of social transfers, with 62% of grants going to 40% of the poorest households and 82% to the poorest 60% of households. It is widely documented that without social grants poverty would deepen over time rather than improve in South Africa (Leibbrandt et. al, 2010) Whilst Table 2 below shows an overall decline in poverty levels, it also shows the magnitude of absolute poverty currently prevailing in the country, with 53% of households in the metros living below the poverty line (and nationally 63% of households living below the poverty line). In sum, urban areas tend to be the loci of huge concentrations of this absolute poverty which continues to grow leading to social discomfort and conflict.

⁷ Indigent refers to those households and citizens who are unable to access or pay for basic services, as a result of unemployment and poverty within municipal areas. A municipality would therefore need to develop and adopt an indigent policy to ensure such citizens and households have access to the package of services included in the FBS programme. (DPLG, 2005)

⁸ The Free Basic Electricity policy (FBE) was introduced by the Department of Energy in 2003 and has been funded through the equitable share to municipalities since 2004/05. This policy stipulates that every indigent household should receive 50kWh of free electricity per month. In 2011/12, the equitable share included R9.5 billion in funding towards the provision of free basic electricity (NT, 2011)

Table 2: Households living below the poverty line in South Africa's metros over the last decade*(Data sourced from: StatsSA, 2001, 2011)*

Metropolitan Municipality	HOUSEHOLDS EARNING <R1600/MONTH				HOUSEHOLDS EARNING <R3200/MONTH			
	Number (2001)	% of total households (2001)	Number (2011)	% of total households (2011)	Number (2001)	% of total households (2001)	Number (2011)	% of total households (2011)
Buffalo City	133 366	69.5%	106 754	47.8%	155 436	81.0%	144 801	64.8%
City of Cape Town	292 305	38.5%	331 585	31.0%	420 000	55.3%	502 409	47.0%
City of Johannesburg	513 791	51.0%	500 214	34.9%	673 874	66.9%	740 984	51.6%
City of Tshwane	277 972	45.9%	296 440	32.5%	371 324	61.3%	437 415	48.0%
Ekurhuleni	409 113	54.9%	391 049	38.5%	525 727	70.5%	562 617	55.4%
EThekweni	437 211	55.6%	400 182	41.8%	557 327	70.8%	561 562	58.7%
Mangaung	123 208	66.6%	92 725	40.0%	147 613	79.8%	139 538	60.2%
Nelson Mandela Bay	150 202	57.6%	136 850	42.2%	188 060	72.1%	192 695	59.4%
Total Metro	2 337 171	51.5%	2 255 800	36.6%	3 039 362	66.9%	3 282 022	53.2%
National	7 322 884	65.3%	6 367 896	44.1%	8 773 983	78.3%	9 108 492	63.0%

3.3 Informality

The reason for exploring informality in cities is to acquire a better understanding of the magnitude of people living in areas that are un-serviced, particularly as the delivery of energy infrastructure is closely linked to the delivery of housing. To this end this research has examined the status of urban informal households with respect to population growth rates, housing backlogs and electrification backlogs.

Households require energy for essential services in order to satisfy basic human needs and a lack of choice in accessing adequate, reliable, safe and environmentally benign energy services is the way in which energy poverty manifests itself (UNDP, 2000). Energy poverty is particularly prevalent in informal settlements⁹ and includes those households living in backyard shacks of formal properties (serviced plots) in overcrowded conditions. The majority of informal settlements are situated on the periphery of cities and do not have formal access to Eskom or Municipal distributed electricity. Those that are electrified are generally receiving electricity through illegal connections and figures show that non-technical losses from electricity provision as a percentage of total revenue in municipalities ranged from 2%-9% in 2004¹⁰.

⁹ Informal settlements are situated on land unauthorised or not zoned for residential development and poor and overcrowded

¹⁰ State of Energy in South African Cities 2006, Sustainable Energy Africa

Currently South Africa has a population of 51.7 million people living in approximately 14.5 million households of which 1.96 million are informal households¹¹ i.e. living in informal dwellings¹². This equates to approximately 13.6 % of the national population of which 8%) reside in South Africa's largest cities (metros). This is indeed a sizeable proportion, reflecting the magnitude of the task to provide all with a permanent residential structure.

Currently there are about 2 700 informal settlements across South Africa accommodating the majority of the 1.96 million informal households (PMG, 2010, StatSA, 2011). Despite government's progress in providing more than 2.8 million housing opportunities to an estimated 14 million people, housing demands remain high and outstrips the pace of delivery. Housing backlogs increased from 1.8 million in 1996 to an estimated 2.1 million in 2013 according to the Financial Fiscal Commission (Ndenze, 2013). In response to the housing crisis, in 2010, government introduced the National Upgrading Support Programme which aims to upgrade 500 000 informal settlement sites by providing basic services and land tenure rights by 2014. This number amounts to 125 000 informal settlement units to be upgraded annually across the country over a four-year period (PMG, 2010). The Upgrade Programme essentially facilitates the formalisation and upgrading of informal settlements which are already on well located state land (PMG, 2010). In terms of delivery, the National Department of Human Settlements have reached just over 50% of their 2014 target, with the largest upgrades being undertaken in the Eastern Cape (DHS, 2013).

Data analysis informs that 127 000 more households were living in informal dwellings nationally in 2011 than in 2001 (Table 3 below). This reflects the challenges associated with eradicating informal settlements and the limitations of informal settlement upgrading programmes (FFC, 2013b). However, the rate at which the number of informal households is growing appears to be on the decline (Table 4 below) relative to 1996 levels. Nationally the annual growth rates of informal households declined from 4.8% over the period 1996-2001 to 0.7% over 2001-2011. The same trend prevails for the metros where the rate of informal household growth (when comparing growth between 2001 and 2011, with 1996 and 2001) is declining in all metros, with the exception of City of Cape Town. Some metros, notably Nelson Mandela Bay and Mangaung are even showing a negative growth, reflecting an actual decline in the number of informal dwellings between 2001 and 2011. This decline could be explained by the impact of the National Upgrading Support Programme mentioned above.

City of Cape Town in contrast shows an increase in informal households from 18.8% to 20.5% between 2001-2011, amounting close to 100 000 additional households presently living in informal dwellings (Table 3). This shows the steepest growth rate in the country, reflecting strong urbanisation.

Table 4 below reveals growth in the formal housing sector having surpassed growth in the informal sector. This is a shift in the trend evident pre-2008 where the growth in informal sector was higher than that of the formal sector (SANERI, 2008). However it is important to note that while there has been an overall decline in the growth of the informal sector in recent years, likely to be the result of

¹¹ A household is defined as a group of persons who live together and provide themselves jointly with food or other essentials for living, or a single person who lives alone (Stats SA).

¹² An informal dwelling defined by Statistics South Africa is a "Makeshift structure not approved by a local authority and not intended as a permanent dwelling. Typically built with found materials (corrugated iron, cardboard, plastic, etc.)..."

the number of national initiatives in place to alleviate informality, the actual number of informal households has grown.

Experts in the housing sector caution that the actual number of informal households nationally could be substantially higher than these figures suggest. According to Misselhorn (2010), “the actual numbers of households residing in informal settlements is likely to be significantly higher than estimates by Stats SA.” Misselhorn alerts that evidence from actual research reveals that shack counts undertaken by housing officials (aerial surveys supplemented by ground surveys) are more reliable, and sometimes the discrepancy can be as high as 45 percent between Stats SA and municipal department figures. This is explained by the fact that often the number of shacks is used as the basis for counting, and not the number of sub-households which might reside in a single shack. Moreover, official estimates do not factor in high levels of migration into South Africa from neighbouring countries. Misselhorn (2010) therefore argues “...that the actual number of households living in informal settlements in South Africa is probably substantially more than the official Stats SA estimate [of approximately 1.96 million households], and that, contrary to what official estimates suggest, there has probably not been a rapid decline in numbers of households living in informal settlements in recent years...”

Table 3: Growth of informality in South Africa’s major cities since 2001 (StatsSA, 2001, 2011)

Metropolitan Municipality	INFORMAL HOUSEHOLDS				
	Number (2001)	Number (2011)	% of total households (2001)	% of total households (2011)	Annual growth (2001-2011)
Buffalo City	55 056	49 790	28.7%	22.3%	-1.0%
City of Cape Town	142 981	218 780	18.8%	20.5%	4.3%
City of Johannesburg	212 693	249 823	21.1%	17.4%	1.6%
City of Tshwane	139 482	164 014	23.0%	18.0%	1.6%
Ekurhuleni	213 334	218 259	28.6%	21.5%	0.2%
EThekweni	150 390	149 289	19.1%	15.6%	-0.1%
Mangaung	43 811	32 747	23.7%	14.1%	-2.9%
Nelson Mandela Bay	59 795	38 861	22.9%	12.0%	-4.2%
Total Metro	1 017 542	1 121 563	22.4%	18.2%	1.0%
National	1 836 231	1 962 731	16.4%	13.6%	0.7%

Table 4: Comparison of growth in the housing sector (informal versus formal sectors)

(StatsSA, 1996, 2001, 2011).

Growth pa	Informal		Formal		Total	
	1996-2001	2001-2011	1996-2001	2001-2011	1996-2001	2001-2011
Metro						
Buffalo City	5.30%	-1.00%	3.98%	2.98%	3.56%	1.54%
City of Cape Town	2.69%	4.35%	3.02%	3.40%	3.11%	3.47%
City of Johannesburg	6.47%	1.62%	6.77%	4.12%	6.56%	3.61%
City of Tshwane	8.83%	1.63%	5.02%	4.94%	5.71%	4.17%
Ekurhuleni	6.40%	0.23%	6.71%	4.19%	6.56%	3.14%
EThekweni	1.47%	-0.07%	4.84%	2.82%	4.01%	1.98%
Mangaung	4.73%	-2.87%	4.13%	3.88%	3.85%	2.29%
Nelson Mandela Bay	-0.29%	-4.22%	4.06%	3.72%	2.94%	2.20%
Metro average	4.77%	0.98%	5.11%	3.84%	4.92%	3.10%
National	4.79%	0.67%	5.65%	3.86%	4.34%	2.58%

Moreover Huchzermeyer (2010) points out that the inconclusiveness of data and the definitions of informal households renders claims made about the growth of informal settlements in South African cities to be somewhat inaccurate. “She refers, for example, to the interchangeable use of figures for households living in “informal settlements” and “informal structures”, the latter term referring to shacks which may be constructed on formally planned and authorised serviced sites, in planned and authorised temporary relocation areas (transit camps) or in unplanned informal settlements.” (Tissington, 2011). She further points out that the Census and Community surveys give “no conclusive data on the number of [actual] informal settlement dwellers and on any increase or decrease in this number” (Huchzermeyer, 2010).

Significantly, the National Department of Human Settlements (DHS) also cautions that the data it relies on to determine the housing backlog in South Africa is most likely unreliable, and that a state-subsidised house that is delivered may “remain inadequate because of lack of access to basic services.” To this end the department is uncertain as to actual numbers involved in “eliminating the backlog” and delivering adequate housing. The DHS has indicated that with respect to statistics collection and verification, they are hoping that the 2011 Census will provide government with a more reliable picture of the accuracy of the data they use to determine backlogs and access delivery (Tissington, 2011). Reasons for the unreliability of data include poor provincial and municipal record-keeping in many parts of the country, as well as incomplete data relating to house construction. According to the National Treasury, “...detailed records of spending on subsidy instruments per municipality are not readily available on a national basis. These data weaknesses are a problem for the sector and reflect the ongoing coordination problems being experienced. It also severely undermines any detailed analysis, oversight and accountability.” (Tissington, 2011). In light of the above, the actual informal settlement backlog is difficult to accurately determine, however it is likely that the figure is in excess of 1.5 million households.

Other noteworthy elements relating to the growth of informality that have emerged from the data analysis (evident in Table 1) show Johannesburg, Cape Town and eThekweni as the metros with the highest share of national population, at 8.6%, 7.2% and 6.6% respectively. The fastest growing cities are Johannesburg (3.2%), Tshwane (3.2%), Cape Town (2.6%) and Ekurhuleni (2.5%). Johannesburg, Tshwane and Ekurhuleni are located in the Gauteng province, potentially indicating that the province may be particularly under strain. The metros with the highest percentage of informal households (Table 3 above) are Buffalo City (22.3%), Ekurhuleni (21.5%) and Cape Town following closely at 20.5%. Low income households as a percentage of total households (Table 2 above) are found as the majority in Buffalo City (64.8%), Mangaung (60.2%), Nelson Mandela Bay (59.4%) and eThekweni (58.7%). In fact the only metros with less 50% of all households living in low income households are Cape Town (47%) and Tshwane (48%). Household growth rates do not mirror those of population growth rates (Table 1). Households on average in the metros as well as nationally are growing at 3.1% and 2.6% respectively, while annual population growth in the metros and nationally stands at 2.3% and 1.5% respectively. This could indicate a reduction in household size and a proliferation of houses and therefore increased requests for electrification.

In terms of the results from this piece of research on the current state of informality in the metros (the focal areas of this study), an overall increase in the number of informal households nationally and across 50% of the metros is evident (Table 3 above).

3.4 Universal access to electricity and backlogs in delivery

Access to electricity is determined by two key factors: 1) the number of households connected to electricity, either through the national grid or alternative sources such as solar panels and 2) the affordability of that electricity - poor households need to afford electricity to benefit from its use.

In terms of connecting households to electricity, national government funds the rollout of energy distribution infrastructure through the Integrated National Electrification Programme (INEP) grants (details on this are discussed under policy frameworks below). INEP allocations are intended to fund the capital costs of providing electrical connections to poor households and providing the bulk infrastructure needed to ensure a stable supply of electricity. It is not always practical or cost-effective to connect all households to the national grid. In remote areas it can be cheaper to provide households with alternative sources of energy, such as through solar panels. In these remote areas INEP funds are used to connect households and schools to alternative sources of energy. The bulk of the electrification programme has taken place in urban centres¹³, predominantly within formal housing sector and has not included a fast growing informal and backyard dweller sector. The majority of informal settlements are situated on the periphery of cities and do not have formal access to Eskom or Municipal distributed electricity. Those that are electrified are generally receiving electricity through illegal connections.

In terms of the enabling poor households to be able to afford the use of electricity once they are connected, government introduced Free Basic Electricity, which provides that every indigent household should receive 50kWh of free electricity per month. However, access to FBE does not reach all indigent households as discussed in the next section.

The institutional framework for government in South Africa was established in 1996 when the country adopted its first democratic Constitution. National, provincial and local government were established as three spheres of government, each with expected distinctive functional responsibilities but operating as a single system of co-operative government. Local government was given the responsibility for ensuring development within their localities including the delivery of basic services. As noted above government has succeeded in delivering services to the poor but there remain challenges which in recent years have resulted in service delivery protests.

If the current service delivery challenges persist, the constant influx of people moving to the cities seeking employment, will endure continued levels of inadequate basic services (such as water, sanitation and electricity). In addition because the poor areas are far from economic activity finding jobs becomes very difficult. Cities are under increasing pressure to provide adequate service delivery, promote efficient spatial planning and social integration. Numerous policy instruments are in place to support local government in the delivery of basic services among which are the Local Government Equitable Share Grant, City Development Support Grant, Urban Settlements Development Grant, Neighbourhood Development Partnership and the Municipal Infrastructure Grant. Yet effective implementation of these grants in reaching the intended beneficiaries tends to be mired by institutional, regulatory and resource capacity constraints amongst others.

For instance most of the metros examined in this study have electrified more households than the national average (Table 5 below). Metros with the most households without electricity connections are Buffalo City (19.1%) and Ekurhuleni (17.8%). In terms of economic activity, the metros contributing the most gross value added to the national GDP are Johannesburg (14%), Cape Town (11%), Ekurhuleni (9%), Tshwane (9%) and eThekweni (9%). Typically the lower the GVA as proportion of national GDP, the larger the number of informal households and the lower the rates of access to electrification as seen in the case of Buffalo City, Mangaung and Nelson Mandela Bay. Ekurhuleni emerges as an anomaly regarding this trend in that its GVA is the 3rd highest yet it has 2nd highest number of informal households (Table 3 above) as a proportion of total households. The big metros contain the largest shares of the national population, notably Joburg, Tshwane, Ekurhuleni, Cape Town and eThekweni. These are the same cities generating the largest GVA as a share of national

¹³A survey of energy-related behaviour and perceptions in South Africa, 2012, Department of Energy

GDP. Surprisingly only a portion of these large metros are among the most electrified of the sample that was examined in this study. The metros with the highest residential access to electricity are Cape Town and Mangaung.

The capacity for municipalities to deliver on the needs of the poor is dependent on a number of factors including population size, which adds to the demand of housing and services such as electricity. The relevance of displaying the share of GVA for the metros is to reflect economic growth and the potential ability of the citizens of each municipality to pay for services such as rates, electricity etc to the municipality. This in turn generates revenue/financial income for the municipality to support meeting the costs of service delivery to the poor.

Table 5: Percentage of households that do not use electricity for lighting* in South Africa’s major cities (StatsSA, 2001, 2011)

Metropolitan Municipality	HOUSEHOLDS NOT USING ELEC FOR LIGHTING	
	% of total households (2001)	% of total households (2011)
Buffalo City	37.0%	19.1%
City of Cape Town	11.2%	6.0%
City of Johannesburg	15.1%	9.2%
City of Tshwane	20.1%	11.4%
Ekurhuleni	25.2%	17.8%
EThekweni	20.3%	10.1%
Mangaung	15.0%	8.6%
Nelson Mandela Bay	25.0%	9.5%
Total Metro	19.2%	10.9%
National	30.3%	15.3%

**Lighting is being used as a proxy for electrification in this instance*

3.5 Household Energy Use Patterns

The RDP considers energy a basic need. Human survival is reliant on the production and use of energy (UNDP 2000). To this end energy forms an integral input to the primary development challenge of providing sufficient food, shelter, clothing, water, sanitation, medical care, education and access to information. Moreover energy fuels productive activities such as agriculture, mining, industry, commerce and manufacturing. Energy therefore emerges as critical for sustained human development and economic growth universally. It is recognised worldwide that the provision of adequate and affordable energy is integral to poverty alleviation, improving human welfare and increasing living standards (UNDP 2000).

Importantly, energy is not consumed for itself, but for what it can do i.e. the services it provides such as cooking, lighting, heating, cooling and the production of goods and services. These energy services are essential in helping meet other basic needs, in the form of cooked food, lighting, comfortable living temperature, use of appliances, piped water, sewerage, health care, education aids and communication (radios, televisions) (UNDP 2000).

It is therefore important to understand the energy use patterns displayed by low income households, so that the planning and design of policy interventions aimed at enhancing the welfare of low-income households through improved access to clean, safe, reliable, convenient and affordable energy services, can be appropriately informed and targeted congruent to current needs.

To this end, this section examines the energy consumption and patterns of energy poverty among South African households.

Household energy use patterns are influenced by both macro- (external to the household) and micro- (within the household) determinants (UNDP/ESMAP 2003). One of the main macro-determinants of household energy consumption in South Africa is geographic location of which climate (seasonal variation) and access to cheap coal (determined by distance from the coal mines) are important factors affecting energy use in low-income households especially with regard to space heating (space heating requirements vary significantly throughout South Africa and are influenced by climate) (Eberhard & Van Horen 1995). Micro-determinants include household income and expenditure, household size, gender, age, education, dwelling type (includes household construction, insulation), access to water supplies and access to energy supplies.

Poor households are burdened with relatively high energy costs, often in excess of 10% of their income compared to wealthier households who typically spend 2-3% (SEA, 2006). This energy expenditure approach to define energy poor households is an internationally accepted one. When using this measure of energy poverty (i.e. households spending more than 10% of their household income on energy), on average South Africans spend 14% of total monthly household income on energy needs (DoE). However, there is a strong gradient based on income levels with the poorest quintile spending about 4 times as much on energy, than those with higher living standards (27% of monthly income as compared with 6% for richer households). If the 'energy poverty' definition is applied, then almost half of South African households are classified as energy poor. According to the survey undertaken by the DoE¹⁴ in 2012, 47% of South Africans are energy poor as they spend more than 10% of their income on energy needs.

The Department of Energy 2012 survey on energy related behaviour identifies thermal efficiency¹⁵ as another measure of energy poverty. According to the report 32% of formal houses are thermally inefficient compared to 86% of shacks and informal dwellings being thermally inefficient (DoE, 2012). The implication is that those residing in informal dwellings, often non-electrified, bear higher energy costs for space heating for example due to inefficient living quarters. This is corroborated by the difference in how urban formal and urban informal residents perceive the quality of electricity service received (DoE, 2012).

It is interesting to note that the National Department of Human Settlements has recently approved the enhancement of the National Norms and Standards for the construction of residential dwellings to take effect from the 1 April 2014. This entails additional budget being allocated to the housing subsidy for the inclusion of energy efficient interventions in RDP houses, notably ceilings, insulation and waterproofing, optimised window size and a proper electrical distribution board with lights and

¹⁴ This was a nationally representative survey undertaken by the DoE in 2012 to gather information on energy related behaviour and perceptions in South Africa with a particular focus of energy poverty.

¹⁵ Thermal efficiency, a measure of energy poverty "relies on assessments of the condition of one's place of residence, focusing particularly on thermal comfort levels relative to social needs.This involves rating the thermal efficiency of dwelling units, since this influences the amount of energy required to heat the home to an acceptable standard and typically represents a notable determinant of domestic energy costs." (DoE, 2012)

plug points in each living area. This is a significant policy development and will impact the lives of the poor substantially. Results from a recent pilot study conducted by National Department of Human Settlements over a period of two years, have shown that the inclusion of energy efficiency interventions in government delivered low income housing in Joe Slovo Settlement in Cape Town (such as those included in the Norms and Standards) have made a significant impact on the lives of the poor.

Energy poverty is also manifest in the persistent multiple fuel use patterns displayed by poor households across South Africa despite being electrified (Figure 4 below). This means that almost 7 million households continue to largely rely on unsafe, unhealthy forms of energy such as paraffin, coal and biomass, when they cannot afford to buy electricity. The pattern of fuel use by low-income households better resembles a portfolio of different energy sources at any time, and the varied fuels chosen often depend on budget, need, availability and preferences (i.e. a complexity of social and economic factors determine household fuel use). Poor households often experience irregular and erratic sources of cash flows, giving rise to expenditure patterns that do not allow for large discrete amounts of income to be spent on energy such as paying an electricity bill at the end of the month or buying a large quantity of fuel for the month. Thus energy has to be procured in small amounts (e.g. bucket of coal, litre of paraffin, prepaid electricity card for the minimum amount of R10), enabling the household to spend smaller amounts at a time, given their available income

Limited resources and unpredictable incomes of poor households lock them into making frequent purchases of small quantities of fuel such as paraffin, which tends to be more expensive than buying such fuels in larger quantities. Moreover the use of firewood and paraffin for cooking and lighting respectively are not cost efficient compared to using modern fuels (such as electricity and liquefied petroleum gas) for the same end uses (Barnes et al 2005:107). As a result poor households tend to spend a higher proportion of their income on energy services than households with more resources.

It is widely documented that as low-income households move back and forth unpredictably between improved to worsened economic conditions, different fuels or a combination of fuels are used.

Figure 5 below importantly shows that household transition to electricity use to meet basic energy needs appears to be more closely related to income than access to electricity.

Moreover, household energy use patterns emerging over the last 10 years show an increased uptake in electricity to fulfil basic household energy needs over time particularly with respect to lighting and cooking— see Table 6 below. The use of electricity for cooking has shown the largest increase (23%) relative to other end uses. This trend is developmentally enormously significant (for reasons explained below) given that cooking is one of the most energy intensive domestic activities which forming the primary energy need of a household.

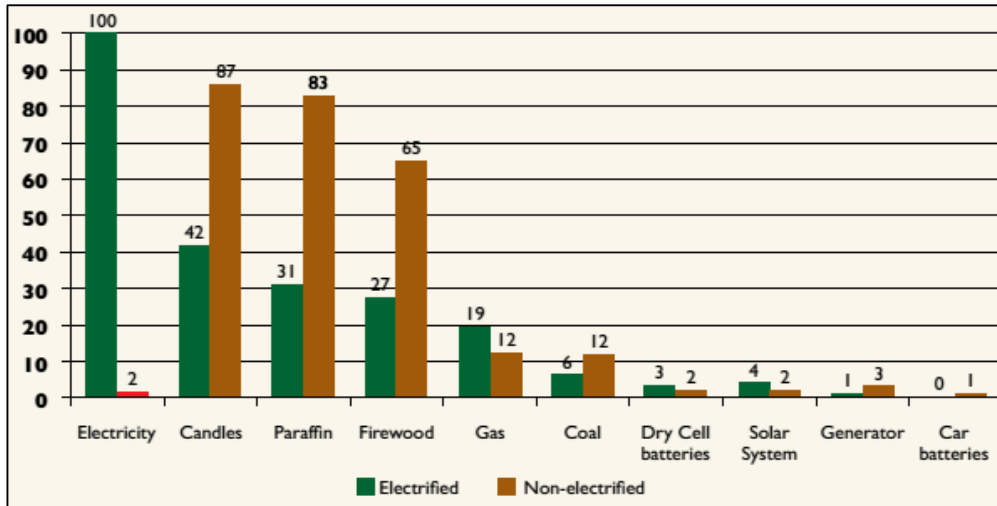


Figure 4: Multiple energy sources used by electrified and unelectrified poor households
(Source: DOE 2012).

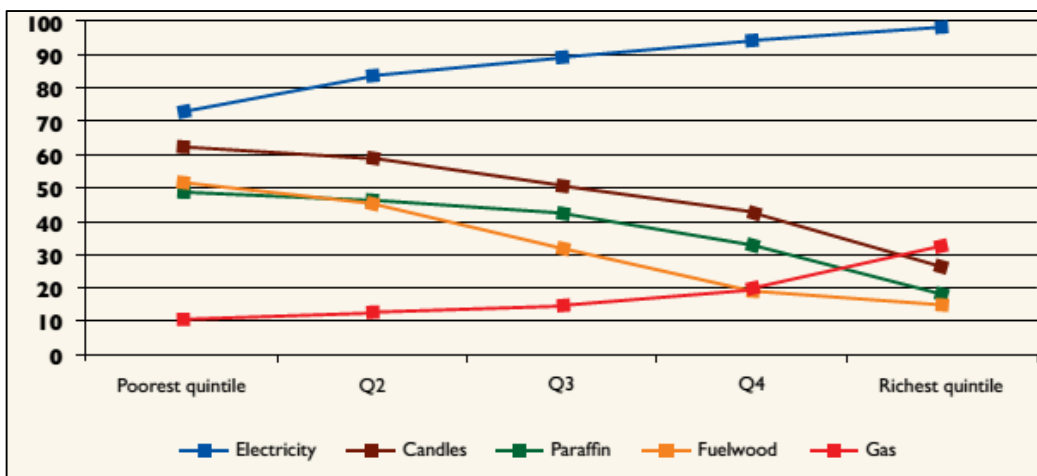


Figure 5: Fuels used to meet basic needs (lighting, water and space heating) across income groups
(source: DOE 2012)

Another widely documented characteristic of energy poverty in South Africa is that women and children endure the harshest consequences of this condition (Barnes et al 2000). Women are generally the primary users and managers of energy in the household, since they shoulder the responsibility for reproductive activities such as the care, feeding, education and health care of children and families (UNDP 2001: 9). Rural women in particular are confronted with the arduous burden of collecting wood and sometimes dung (inefficient and unhealthy fuels) and the associated health risks (Mokoena & Afrane–Okese 2005). Fuelwood gathering imposes a huge social burden on women. Its collection involves immense labour and time (anything from up to 3 hours per trip with 2 to 4 trips per week) which could be spent on more economically and socially productive as well as enjoyable activities such as farming, education and entertainment. Apart from long distances walked and more time and physical energy spent in search of fuel as fuelwood becomes scarce (due to over harvesting, land clearing and environmental degradation), chopping, bundling and carrying heavy

headloads (as much as 35kg) bear a heavy toll on women’s health in the form of neck, back and child bearing complications (Annecke 2000).

To this end the trend of increased electricity uptake by poor households with its associated enormous socio-economic developmental benefits outlined earlier in the report would certainly mitigate the extent of energy poverty in these households which make up the majority of households in South Africa.

Moreover, the indoor air pollution arising from the combustion of fuelwood, dung, coal and paraffin and the associated severe health implications are particularly directed at women and children who spend the largest amount of time around chimneyless cooking fires and in poorly ventilated spaces. Numerous studies have associated the inefficient use of traditional biomass and coal for indoor cooking and heating with acute respiratory infections (ARI’s) and chronic obstructive pulmonary disease, as a result of poor indoor air quality (Mduli et al 2005, IEA 2002:7-8, UNDP 2000). ARIs are among the leading causes of death among black South African children¹⁶ (Poggiolini 2007, Mduli et al 2005).

Again the trend of increased electricity use by poor households would certainly help alleviate the severe health impacts associated with the use of inferior energy sources for primary household energy needs.

Table 6: The variation in energy use between urban formal and informal households in South Africa (DoE, 2012)

	Electricity	Candles	Paraffin	Firewood	Gas	Coal	Dry cell batteries	Solar system	Generator	Car batteries	Base N
South Africa	88	47	37	32	19	7	3	3	1	0	3000
Geographic location											
Urban formal	98	30	25	11	22	5	4	4	2	0	1885
Urban informal	70	51	62	17	12	12	4	2	2	0	243

While there is almost 100% access to electricity in urban formal households, only 70% of urban informal households have access and are forced to rely on energy carriers such as candles and paraffin. It is important to note that paraffin use persists for thermal applications of cooking and space heating. Affordability of energy for those who have low and irregular incomes is still the prevailing reason for this, i.e. it is easier to buy frequent purchases of small quantities of paraffin than electricity where there is a minimum threshold fee for each purchase (Prasad et al, 2006). Another reason for persistent paraffin use over time, could be related to the limited electricity supply to these households (20Amps), giving rise to the use of alternative forms of energy notably paraffin for its accessibility and suitability for meeting thermal needs such as cooking and heating (DoE, 2012).

A summary of the primary sources of energy used by South African households to meet the three main household energy end-uses namely; lighting, cooking and space heating is outlined below.

¹⁶ ARIs are recognised as the 6th largest killer of children under the age of four in South Africa (Poggiolini 2007).

According to the DoE 2012 survey, it is apparent that electrified households across South Africa almost exclusively use electricity for **lighting** (97% of the survey sample) with a small component of households continuing to rely on candles. This trend also prevails for South African metros as is evident in Table 7 below. In contrast two thirds of unelectrified households rely on candles as the main lighting source while the remaining third rely mainly on paraffin. In formal urban areas, the trend is almost exclusive use of electricity for lighting, while in informal urban settlements, candles and paraffin are more extensively used (see Table 6 above). Candles and paraffin pose significant health risks. Coupled with paraffin, candles used by poor households for lighting are also known to be a leading cause of fires and associated fatalities and burns when accidentally overturned, wreaking immense devastation particularly in dense informal settlements of crowded, improvised shacks (Panday et al, 2007). Further, another health hazard associated with paraffin use is accidental poisoning of children through ingestion due to mistaken identity of paraffin usually stored in a beverage bottle. The 2003 Treasury Report, estimated the annual South African externality cost¹⁷ of paraffin related incidents to be R104 billion, which exceeds the annual turnover value of paraffin sold by a factor of fifty (PDC & SCE 2003).

Electricity is generally recognised as the cleanest energy source for households, thus reducing health risks and also providing a more efficient lighting source for children to do their homework.

Table 7: Electricity use to meet basic household energy needs (Stats SA 1996, 2001, 2011)

Households that use electricity for...	Lighting			Cooking			Space Heating		
	1996	2001	2011	1996	2001	2011	1996	2001	2011
Buffalo City	47%	63%	81%	42%	43%	74%	39%	36%	41%
City of Cape Town	87%	89%	94%	80%	80%	88%	75%	75%	63%
City of Johannesburg	85%	85%	91%	80%	79%	87%	79%	77%	82%
City of Tshwane	77%	80%	89%	71%	71%	84%	70%	69%	74%
Ekurhuleni	75%	75%	82%	64%	66%	79%	60%	62%	66%
EThekweni	74%	80%	90%	71%	72%	86%	69%	72%	76%
Mangaung	61%	85%	91%	52%	61%	88%	49%	54%	53%
Nelson Mandela Bay	71%	75%	90%	65%	65%	86%	60%	59%	54%
Metro average	77%	81%	89%	71%	72%	85%	68%	68%	70%
National average	58%	70%	85%	47%	51%	74%	44%	49%	59%

In terms of **cooking**, one of the most energy intensive applications in the household, the DoE survey indicates that 76% of households (across all income groups) use electricity as the main energy source for this activity (Table 8 below). This result appears in line with the Census 2011 data showing a national average of 74% (Table 7 above). As can be seen from Table 7, the metro average is 11% higher than the national average, displaying a higher prevalence of electricity use by metro households for cooking. In terms of formal urban areas, electricity use appears to be the predominant energy source used for cooking (91% of households). In urban informal settlements two thirds of households use electricity for cooking (68%), while close to third (27%) of households rely on paraffin. This is distinguishing feature with respect to electrified and non-electrified households in informal settlements, with the former choosing to use electricity while the latter is limited in their choice in the absence of electricity and therefore reliant on paraffin to meet their energy needs.

Previous research studies have shown the use of electricity for cooking increasing but at a slower rate than for lighting and media use. A complex set of factors influence the use of electricity for thermal applications once a household is electrified. These range from entrenched cultural practices

¹⁷ The externality costs refer to the numerous deleterious economic and social consequences associated with the use of energy, commonly not reflected in the market price of energy such as health impacts of pollution of air, water and soil, and the ecological disturbance

and a resistant to change to perceived lack of affordability of electricity (DoE, 2012). Despite this, the DoE survey showed that only around 8% of electrified households continue to rely on firewood as the primary energy source for cooking with even smaller percentages relying on paraffin, gas, coal and solar electricity for cooking. In contrast non-electrified households displayed paraffin and firewood as the dominant energy source for cooking (50% and 40% respectively).

Table 8: Main energy source used for cooking by electrified households (in percentage)
(DoE, 2012)

	Electricity	Firewood	Paraffin	Gas	Solar System	Coal	Generator	Other	Total	Base N
South Africa	76	11	7	3	2	1	0	0	100	2970
Electrified	86	8	1	3	2	1	0	0	100	2687
Non-electrified	2	40	50	4	1	2	1	0	100	271

In terms of **heating spaces** and keeping warm (another household energy intensive thermal application apart from cooking), it is apparent that two thirds of South African households (65%) utilize an energy source for this end use, while the remaining third do not use any energy sources for this purpose instead they keep warm by dressing up warmly and using blankets. Around 38% of households use electricity as the main source of energy for space heating, while 12% of households use paraffin and 9% use firewood. Coal, gas and other sources are utilised by less than 5% if households. In non-electrified households firewood forms the primary energy source for space heating for 40% of households, while paraffin as the main source of energy is used in 18% of households. Other energy sources mainly coal is used by 4% of households. Households with a low living standard were shown to adopt a very similar pattern to non-electrified households in terms of main energy source used for space heating. As few as 5% of households used electricity, while 43% used firewood, 12% used paraffin and 36% used no energy source. (DoE, 2012)

Households in formal urban areas use predominantly electric heating (50%). Non energy sources such as blankets and warm clothing are utilised for space heating in 35% of households. Households in urban informal areas tend to use paraffin for heating (20%), while 5% use firewood. The latter is likely a reflection of limited availability of biomass in many informal settlements. Just over a third of informal households (35%) use electricity while 30% use no energy source (DoE 2012).

The above describes main energy sources utilised by households to fulfil the basic household activities, however multiple fuel use is an enduring reality of the energy consumption patterns among both electrified and non-electrified households (described in detail earlier in this section). While electrified households report use of electricity for either lighting, cooking or heating, it is evident that other forms of energy such as candles, paraffin, firewood and gas continue to be used in at least 20% of households. In non-electrified households in contrast, candles, paraffin and firewood are predominantly used for household purposes, with only a small of share of households using coal and gas.

4. POLICY FRAMEWORKS

National government pro-poor energy poverty strategies and analysis

With the onset of democracy in South Africa in 1994, national government in tackling the deeply entrenched historical inequalities and poverty of the country, embarked on the provision of basic services to the poor and the disadvantaged who formed the overwhelming majority of South Africa's population. Provision of modern energy services formed a key component of such services, particularly good quality electricity supplies.

National government has since made enormous strides in developing and implementing numerous pro-poor energy policy instruments geared towards improving access to safe, affordable and reliable energy services to low-income households.

Below is an outline and analysis of such key energy policy and strategy interventions that have sought to impact energy poverty in South Africa. The analysis attempts to highlight some of the reasons why these policies have not succeeded in reducing energy poverty and inequality in the country.

4.1 The White Paper on Energy for the Republic of South Africa

The White Paper on Energy Policy (1998) (an overarching document that defines government's policy on the supply and consumption of energy across various sectors) recognises that access to adequate energy services by households for thermal applications, lighting and communication is a basic need. As a consequence it places strong emphasis on ensuring increased access to adequate, safe and affordable energy services to the majority of South Africans largely denied by past policies. Among its key objectives are 1) widening access to affordable, adequate and secure energy services for disadvantaged households (urban and rural), small business, small farms and community services, and 2) promoting access to cleaner and safer forms of energy to low-income households to improve the negative health impacts arising from the use of certain fuels (DME 1998). In particular government committed to providing access to energy for all.

4.2 Integrated National Electrification Programme (INEP)

In 1994, the newly elected government made universal access to electricity for all of its citizens by 2012 among its key objectives in the drafting of its energy policy, as a means of meeting the huge demands concerning service delivery, including electricity. To this end the government embarked on an accelerated national electrification programme, targeted at low-income households previously deprived of access to electricity. The benefits of using electricity are well known and widely documented. With electricity people have convenient access to a clean, easy fuel source enabling them to power a diverse number of appliances and boost income-generating, productive and entertaining activities. Using electricity also reduces exposure to low-grade fuels, which often pose dangerous health and environmental risks. Electricity is also more efficient, less expensive and less time consuming than other fuels, thus freeing up time and income for other purposes.

INEP increased the level of household electrification from 36% in 1994 to 87% (5.7 million households have been electrified under the programme) in 2012 (DoE, 2012), a significant milestone for South Africa and unprecedented internationally (DME 2004).

However government soon recognised that due to:

- 1) significant electricity generation capacity constraints;
- 2) electrification spending being used to fund not only electricity connections as in the past, but also upgrades of an ageing network backbone electricity infrastructure, resulting in a lower share of available funds being targeted for new electricity connections;
- 3) increasing growth rates in households electricity demand and the associated increased costs to electrify poor urban households typically located on the margins of the urban areas;
- 4) municipalities experiencing enormous capacity challenges with regard to availability of planning and technical personnel to undertake the electrification within their jurisdictions;
- 5) the ongoing rural urban migration arising from historic spatial inequalities places increasing pressure on already constrained power supplies in the urban areas;

that the goal of universal access would be difficult to achieve within the initial timeframe and amended its goal to 92% by 2014. More recently the DoE in 2013 announced that it is unlikely to fulfil the 2014 target for reasons cited above. The DoE is presently developing a new Household Electrification Strategy/Roadmap, in alignment with the strategic objectives of the National Development Plan, and committing to reach universal access of 97% by 2025 (see Appendix 2). The Department cites that 100% electrification is not possible on account of rapid household growth and delays in the process of formalizing informal settlements. The aim of the strategy is to electrify about 3 million formal households via grid (90% of backlogs) and about 300,000 households with high-quality non-grid solar home systems to address current backlogs (DoE, 2013).

Despite the impressive progress achieved by the national electrification programme in the number of households electrified, many households still remain and indeed will remain without electricity well beyond 2014. The current backlog stands at 3.3 million households (Table 9) comprising 1.2 million informal households (includes backyard dwellers and flatlets on large properties such as granny flats or servant quarters) and 2.1 million formal households requiring an electricity connection (DoE, 2013) and this is expected to grow at 2% on a national average per annum (DME, 2007). Thus the number of households that still do not have access to electricity in South Africa are rapidly growing (DoE 2013; SANERI, 2008). It is important to note that the remaining households without access to electricity are such that 75% of households are located in Eskom supply areas and 25% in municipal supply areas. Most of these households are predominantly located in the rural areas and the additional infrastructure required to reach these households is more expensive as these households tend to be located far from the national electricity grid network that distributes electricity to households.

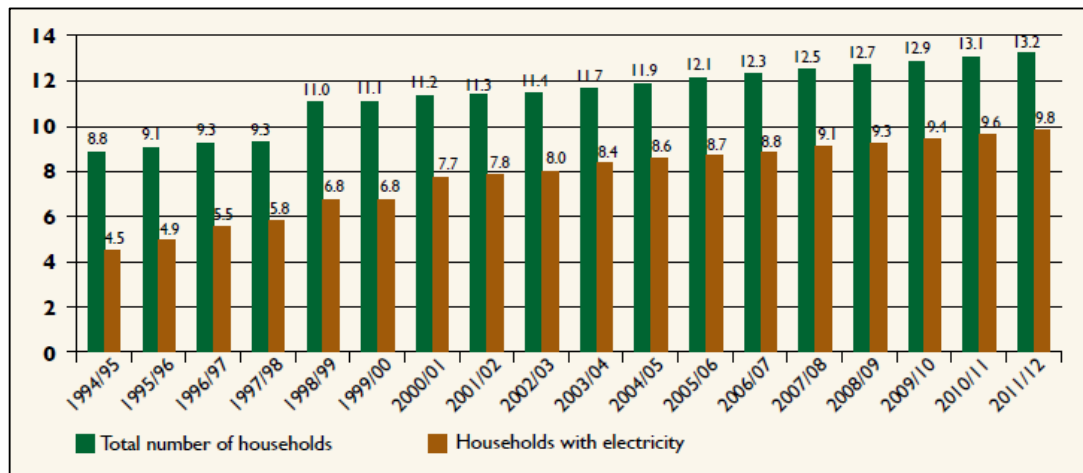
Prior to 1994 municipalities distributed electricity to historically white areas, while Eskom served the historically black townships and some homelands. This division has to a large extent remained in practice and currently Eskom and 184¹⁸ municipalities are licensed to distribute electricity. Basically the responsibility for distributing electricity is shared between Eskom and the municipalities however they operate different tariff structures and different functions. For instance under the Constitution, electricity reticulation is a municipal responsibility as is the delivery of basic services. This can be problematic as in some of the larger municipalities and metros electricity is being

¹⁸ <http://www.sanea.org.za/CalendarOfEvents/2013/SANEALecturesJHB/Apr16/ThembaniBukula-NERSA.pdf>

distributed by both Eskom and the municipality itself, leading to challenges around who provides Free Basic Electricity and tariff structure differences. In addition municipalities depend on the sale of electricity to cross subsidise services and provide for the poor. By Eskom distributing electricity within a municipality's jurisdiction means that their ability to raise revenue becomes challenged.

More than 50% of the household connections are provided with electricity by Eskom (approximately 4.1 million connections), and the majority of these households are poor. The remaining 50% of household connections are supplied by the metros and other municipalities, of which 30% of household connections are provided with electricity by the metros (2.4 million connections) and 20% are provided by other municipalities (about 1.4 million connections). (PDG, 2012)

Table 9: Comparison of total number of households and electrified households electrified in South Africa (in millions) (DoE, 2013)



Presently, approximately 87% of formal households and 76% of informal households have access to electricity as illustrated in Table 9. One of the reasons for the slow delivery of electrification and housing stems from the apartheid legacy.

Table 10: Electrification backlogs per province (DoE, 2012)

Province	Projected Households	Backlog (Formal Houses)	% Access on Formal Houses	Backlog (Including Informal Houses)	% Access on Informal Houses
Eastern Cape	1 725 713	437 874	74,65	613 113	64,47
Free State	855 508	107 043	87,49	200 435	76,57
Gauteng	3 370 177	412 816	87,75	878 725	73,93
Kwazulu Natal	2 510 605	527 997	78,97	829 737	66,95
Mpumalanga	910 505	124 467	86,33	214 409	76,45
Northern Cape	283 663	23 255	91,80	44 397	84,35
Limpopo	1 293 462	157 807	87,80	270 877	79,06
North West	879 888	73 942	91,60	157 419	82,11
Western Cape	1 401 279	42 178	96,99	212 552	84,83
TOTAL	13 230 800	1 907 379	87,04	3 421 664	76,52

The national housing programme struggles to keep pace with the growing number of households in informal settlements over the last decade (Misselhorn, 2010). Keeping pace with electrifying backlogs and at the same time servicing newly built and informal households has been a huge

service delivery challenge. In addition to the above challenges, escalating electrification costs and limited funding, as well as high growth rates of houses (both formal and informal) has played a major role in hampering the government's goal of providing universal access to electricity. The table below provides a breakdown of this backlog.

The INEP data in above Table 10 indicates that close to 2 million formal houses are without electricity and this figure increases to 3.4 million when the informal unelectrified sector is added.

According to 2011 census approximately 12.24 million households out of a total of 14.45 households were using electricity for lighting. This amounts to 85% of households having access to electricity for lighting. This proportion of households with access to electricity also includes 1.26 million household units such as backyard rooms, shacks and granny flats all built on the same stand as formal households. Of this 1.26 million households, 1.1 million are estimated to be not metered (have not received electricity formally). Network designs were not done to accommodate these additional households therefore they would have to be upgraded. These households also do not qualify for inclining block tariff and FBE. About 2.2 million households according to Census 2011 statistics are without electricity, very similar to the DoE figures in Table 9. If the 1.1 million households that are not metered are counted as unelectrified, then the total figure of unelectrified households is 3.3 million households. This is in line with the INEP statistics for households that are not formally electrified (metered), hence approximately 77% households have a metered supply. The implications of this indicate that 77% of South African households are formally electrified compared to the official figure of 87%. This could impact the ability of government to reach its 2025 target.

4.3 Free Basic Electricity Policy

The Free Basic Electricity policy was developed by the national government of South Africa as part of an action plan to assist in alleviating the worst effects of poverty by subsidising the cost of consuming electricity to meet basic energy needs. The policy was developed when it became clear that despite the national electrification drive in South Africa facilitating widespread access to electricity, the consumption levels of low-income households remained very low, as poor households could not afford to use electricity (ERC 2006). As a consequence these households were not able to derive the full socio-economic benefits of access to electricity. National government, in an effort to remedy this situation and to ensure that low-income households benefit from the enormous investment in the INEP, introduced in 2003 the Free Basic Electricity (FBE) policy, following comprehensive research conducted by University of Cape Town, Eskom and the DoE (formerly known as the Department of Minerals and Energy), on the purpose, cost, benefits and processes relating to implementing such a tariff (UCT 2002). This tariff provides poor households with 50kWh of electricity per month free of charge, with an associated blocked or stepped tariff for electricity consumption levels exceeding 50kWh (DME 2003). This amount of free electricity enables the poor to meet some of their basic energy needs namely lighting, media access and some water heating (Winkler, 2006). FBE is funded by national government, through allocations made to local government and cross subsidies from high end users (i.e. industry and wealthy customers) (Winkler, 2006). According to the DoE (2013) 69% of poor households are benefitting from free basic energy policies. But as noted below the data is not reliable given that determining those who are eligible for FBE depends on how poor households are defined by different municipalities.

Funding for the distribution of the subsidy would be contained in a basket through the Local Government Equitable Share (LGES) fund to municipalities allocated by DCOG. In terms of Section 227 of the Constitution, local government receives an equitable share of nationally raised revenue to support its provision of basic services and perform its allocated functions. This is an unconditional transfer which complements the income that municipalities raise from their own revenue sources

such as property rates and service charges notably electricity sales etc. The LGES provides funding for municipalities to deliver free basic services notably water, sanitation, refuse and electricity to poor households as well as subsidises the cost of administration and other core services for particularly economically weak municipalities struggling to cover costs from their own revenue base. The size of the equitable share allocation is determined by the number of poor households and the capacities of the municipalities to raise their own revenue. The basic services component of the new equitable share formula funds free basic services for every household below an affordability threshold of R2300.00 (which is equivalent to twice the value of a monthly old-age grant) per month in 2011 prices (NT et al 2012). 59% of South African households fall below this threshold (NT et al 2012). The allocation for each poor household per month for the provision of free basic services is R277.78 of which R56.29 is allocated to free basic energy (this includes a 10% allocation for maintenance). This subsidy amount for energy per household is costed to be higher than the cost of 50kWh of electricity at NERSA approved Block 2 municipal tariffs and this amounts to R5.7 billion allocated for energy through the LGES. (NT et al 2012) These funds could be utilised for electricity or alternative energy. It is important to note however, that each municipality has the authority to spend unconditional grants as they deem necessary making it difficult to determine if funds have been spent on subsidising services to the poor (NT, 2005; DPLG, 2007; NT et.al 2012). Other elements in the new LGES formula include an institutional component which provides funds for administration costs required to run a municipality including activities such as administering the implementation of FBE. In this respect the new LGES allocation includes a core amount to fund municipal administrations as well as ensuring that a larger allocation is provided for poorer (least ability to raise their own revenue) and larger municipalities. The new formula certainly aims to be more redistributive in structure. The challenge that remains with the introduction of the new LGES formula is to ensure that once funds are disbursed to municipalities they are used to deliver services that benefit poor households.

In terms of the implementation of FBE, a number of structural and institutional challenges continue to prevail, notably:

- 1) Not all poor households receive FBE. Only those with an electricity connection benefit from the subsidy. There are still 3.3 million households without access to electricity. Approximately 60 billion rand is required to connect these households (PDG 2010).
- 2) There is a divergence in the implementation approach of FBE between Eskom and municipalities. Local government is responsible for the provision of basic services in its area of jurisdiction. Eskom is providing a service on behalf of municipalities. Even in a case like this, municipalities will still be responsible for funding the provision of free basic services. Where government grants are paid to municipalities, these must be paid to Eskom to cover the cost of providing free basic electricity to the targeted households.
- 3) The approaches adopted by municipalities are varied across municipalities. Some leakage of the subsidy to the wealthier households occurs particularly when the broad based approach¹⁹ to the implementation of FBE is used by municipalities. Further large households who share their electricity connection with other households (typical of backyard dwellers) or run a small business from home are vulnerable to being pushed into higher consumer category thus excluding such households from the subsidy.
- 4) Data on the uptake and effectiveness of FBE is weak.

¹⁹ A broad based approach is where all households with a legal electricity connection receive the intended benefit of FBE. This tends to result in a large degree of leakage of benefits to households for whom poverty alleviation is not intended. (DME, 2003)

- 5) Limited financial resources are encountered with municipalities reporting that grant allocations are not sufficient. There are also competing demands for the use of equitable share
- 6) Poorer municipalities experience limited technical and human resource capacity to implement FBE. With the introduction of the new equitable share formula, these constraints may to some extent be alleviated if LGES is implemented in practice.
- 7) The lack of adequate electricity distribution infrastructure predominantly in rural areas gives rise to many households not benefitting from FBE.
- 8) The lack of compatible and coordinated billing, collection and vending infrastructure in the administration of FBE hampers the success of the FBE as a pro-poor instrument.
- 9) There are numerous challenges in dealing with connection and reconnection fees with respect to connections and cut offs respectively.
- 10) High levels of electricity theft in some areas render FBE irrelevant.
- 11) Given that the LGES is an unconditional grant entitled to Local government to support the provision of free basic services, effective regulation and enforcement of FBE is difficult to achieve.

If the formal and informal electrification backlog were to be addressed and assuming that all 3.4 million formal households qualify for FBE and are able to access it, this would amount to the delivery of FBE to a total of 5 647 333 households²⁰.

However, the total number of households for 2011, according to the national census data, is 14 450 161, of which 8 466 500 (i.e. 59%) have been categorised as poor (NT, 2013). Yet only 2 547 333 FBE allocations are being provided each month. In other words, only 30% of poor households receive FBE.

This is in stark contrast to the figures provided by the DoE, which indicate that 69% of poor households in South Africa are benefitting from FBE. (DoE, 2012) This discrepancy in the figures could be attributed to the different data sources used by both institutions in determining the number of FBE allocations made nationwide.

Since the FBE is a national policy that applies to a municipal service and is funded through an unconditional grant, national government does not prescribe how municipalities implement the free 50kWh provided through the FBE subsidy. Municipalities therefore had to make their own decisions on how to implement it, with some providing it to all households and some only to households that fall below a poverty line or indigence measure. (NT, 2011)

Municipalities are generally using two different approaches to identify poor households that can access FBE. Both are to some extent problematic. The first works on the basis of an indigent register, to target poor households for the delivery of FBE, and are intended to reach those households that are conclusively the poor. However, it is well known that not all poor households are registered and many who would be eligible are not obtaining free electricity. The second system is based on the household's electricity consumption thresholds e.g. < 450kWh/month., and in this case the reach of FBE is not always towards households who are conclusively poor, resulting in the leakage of the subsidy to wealthier households. For instance a mid to high income household that uses less than the deemed amount of electricity will also qualify for FBE. The second approach while benefitting mid to high income households generally does ensure that all poor households (with the exception

²⁰ In 2010, the cost of supplying 50 kWh Free Basic Electricity to 4 million households would cost the country R4billion per annum (PDG, 2010).

of back yard dwellers i.e. where multiple poor households are connected to one meter and their consumption takes them above the benefit threshold), will be eligible for FBE. The administration involved in separating the wealthier households is not financially viable for municipalities. In addition this points to challenges in the discrepancy of information available and how the poor are defined.

As seen in Table 11 below, FBE is applied differently across municipalities based on their approach used in targeting and defining the intended beneficiaries. The table below details the 4 approaches used in implementing FBE as well as the proportion of municipalities applying each approach.

Table 11: Approaches used by municipalities in targeting poor households to receive Free Basic Electricity subsidy

<i>Approach</i>	<i>Proportion of municipalities</i>	<i>Definition</i>
Broad-based	17%	Each consumer unit in that municipality receives free basic services on the current billing system of the municipality
Geographical	2%	The process whereby consumers living in a particular area are assumed to have the same socio-economic profile and therefore tariffs can be set on location.
Self targeting / indigent	72%	A system whereby only indigent households receive the benefits of the free basic services programme as mutually determined by the service provider and service authority.
Technical / service level	9%	The process whereby technology is used to regulate the provision of free basic services (including electricity meters).

(Source, PDG 2010)

In 2008 Statistics South Africa’s annual Non-financial Census of Municipalities reported a decline in the number of consumer units receiving free basic electricity (from a peak of 3 351 388 in 2006 to 2 781 043 in 2008. This may have been attributed to the fact that several municipalities had changed their approach from providing free basic electricity to all households to targeting poor households exclusively. In 2009, as can be seen in Table 12 the number of consumer units increased to 2 952 682, possibly reflecting an increase in the number of poor households accessing free basic electricity, illustrating that the self- targeting approach is beginning to be effective. (NT, 2011)

Table 12: Consumer units²¹ receiving Free Basic Electricity from municipalities from 2008 and 2009

Province	2008			2009		
	Number of consumer units receiving basic electricity services	Free basic electricity services		Number of consumer units receiving basic electricity	Free basic electricity services	
		Number of consumer units	%		Number of consumer units	%
Eastern Cape	811 953	282 175	34.8%	872 170	312 975	35.9%
Free State	576 790	345 545	59.9%	602 434	379 981	63.1%
Gauteng	1 802 607	706 822	39.2%	1 829 044	724 178	39.6%
KwaZulu-Natal	1 283 813	165 505	12.9%	1 327 485	192 265	14.5%
Limpopo	1 072 824	271 992	25.4%	1 157 388	319 559	27.6%
Mpumalanga	559 499	220 106	39.3%	591 867	234 183	39.6%
Northern Cape	227 033	100 021	44.1%	243 075	107 788	44.3%
North West	579 004	119 919	20.7%	588 298	129 443	22.0%
Western Cape	1 173 637	568 958	48.5%	1 209 566	552 314	45.7%
Total	8 087 160	2 781 043	34.4%	8 421 327	2 952 686	35.1%

Source: Stats SA, Non-financial census of municipalities for the year ended 30 June 2009

4.4 Free Basic Alternative Energy Policy

Recognising that FBE and electrification will not reach unelectrified households in the near future, national government in its bid to close this energy poverty gap introduced policy with a wider approach covering 'free basic energy' and not just electricity. This took the form of the Free Basic Alternative Energy (FBAE) policy introduced in 2007 - a subsidy intended to provide poor households with alternative energy (see Table 12) where electricity is not available, as a means to improve their welfare and promote a more equitable share in reliable and affordable services to the growing unelectrified poor households. The objective of this policy is to support indigent households by providing them with the equivalent of R56.29 per month of alternative fuels/technology such as paraffin, Liquefied Petroleum Gas (LPG) and other energy forms deemed appropriate by the municipality. Municipalities are tasked with implementing the policy by identifying the indigent households and issuing them with an alternative fuel. The policy guides that although municipalities receive FBAE allocations through the Local Government Equitable Share Grant (LGES) disbursed from National Treasury (NT) via DCOG, they will be required to supplement the grant from their own revenues. To date the number of households receiving FBAE is small and there has been no successful implementation of FBAE in the metros. By 2011 households receiving FBAE increased by 36 000 (see Figure 6 below).

²¹ The figures from both the non-financial census and Eskom are based on consumer units and not households, and are therefore not comparable with household data collected in the census and community survey. Eskom and municipalities, the 2 distributors of electricity to households, have no way of estimating how many households are serviced by a connection, so the number of households receiving free basic electricity could be larger than the 4.3 million consumer units recorded by Eskom and municipalities in 2009.(NT, 2011)

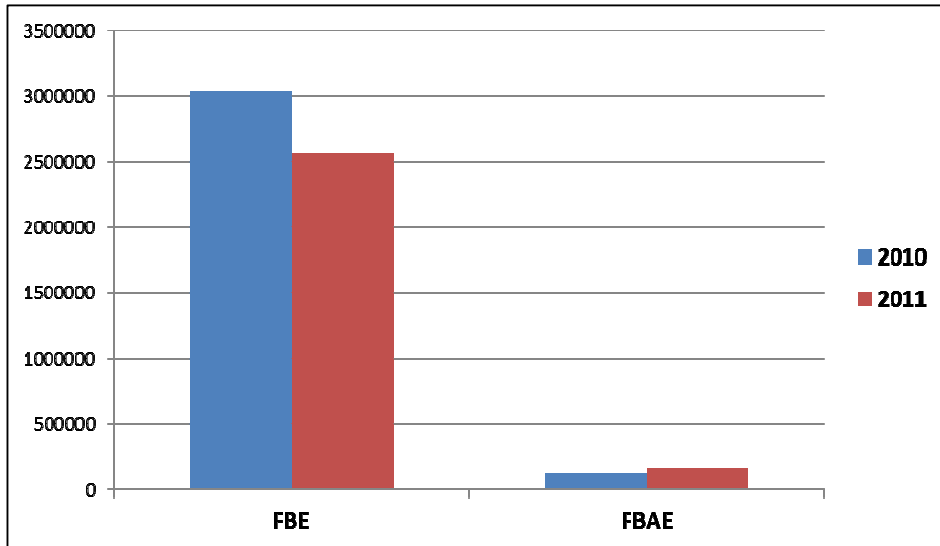


Figure 6: Low provision of FBAE in South African municipalities relative to FBE

(Source: DoE, 2012)

Table 12: Number of households receiving Free Basic Alternative Energy subsidy from different energy sources (NT, 2013)

Source	2011
Coal	26
Gas	1 098
Paraffin	47 523
Candles	24 115
Solar home system	41 635
Fire gel	44 817
Total	159 214

However there are significant challenges for municipalities to roll out FBAE. Research shows that in fact very few municipalities are implementing FBAE which was really intended for rural areas but has been considered for urban areas. Unlike FBE it is very difficult to administer and monitor thus putting municipalities under considerable strain. Further municipalities are not capacitated in terms of human and financial resources to roll out FBAE. Concerns expressed by municipalities include:

- difficulty in identifying the actual location of indigent households, which clearly prevents the municipality from issuing an alternative energy subsidy;
- additional financial implications that cannot be met under current budget allocations. These additional costs include the establishment of the infrastructure the delivery of alternative fuels and the varying cost of alternative energies compared to electricity (DPLG, 2007, DME, 2007).
- a strong reluctance for people to accept alternative energies, as they are thought to be in place of electricity. It is thought that if they accept these other energy carriers then they will no longer be considered for electricity. Therefore, many people refuse the fuels stating that they would rather wait (DPLG, 2007, DME, 2007b). These factors all result in the actual implementation of the policy to be rather difficult in filling the gap of electrification.

- Municipalities have also identified that they lack the skills to identify appropriate energy sources that would meet informal household needs. There is the added problem that most alternative fuels are not regulated in price, meaning that neither municipalities nor households can depend on the same quantity or quality of fuel being delivered each month should the costs or standards vary. Municipalities and households are also not always aware of the dangers and progress in safety of using alternative fuels.

4.5 *Inclining Blocked Tariff (IBT)*

As discussed above, studies over time have repeatedly shown that poor households are spending a far higher proportion of the household income on electricity (PDG, 2013). To this end, in April 2010 national government (NERSA) introduced the IBT to help cushion the low income electrified households from the particularly sharp electricity price increases. Eskom and the municipalities as electricity service providers bear the responsibility for the implementation of this intended pro-poor policy instrument. Since its introduction, Eskom and majority of the municipalities have implemented this tariff structure. The tariff has only been applied to the residential sector as it is the only electricity consuming sector which can be easily differentiated into consumption blocks. The design of the IBT was informed by the overarching national Electricity Pricing Policy (EPP) GN 1398 of 19 December 2008 which stipulates that cross subsidies for low income household users will remain a priority in electricity tariff pricing and that “...charging an appropriate tariff structure that allows for maximum subsidisation at low consumption levels will gradually [function as means of] reducing cross subsidies as the consumption level increases” (DME, 2008:40). The IBT is designed such that it comprises 4 consumption blocks (each block based on the amount of electricity used by consumers) with each successive block representing a higher price per kWh of energy consumed. All consumers start their consumption in block one (which also corresponds to the FBE allowance which poor households are entitled to) and as the household purchases more electricity during the month, they move to the next consumption block. The design of this tariff is such that each block corresponds to the welfare needs of the related consumption group. With the result higher-consuming households will pay higher tariff rates for electricity while lower-consuming households will benefit from a lower tariff rate. In essence, higher-consuming customers are cross-subsidising lower-consuming customers. This tariff structure is intended to be both pro-poor and promote energy efficiency.

With regard to implementation of the IBT by Eskom and municipalities, National Treasury while it urges close alignment of any proposed IBT to the Electricity Pricing Policy by the implementers, it also encourages municipalities to customise the structure of their IBTs appropriate to their local circumstances (such as income brackets and electricity demand changes in response to price increases) (NT, 2012, 14-15).

While the intention for this tariff is to be pro-poor in that the lower consumption blocks can be set at affordable levels for those who consume less electricity, there are concerns that this tariff is not benefitting those for whom it is intended. In practice this tariff is tending to place poor households in a less favourable position with regard to access to electricity. In reality multiple households share a single meter such as the case of backyard dwellers which results in the benefits of free or below cost allocation defined by the lower first consumption block of the IBT not being achieved. In fact the electricity consumption of such households is such that they are paying high electricity prices as a result of being in the higher consumption blocks and therefore bearing an inequitable share of the cost burden of IBTs.

Studies have also shown that the scope for cross subsidization through the tariff is more feasible in urban areas where the economic wealth of South Africa tends to be concentrated relative to the

rural areas. Hence substantial differences prevail in the ability of different regions to implement a cross subsidy system like IBT (PDG, 2010).

Experience has shown that the low-use customers targeted for cross-subsidies in this policy do not always correlate with the poor households that most require cushioning from the rising cost of electricity. To this end IBTs have shown to subsidise wealthier customers as well as irregular users of electricity (such as wealthy customers who own a holiday home). In terms of wealthy customers, given that IBTs set relatively low tariff levels which are applied to all domestic customers, high income consumers are able to benefit from the subsidy if their consumption is low. In addition irregular users tend to be wealthy customers who consume electricity for a few weeks or months in a year typical of holiday homes, and therefore these customers will be significantly subsidised through the IBTs. (SALGA, AMEU, Eskom, 2011). This leakage can be explained in part by a lack of understanding of household electricity consumption patterns which in turn has hampered the success of the IBT as a pro-poor instrument. A major limitation is the lack of a feedback system between domestic meters and the municipality to track household consumption patterns.

Moreover, since many of the poorest households in the country do not have access to electricity, they are unable to access the intended pro-poor benefits of the IBT. Further the inclining block tariffs also mask the actual costs of service provision to any one consumer block. Over time, this can give rise to the service providers capturing the intended subsidy to consumers through raising prices for all groups. However, the strengths of the system are that it is easily understandable and simpler to implement than an indigence-based system and it also promotes the reduced consumption of electricity/energy efficiency. (NT, 2011)

To date Eskom and majority of the municipalities have implemented the IBT tariff structure. This has required significant shifts in the tariff structures as well as customer understanding. However implementation has not been universal, particularly in the case of secondary cities (municipal category "B1") small town municipalities (municipal category "B3") and rural municipalities (municipal category "B4"). This in part can be explained municipalities seeking to avoid financial/revenue loss associated with IBTs while others lack a wealthy customer base to cross-subsidise the low income low use customers. (PDG, 2013)

5. CONCLUSIONS AND RECOMMENDATIONS

It is clear from the outline above that there are many policies and strategies that have been implemented since 1994. Considerable progress has been made – if we consider that only 36% of the country was electrified in 1994 and now that figure sits at 87%, and close to 3 million houses have been built. It is an extraordinary accomplishment. In addition all spheres of government are constantly evaluating and reviewing where they have got to, what the gaps are and adjusting and bringing in new policies and frameworks to address the challenges that a developing country such as South Africa faces.

Although there is strong articulation in almost all national government policies including the National Development Plan of the need to enhance development, increase employment and reduce poverty and inequality, the country continues to be faced with massive challenges in this arena. This short study has attempted to explore one small aspect of these issues, namely urban energy poverty. In doing so we have asked the questions: Why do the developmental problems persist to the extent that they do, given the good intentions and financial investments through policy development since democracy?

One answer to this problem is that at the heart of some of the issues are the economic policies that have been developed since 1994. In a paper presented by Adam Habib (an eminent South African socio-political analyst, academic and national commentator) at a recent national conference analysing South Africa's experience of 19 years of democracy, questioned whether South Africa is a better place today than pre-1994. Obviously the response is a resounding yes – the country has made in-roads into poverty alleviation and the economy has doubled in the last 20 years in terms of GDP. The single biggest failure he claimed has been in the increase in inequality in the country. He further states that the NDP although a robust document uses the same indicators to address poverty and inequality as pre 1994 – thus not significantly transforming the status quo in terms of how the economy is run. In part, it is perhaps not surprising that the country has struggled with implementation of developmental policies. The developmental policies are in place yet the very core of the country's economic base is often in conflict with that developmental agenda. Thus it is clear that a detailed analysis of the economic policies would assist in providing a detailed analysis of the challenges of energy poverty. However, this is not the scope of this paper.

Instead the paper has concentrated on the policies and the municipal role as the seat of delivery of national policies and how they can be understood and worked with in such a way as to improve implementation to better service the poor from an energy and development perspective. In addition the paper draws on Sustainable Energy Africa's 15 years of practice of working with municipalities and having a clear understanding of the challenges facing them and a meeting held with National Treasury and the Department of Energy set up for the project. The analysis and recommendations below are based on this.

Analysis

The institutional framework for government in South Africa was established in 1996 when the country adopted its first democratic constitution. National, provincial and local government were established as three spheres of government, each with expected distinctive functional responsibilities but operating as a single system of co-operative government. The South African constitutional order is founded on two inter-related concepts, namely that of 'sphere of government' and 'co-operative government'. 'Co-operative government' means that, although each sphere is distinctive and has equal status, the spheres are also inter-dependent within the overall structure of the state. The three spheres must therefore work together to ensure effective government in the whole and each of its parts.

Coordination and alignment

National Government develops strategies, frameworks and policies which are guiding documents for the country and for provincial and municipal governments to put into practice. A challenge for the country is that the three spheres of government are not always aligned and operating in a co-operative manner. In part this is due to the siloed nature in which government departments operate as well as the fact that they are driven and found accountable according to their mandates. It is clear that a lack of alignment of policies between departments and between spheres of government hamper the process of implementation. Further there is a lack of coordinated planning across spheres and sectors of government. The National FBE and FBAE are clear examples where the intention of the policy is pro-poor yet in its implementation at the local level it often falls short. We know that only about 30% of those eligible for FBE are actually benefitting from the policy. The reason for this is a lack of coordinated and integrated planning between these two spheres of government and between the departments within local government. It involves the coordinated and integrated effort of housing, electricity and social development departments to obtain the indigent

register among other important elements to ensure successful implementation of these instruments.

IBT is another example, it is designed by national government and implemented at the local level and as noted above there are challenges around its rollout and reach to the poor and resolution of this lies with coordination and integrated planning.

National and local governments have identified that departments currently do not operate in a coordinated manner, particularly with respect to housing and electrification delivery. A further problem relates to position of some electricity departments in municipalities which have excluded addressing alternative energy needs of unelectrified households, as this falls outside of their mandate to service electrified consumers. Other departments typically do not pick up this alternative energy mandate.

Municipalities identified the lack of coordination around projects as a cause for slower energy service delivery, in particular electrification. This is reiterated by the national departments who are confronted with communication blockages. Some municipalities have found that housing projects are delivered, but cannot be electrified because the budgets for electrification have already been committed to other areas. In addition, poor coordination resulting in housing being completed well before the electrification schedule has the added complication that beneficiaries are reluctant to move to their new homes that have been built because they are without electricity. Beneficiaries instead prefer to move to areas that are being electrified, where they may be able to at least acquire informal electricity connections. On the other hand electricity departments cannot electrify unoccupied houses or spaces, because the cables will be stolen, which imposes an additional cost to the municipality. This means that informal areas seem to mushroom, while formalised areas may be slower in uptake. This further illustrates the priority given to electricity by people.

It is clear that different municipalities have differential capabilities in terms of human, infrastructure and financial resources and this will impact on the scale and reach of pro poor interventions. In this respect improved planning, support and coordination may assist in closing this gap.

Multiple fuel use

Despite the increased access to electricity in the country, multiple energy use patterns remain entrenched among South African households. This is largely attributed to affordability as poor households are faced with difficult choices between meeting basic household energy needs and other competing household priorities such as food, all of which are escalating in costs. Close to 50% of households in South Africa use electricity in combination with other fuels such as firewood, paraffin and gas for cooking. Therefore, energy price reviews are urgently required to ensure that poor households do not get further entrapped in energy poverty.

The continued reliance on non-commercial energy such as firewood has adverse potential impacts on health, environmental degradation and energy poverty. However their economic choices are severely limited. Increasing the commercialisation of energy such as firewood would not necessarily resolve the challenges. If households are not able to pay firewood then this would serve to deepen their energy poverty and deteriorate livelihoods further. Thus multiple fuel use will persist for the foreseeable future in poorer households. This fact needs to be considered in any policies going forward.

Where extreme energy poverty prevails, the direct impacts can be malnutrition, disease and even death. Extreme energy poverty could certainly contribute to worsening the plight of vulnerable households especially with vulnerable family members such as the frail, elderly and the young

children. As mentioned earlier in the report, close to half of South African households (47%) are considered energy poor and therefore likely to be faced with difficult choices between meeting basic household energy needs and other competing household priorities such as food. To this end, increasing electricity prices pose a threat to poor households. Energy price reviews are urgently required to ensure that poor households do not get further entrapped in energy poverty. It is critical that a review of the current electricity price increase model and tariff structures is undertaken.

The Department of Energy has indicated that an energy development strategy seeking to improve the plight of the poor cannot exclusively focus on electrification but also needs to include improved access to reliable, affordable, safe and healthy non-electric energy sources. This is imperative if the health impacts and risks (associated with paraffin poisoning in children and fire accidents arising from candle and paraffin use razing shacks to the ground) are to be reduced. In other words the country needs to develop a comprehensive energy poverty policy.

Finance and regulation

Municipalities are constrained by their financial accounting and the regulations that they are accountable to such as the Municipal Finance Management Act. The decisions that they take are driven by these regulations and the need to generate income in order to deliver on their constitutional agendas. This in turn impacts on their developmental agenda. For instance, the manner in which the equitable share grant is distributed, and the cross subsidisation of electricity sales to service other municipal services means that decisions have to be taken that impact on level and extent of pro poor service delivery. They are constantly balancing between delivery and good financial accounting with limited resources.

Data

Data collection and reporting is not always adequate and consistent. Different government departments do not have a unified manner of reporting. For instance Treasury and DoE provide contrasting numbers in terms of the number of beneficiaries accessing FBE. It is clear that the major issue is the discrepancies listed in terms of numbers of indigent households, electrified households and numbers of households receiving FBE. This highlights the difficulties municipalities face in identifying and better assisting the indigent households. Without consistent, accurate and clear data we do not have an adequate picture of the problem and this in turn impacts and informs planning and investment decisions. It is therefore unclear to what extent the country is faced with energy poverty challenges.

Recommendations

Implementation of different solutions to addressing the energy welfare of the urban sector shows that a multi-pronged approach is necessary.

- The development of an integrated energy poverty policy/framework for the country that also considers the institutional coordination of the spheres of government.
- Round table meetings with key players from national and local departments to thoroughly engage with the lack of integration, alignment and coordination in an attempt to redress this problem.
- Consultative engagements with targeted recipients would be useful in informing and guiding a more effective approach to energy service delivery.
- An awareness campaign for households that could assist in highlighting the development plans (eg housing, electrification) in different areas. Households would benefit greatly by receiving information about new developments on the energy front, such as LPG use over

electricity for cooking and LED lights etc. Since households will continue to use paraffin and other inferior and polluting fuels in the long term, greater emphasis should be placed on maintaining an ongoing safety awareness campaign, such as the use of SABS approved safe stoves etc.

- To undertake further in depth research on the specific barriers identified in this report including:
 - a detailed review of the data constraints
 - the plight of the backyard dweller
 - A dedicated and coordinated effort on upgrading informal settlements is urgent. Informal settlements should not be perceived as a problem but should rather be leveraged as an opportunity to empower households and redesign cities. In-situ upgrading of informal settlements should be prioritised.
 - Energy price reviews are urgently required to ensure that poor households do not get further entrapped in energy poverty. To this end it is critical that residential energy pricing models and tariff structures be reviewed
 - The measure of energy poverty using the different approaches such as the expenditure approach and thermal efficiency approach outlined earlier in the report, provide differing results in the overall incidence of energy poverty and who is energy poor, It is therefore important that the DoE carefully examine and decide upon an official definition of energy poverty for the country given the significant policy implications this would have from a poverty, health and well being and environmental perspective.
- While government has put in place energy subsidisation policies to relieve the energy burden of the poor in the form of FBE, FBAE and IBT, it is argued that the broader socio-economic benefits of electrification and other energy relief initiatives are still not being felt, as poor households continue to struggle to meet basic household energy needs with the amounts subsidised by government. Consideration needs to be given to these issues and a suggestion could be targeted interventions to municipalities with low or no revenue where a large proportion of households are poor. One such intervention could be an increase of the fiscal allocation to these types of municipalities. A fiscal increase could be in the form of a conditional grant, thus restricting the allocation of FBE and FBAE to exclusively poor households.
- Alternative energy needs should be included in the mandate of a specific department in the municipality, most likely the electricity department, which could become an 'energy and electricity' department. This change of scope has been successfully implemented in a few municipalities in South Africa already, such as Tshwane, Mangaung, Sol Plaatje and Nelson Mandela Bay Metro. In terms of coordinating local government efforts, this could be synchronized from a coordination office within local government or by ensuring better intergovernmental communication through a suitably constituted forum.

What this small piece of work has shown is that since 1994, the government has made enormous inroads into dealing with the challenges of urban energy poverty. Yet as has been outlined there remain many problems and whilst we have detailed some possible recommendations for a way forward, it is acknowledged that a systematic and comprehensive outlook will assist in bringing the kinds of transformation and development that the country is working towards.

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Appendix 1

Principles that guide implementation of indigent policies in South Africa:

(Source: *Guidelines for the implementation of Municipal Indigent Policies, DPLG 2005*)

- Everyone has inherent dignity and the right to have their dignity respected and protected. All process that involves the provision of services to citizens must be done in such a manner as to respect the entrenched rights and dignity of those citizens.
- Municipalities must provide basic services to its indigent in a sustainable manner. It is not expected that a municipality will provide FBS beyond its financial and other capacities.
- Indigents must be afforded access to more than just the FBS package. It is widely acknowledged that the FBS package on its own will not see indigent communities' standards of living improve. It is imperative that linkages be made between the FBS package and the broader package of social services (the social package is explained later in this document in section 2.9).
- In providing FBS to indigents, municipalities must provide these services at the recognised and approved minimum basic levels. Municipalities are not dissuaded from providing a higher level of a service if they can afford to do so, and can sustain this higher level.
- FBS is targeted at the indigent. Therefore a municipality can use any approach it chooses to provide FBS as long as it can ensure and demonstrate that the indigent are benefiting from FBS. This guideline discusses a management process that supports a means testing process.
- The municipal indigent policy is not a stand-alone policy which is independent from municipalities IDP's, its debt and credit control procedures, its municipal by laws etc. Municipalities' indigent policies need to be developed to integrate with these strategic management plans and procedures so as to ensure that the municipalities will be able to sustain their FBS programme.
- Municipalities need to start planning realistic exit strategies for their indigent populations to exit from the indigent registers and subsidies. This will entail that the living circumstance of the indigent has improved significantly so that the indigent can afford to pay for their service. What this implies is that municipalities should integrate their FBS delivery with structured poverty alleviation programmes.
- Due to the varying circumstance and conditions within municipalities it is recognised that municipalities should exercise their right to apply the national indigent framework and these guidelines according to their own circumstances.

Appendix 2

Key elements of the new Household Electrification Strategy being developed by the Department of Energy in an effort to increase efficiency in planning and the delivery process in reaching universal access to electricity by 2025:

1. Re-setting universal access date to 2025 and defining universal access as 97% - full electrification is not possible due to growth and delays in the process of formalizing informal settlements.
2. Electrify about 3 million formal households via grid (90% of backlogs) and about 300,000 households with high-quality non-grid solar home systems to address current backlogs.
3. Increased efficiency in planning and the delivery process will require Master Plan to ensure
4. More connections and to be in line with Presidential Infrastructure Coordinating Commission and Strategic Integrated Projects programmes.
5. Current financial year will improve efficiency, especially with respect to municipality's delivery (in 2012 electricity connections increased by about 20 000), as well as to prepare the electricity industry for the increased connection rate.
6. Additional funding will be required if universal access is to be reached by 2025. An additional R0.5 billion annually (nominal 2012 figure) top-up of existing allocations will be required from 2014/15 onwards.
7. Eskom's to lead the development of the Master Plan.
8. Municipalities to improve delivery and management of projects.

(Source : Presentation by the Department of Energy on the Integrated National Electrification Programme made to the Parliamentary Portfolio Committee on Energy – 20 June 2013)

Appendix 3

Box 1. A range of South African poverty lines at 2008 Rand and PPP Dollar Values

In reviewing the poverty literature, one is confronted by a bewildering array of poverty lines. For orientation, the table below introduces a range of per capita monthly poverty lines at their 2008 South African values. It also records them at their purchasing power parity dollar values using a parity exchange rate of 4.25 rands to the dollar. The year is selected because all of the poverty analysis in chapter 2 is undertaken using poverty lines calculated at real 2008 values. The two major poverty lines that are used in the analysis of chapter 2 are two absolute poverty lines called South African Upper and Lower in the table. Then a range of dollar a day lines are presented at their rand per capita per month values. Finally, two median related relative poverty lines that are in common usage in the OECD literature (OECD, 2008) are presented. It is noteworthy that due to the skewed distribution of income, these median lines are lower than the \$2/day line.

A range of South African monthly poverty lines at 2008 Rand and PPP Dollar values

Poverty Line	2008 Rand Values	2008 Purchasing Power Parity Dollar Values
South African Upper	949	223
South African Lower	515	121
\$1/day	130	31
\$1.25/day	163	38
\$2/day	260	62
\$2.5/day	325	76
50% Median per capita income	233	55
40% Median per capita income	154	36

Source: Own calculations on 2008 National Income Dynamics Survey

Source: Leibbrandt et al. 2010. *Trends in South African Income Distribution and Poverty since the Fall of Apartheid*.