

# HOUSEHOLD EXPENDITURE AFFORDABILITY THRESHOLDS FOR HOUSING, WATER, ENERGY AND TRANSPORT IN SOUTH AFRICAN HUMAN SETTLEMENTS

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## Abstract

Human settlements and housing are a part of people's material living conditions and contribute directly to their life choices. Human settlements that are poorly located, constructed and serviced force households to spend a larger proportion of their income on transport, energy and water. This leaves less for food, education and health, seeking employment, starting a business or saving for a pension or a house. In poor families, this reduces access to education opportunities, increases susceptibility to ill health and disease and makes it more difficult to escape the cycle of poverty. Therefore a sustainability indicator of human settlements and housing is the amount or proportion of household expenditure on transport, water and energy. The paper carries out a literature review to understand patterns of household income and expenditure. Household expenditure indicators and benchmarks are reviewed to propose benchmarks for sustainable housing and settlements. These are critically reviewed in relation to South African human settlement data to establish their relevance and applicability. Results are discussed to ascertain implications for human settlement and housing policy and recommendations for further research developed.

**Keywords:** *Sustainability, affordability, household income, household expenditure, transport, energy, water*

## **1 Introduction**

Households in the Northern Cape of South Africa spend 24,5% of their incomes on transport and 20,5% on housing, water and energy in 2015 (Statistics South Africa), 2015). This indicates that almost half (44.5%) of household incomes are spent on transport, housing and energy. This leaves about 55% for all other household expenses, such as food, water, education, health, clothing, furniture. Is this proportion sufficient to maintain a reasonable quality of life and adequate health and wellbeing standards? If this amount is too high and leads to unacceptably low standards of health and wellbeing, can guidance be developed on what should be the maximum amount or proportion of income expended on transport, housing and energy? This paper attempts to address these issues by addressing the following research questions:

- What are the characteristics of household income and expenditure patterns in South Africa?
- Can benchmarks be developed that indicate maximum levels of sustainable expenditure on transport, housing and energy?
- Can these benchmarks be applied to evaluate South African human settlements and housing?
- Are there implications from household income and expenditure patterns for the planning and design of human settlements and housing?

## **2 Methodology**

A literature review and analysis is undertaken to address the research questions and the methodology applies is as follows. Firstly, a literature review is undertaken to understand the current human settlement and housing situation in South Africa. This focusses on quality of life and income and expenditure patterns. Secondly, a review of indicators and benchmarks applied to household expenditure is undertaken to determine indicators of sustainable expenditure on transport, housing and energy. These indicators are formulated in a simple framework. Thirdly, the framework is applied to selected areas in South Africa. Fourthly, the results of this application are analysed and discussed. Fifthly, conclusions and recommendations are developed.

## **3 South African Human Settlements**

Human settlements are defined as the social, material, organisational, spiritual and cultural elements that sustain a community (Department of Human Settlements Republic of South Africa, 2015). Material elements of human settlements include housing, water, food, energy, transport, education and the internet.

In South Africa, about 80% of the population live in formal housing. However, a large proportion of the population also lives in informal dwellings (13.9%) and traditional dwellings (5.9%). In some provinces like the Northern Cape (20.8%) North West Province (20.8%) and Gauteng (19.8%) about 1 in 5 people live in informal dwellings (Statistics South Africa, 2017).

Tap water is available in most households in South Africa. Areas such as the Western Cape (98.7%), and Gauteng (97.5%) have very high levels of supply but this is less available in provinces such as Limpopo (75.1%) and the Eastern Cape (75.7%). However, water supplies are not always reliable and more than one quarter (27.8%) of households reported a dysfunctional service in 2016 (Statistics South Africa, 2017). This was particularly high in some provinces with 68.1% of households in Limpopo and 58% of households in Mpumalanga reporting supply interruptions of more than 2 days. During these interruptions, households have to fetch water or pay for this to be transported from neighbouring areas (Statistics South Africa, 2017).

Household food insecurity is measured in terms of whether there is inadequate or severely inadequate access to food. In 2016, this was the case in 33.6% of households in the Northern Cape and was also high in Mpumalanga (31.1%) and the Eastern Cape (26.4%).

The percentage of households in South Africa that have mains electricity has increased steadily and was at 84.2% in 2016. Connections are high in Limpopo (94.1%) and the Northern Cape (98.8%) but much lower in Gauteng (80.6%) and North West (81%). The lower proportions of households with connections in Gauteng and North West is attributed to rapid in-migration (Statistics South Africa, 2017).

In most South African households children (66.3%) walk to school. Others (9.6%) travel by car or use taxis (7.1%). The most commonly used means of employees getting to work is by private car (33.4%), following by taxis (20.7%). About 11.1% of the working population work from home so did not need transport (Statistics South Africa, 2017).

Finances affect access to education and 18.7% of South Africa learners reported that they left school prematurely because of 'a lack of money', while 18.9% reportedly fell out due to poor academic performance (Statistics South Africa, 2017). This is despite rapid increases in the number of schools where no tuition fees were charged. For instance, in 2002, only 0.4% of schools in South Africa did not charge fees, but by 2015, this had increased to 65.4%. In the Eastern Cape, 86.2% of schools did

not charge fees and in Limpopo, this was 73.4% compared to 39.3% in Western Cape and 37.4% in Gauteng (Statistics South Africa, 2017).

About 60% of South African households have at least one member who has access to the Internet either at home, work, place of study or an internet café. However, only about 10% of South African households have internet access at home. This is highest in Western Cape (23.6%) and Gauteng (14.8%) and lowest in Limpopo (1.6% and North West Province (3.5%) (Statistics South Africa, 2017).

### **3.1 Income, expenditure and affordability**

Access to elements such as housing, electricity and food not only depend on local availability but also on income, expenditure and affordability. Household spending is the amount of expenditure made by resident households to meet their everyday needs, such as food, clothing, housing (rent), energy, transport, durable goods, health costs, leisure, and miscellaneous services.

The results of the Living Conditions Survey 2014/2015 show that the total annual household consumption expenditure in South Africa between October 2014 and October 2015 is estimated at R1,72 trillion. The majority of this expenditure was urban formal areas at 82.2%, followed by traditional areas at 11.2%, then urban informal areas at 3.7% and lastly rural formal areas at 3.0%. The average South African household spent approximately R103,293 during 2017. Of this amount housing, water, electricity, gas and other fuels take up the largest proportion at 32,6% of total household expenditure. This is followed by transport at 16.3%, miscellaneous goods and services at 14.7% and food at 12.9% (Statistics South Africa, 2015).

Social grants have increased rapidly over time and represent the main income for many households. The percentage of individuals receiving social grants from the government was 12.7% in 2003. This increased to 29.7% by 2016. At the same time, the number of households that received at least one social grant increased from 29.9% to 44.8% in 2016. More than half the households in Northern Cape (58.8%), Eastern Cape (58.5%), Limpopo (57%), Free State (52.3%) and KwaZulu-Natal (50.4%) received at least one grant compared to Gauteng (30.9%) and Western Cape (38.3%) (Statistics South Africa, 2017).

Affordability refers to the ability to pay for a service or product. Sustainable human settlement definitions therefore need to make reference not only to the availability of a service, but also to its affordability. For instance, this definition refers to location, access, security and access:

*Sustainable human settlements and improved quality of household life are defined by:*

- *access to adequate accommodation that is suitable, relevant, appropriately located, affordable and fiscally sustainable;*
- *access to basic services such as water, sanitation, refuse removal and electricity;*
- *security of tenure irrespective of ownership or rental, formal or informal structures;*
- *access to social services and economic opportunities within a reasonable distance* (Government of South Africa, 2019).

Similarly, definitions by the United Nations of adequate housing confirm the importance of availability, security, habitability, accessibility and affordability:

- *Security of tenure: housing is not adequate if its occupants do not have a degree of tenure security, which guarantees legal protection against forced evictions, harassment and other threats.*
- *Availability of services, materials, facilities and infrastructure: housing is not adequate if its occupants do not have safe drinking water, adequate sanitation, energy for cooking, heating, lighting, food storage or refuse disposal.*
- *Affordability: housing is not adequate if its cost threatens or compromises the occupants' enjoyment of other human rights.*
- *Habitability: housing is not adequate if it does not guarantee physical safety or provide adequate space, as well as protection against the cold, damp, heat, rain, wind, other threats to health and structural hazards.*
- *Accessibility: housing is not adequate if the specific needs of disadvantaged and marginalized groups are not taken into account.*
- *Location: housing is not adequate if it is cut off from employment opportunities, health-care services, schools, childcare centres and other social facilities, or if located in polluted or dangerous areas.* OHCHR (2019).

These national and international definitions indicate that the affordability of housing and basic services are a key requirement for human settlements to be considered 'sustainable' and for housing to be deemed 'adequate'.

#### 4 Housing, Water, Energy and Transport Affordability

Housing affordability describes the challenges that households face in balancing costs related to housing and services with income (Stone, 2006). Fankhauser and Tepic (2007) define affordability in terms of the proportion of monthly expenditure of the total household expenditure allocated to housing and service costs. A review of the literature indicates that the proportion of household income spent is widely applied. While this indicator is referred to a range of ways, such as a price-to-income ratio, an outlay in per cent of total household income/expenditure and a burden thresholds, it essentially is the percentage a household pays for housing or a related services (Suhaida *et al.*, 2011; Klugman, 2002; Fankhauser and Tepic, 2007).

Thresholds for housing affordability appear to be similar internationally and tend to be 30 to 33% of household incomes (Suhaida *et al.* 2011). Kutty (2005) notes however that in the US, affordability thresholds vary from 20 to 50% of a household's income. Thresholds for water, sanitation service vary considerably across countries. In general, however, this falls in a band between 2% and 6% (Hutton, 2012).

Work by Briceño-Garmendia and Shkaratan (2011) suggest that electricity expenditure threshold should be 3% of household expenditure. Recent guidance in the US is double this and regards 6% of household income as an affordability threshold for energy (New York State, 2019).

Thresholds for transport expenditure vary widely between countries. South Africa's White Paper on National Transport Policy indicates that expenditure on travel should not exceed 10% of the household disposable income (Venter, 2011). Australian policy indicates that a value of 20% of household income expenditure should be regarded as a threshold. Studies by the World Bank indicates that transport costs of over 30% of income would be regarded as unaffordable for poor households (Carruthers, *et al.*, 2005). These thresholds are summarised in table 1.

Area	Affordability thresholds	Source
Housing	33%	Suhaida <i>et al.</i> , 2011
	30%	Saberi <i>et al.</i> , 2017
	25 - 50%	Kutty, 2005
	33%	Selected threshold
Water	2 - 6%	Hutton, 2012
	5%	Klugman, 2002
	5%	Fankhauser and Tepic, 2007
	3%	Priestly and Rutherford, 2016
	2 - 6%	Selected threshold

Energy	3%	Briceño-Garmendia and Shkaratan, 2011
	10%	Fankhauser and Tepic, 2007
	6%	New York State, 2019
	6%	ACEE, 2019
	3%	Selected threshold
Transport	10%	Venter, 2011
	20%	Victoria Transport Policy Institute, 2016
	30%	Carruthers, <i>et al.</i> , 2005
	20%	Selected threshold

Table 1. Affordability thresholds

## 5 Household Expenditure on Housing, Water, Energy and Transport in South Africa

The most recent household Living Condition Survey can be used to analyse household expenditure on housing, water, energy and transport in South Africa (Statistics South Africa, 2017a). This is presented in table 2, which shows expenditure in these areas relative to the selected affordability thresholds.

Affordability thresholds (% of household income)		Western Cape	Eastern Cape	Northern Cape	Free State	Kwa-Zulu Natal	North West	Gauteng	Mpumalanga	Limpopo
Housing	33	34.25	28.79	24.52	22.42	29.91	25.23	36.71	27.13	31.23
Water	2-6									
Energy	3									
Transport	10	14.73	17.91	20.46	15.54	16.91	18.10	15.53	19.81	16.45
<b>Total</b>	<b>49 - 52</b>	<b>48.98</b>	<b>46.7</b>	<b>44.98</b>	<b>37.96</b>	<b>46.82</b>	<b>43.33</b>	<b>52.24</b>	<b>46.94</b>	<b>47.68</b>

Table 2. Percentage of household expenditure for housing, water, energy and transport in South Africa's provinces compared to affordability thresholds.

The Living Condition Survey also provides cost data per income decile of the population. Table 3 shows this for the lowest, middle and upper deciles (Statistics South Africa, 2017a).

Affordability thresholds (% of household income)		Lowest decile	Middle decile	Upper decile
Housing	33	29.0	24.8	35.6
Water	2-6			
Energy	3			
Transport	10	11.8	11.1	19.6
<b>Total</b>	<b>49 - 52</b>	<b>40.8</b>	<b>45.9</b>	<b>55.2</b>

*Table 3. Percentage of household expenditure for housing, water, energy and transport for South Africa's lowest, middle, and upper income deciles of the population to affordability thresholds.*

The data in Table 2 shows that household expenditure in South African provinces on housing, water and energy were below affordability thresholds. In the case of Free State and the Northern Cape, the average expenditure was substantially lower than the thresholds. In all cases, transport expenditure exceeded the transport affordability threshold. In some cases, such as Northern Cape (20.46%) and Mpumalanga (19.81%) expenditure is about double the affordability threshold.

The data in Table 3 shows that expenditure on housing, water and energy in the lowest income decile was less than the affordability threshold and was only slightly above the transport threshold of 10%. At 24.8%, expenditure by middle decile on housing, water and energy was substantially below affordability thresholds, with expenditure on transport at 11.1% being only slightly higher than the thresholds. Expenditure on housing, water and energy in the upper decile was slightly lower than the affordability threshold, while expenditure on transport at 19.6% was almost double the affordability threshold.

## **6 Discussion**

In discussing the results, it is useful to compare results from South Africa with other countries. An analysis of household expenditure patterns the US over the period 1996 to 2014 shows that housing costs were generally about 20% of household income for most of that period but increased to about 25% by 2014 (Pew Charitable Trust, 2016). Food makes up the next highest expenditure at about 12%, followed by transportation (7%) and pets, toys and entertainment and health (both about 3%). The US study shows distinct differences between income groups, with lower-income households spending far more on housing as a share of income (40%) than those in the middle (25 per cent) or at



the top (17 per cent) income brackets. It also shows that lower-income households were spending (16%) of their income on transport in 2014, up from 9 per cent four years earlier and proportionally more than the middle (11%) and top (8%) income brackets. An analysis of the slack in household budgets (the amount available for wealth-building investments, such as short and long-term savings, education, and life insurance) showed that low income households in 2004 had about \$1,500 left over (slack) and that this had become negative (-\$2,300) by 2014, a \$3,800 decline. At the same time wealthier households had significantly increased the slack in households budgets (Pew Charitable Trust, 2016).

South African patterns differ considerably to US patterns with low-income households expenditure being aligned or under the affordability threshold and high-income households expenditure being the same or considerably higher than affordability thresholds, as shown in figure 3. This, however, is not the case for food, where households in the lower deciles spend close to 40% of their total expenditure on food. This proportion decreases markedly with increased wealth and households in upper deciles spend about 8% of their income on food. The much lower proportion spent on food in wealthier households may be attributed to the relatively higher expenditure these households have on housing and transport, which pushes down their proportion on food (Statistics South Africa, 2017a).

A review of the source and amount of incomes of the different deciles may also help explain differences in relation to affordability thresholds. About 60% of incomes of households in the lowest deciles come from government grants. Per capita incomes in this decile are under R6,485/annum (Statistics South Africa, 2017a). Households in the upper deciles receive less than 10% of their income from government grants and per capita incomes are much higher at over R71,479/annum (Statistics South Africa, 2017a). High reliance on government grants and high levels of unemployment in the lower decile households may, therefore, explain the reduced proportion of household expenditure on transport. The higher proportions of expenditure on transport for households in the higher deciles may be explained by households having purchased one or more cars and using this for commuting as well as for transporting children to school.

The relatively lower proportion of expenditure on water, energy by low-income households may be also explained by the Free Basic Municipal Services policy. This policy requires the government to provide services at no charge to poor households. Municipalities apply a means test to ascertain whether households are eligible for indigent status. If households meet the criteria they become eligible for free or highly subsidised water, electricity, sewage and sanitation. This includes a free

basic water provision of 6kl of water per household, free electricity up to 50kWh per month and free sewerage and solid waste management, as shown in figure 1 (COGTA, 2019).

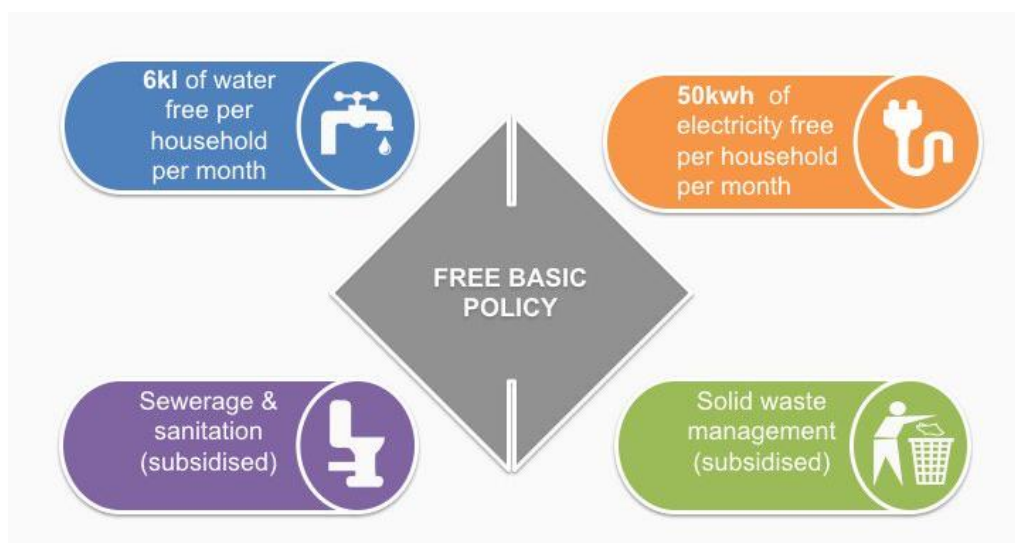


Figure 1. Free Basic Services Policy (COGTA, 2019).

A number of criticisms can be made of the affordability threshold indicator applied in the studies and guidance reviewed in this paper. The review indicates that very low-income households, such as those largely funded by government grants, most income (40%) is spent on food (Statistics South Africa, 2017a). Studies by the Pietermaritzburg Economic Justice and Dignity (2018) indicate that the cost of a household food basket in 2018 for 7 people was about R3,000 per month. This means there is very little left over for housing-related items. In these cases, 30, 20 or even 10 % of household expenditure on housing may be too high, as the costs of non-housing items, such as food may take up all of the available income (Stone, 2006). The % threshold indicator, therefore, assumes a certain level of basic income that may not exist in South Africa. To address this Stone (1990, 1993), suggests that housing-related costs or affordability thresholds should be calculated by taking household incomes and subtracting the costs of a 'minimum adequate level of non-housing consumption'. Thus the affordability threshold would be based on the amount left over after adequate costs for items such as food, education, clothing and health have been allowed for. This model is sometimes referred to as the residual-income approach.

Stone (1990, 1993) argues that housing costs lead to shelter poverty when households cannot afford non-housing necessities. In the South African situation, housing costs may result in shelter poverty in some cases, for instance, in urban areas where rentals are relatively high. However, a more acute problem may be that incomes are so low that poor households have difficulty meeting all of their costs (not just housing-related costs). In this situation, it may be more important to focus on increasing

incomes for families. This can be achieved through increasing grants, better access to employment and self-employment opportunities and enhanced access to education and training opportunities (Stone, 1990, 1993). At the same, it is important that housing-related costs such as housing, water, electricity remain free (as is the situation with free basic services policy) or are as affordable as possible. This may combine to enable some residual income to be retained which can be used to improve education, health and access to job opportunities and thus enhance the potential for households to escape poverty (Kutty, 2005).

## **7 Conclusion and Further Research**

The review of the literature indicates that the affordability of housing-related costs is often measured as a proportion of household income. This indicator is also referred to as a price-to-income ratio, an outlay in per cent of total household income/expenditure and a burden threshold.

The application of this indicator to South African provincial housing data shows that households are on, or near the affordability thresholds. Applying the indicator to income deciles indicates that lower decile households are under the thresholds, while higher-income households are significantly over the thresholds. This may be attributed to a number of factors. Firstly, free basic services and lower-cost housing (in the form of informal dwellings and RDP housing) may serve to reduce housing-related costs for poor households. Secondly, limited incomes of poor families may be largely expended on necessities such as food (40% of income) leaving very little for housing-related costs. Thirdly, wealthier families may live in suburban housing which requires significant expenditure on transport, water and energy to maintain. Spatial patterns and personal choice, therefore, may explain the relatively larger proportion of income spent on housing, water, electricity and transport by wealthier households.

The study indicates that there are several problems with using the proportion of household income expended on housing-related costs as an indicator of affordability. In particular, it appears to be a poor indicator for poor families in South Africa where housing and basic services such as water and electricity are subsidised and where incomes are very low. Instead, the concept of residual income or the amount of household income left over after adequate costs for items such as food, education, clothing and health have been allocated, appears to be a better one as it reinforces a conceptual approach that aims to enhance the potential for households to escape poverty. The study provides a number of useful preliminary findings and proposals which have implications for human settlement design and assessment. It is recommended that further studies be undertaken to build on this initial work.

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