



# Baseline Study of Urban Sustainability in the East African Community

January 2018



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Report prepared on behalf of the United Nations Industrial Development Organization (UNIDO) by:

Dima Reda, Nataij LLC

Faris Sayegh, Nataij LLC

Andy Bilich, Nataij LLC

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## Executive Summary

In collaboration with the East African Community (EAC), UNIDO is preparing a concept for a sustainable cities project to tackle pressing environmental issues confronting urban areas in Burundi, Kenya, Rwanda, Tanzania, Uganda, and South-Sudan. The concept will incorporate climate change mitigation and adaptation perspectives into an integrated, resilient, low impact, low carbon, and environmentally-friendly approach to urban planning, management, and institutional support in the East African region.

The purpose of this current study is to develop a baseline for urban development, and particularly urban sustainability, in six countries – Burundi, Kenya, Rwanda, South Sudan, Tanzania, and Uganda – which together form the regional intergovernmental organization known as the East African Community (EAC). The hope is that this baseline can help better inform, target, and tailor both future and current urban development projects and programs in the EAC region. To that end, the report provides an inventory of ongoing and planned initiatives of sustainable city development across the six countries, reflects the current condition of investment and resources in various urban sectors, develops selection criteria and recommendations for potential pilot cities, and lays out a set of indicators for measuring progress.

### Chapter 1: Key Challenges and Baseline for Urban Development

The UN World Urbanization Prospects projects that the total population in EAC countries will grow from an estimated 111 million people in 2000 to over 407 million people by 2050 (an average growth rate of 4.5% per year). The urban population is likewise expected to grow from about 20 million people (17.7% of the total) to well over 173 million (more than 42.5% of the total).

COUNTRY	POPULATION	2000	2010	2020	2030	2040	2050
BURUNDI	Total Population (in thousands)	6 674	9 233	12 579	16 392	21 082	26 691
	Urban Population (in thousands)	550	982	1 715	2 829	4 524	7 025
	Urban (%)	8.2	10.6	13.6	17.3	21.5	26.3
KENYA	Total Population (in thousands)	31 285	40 909	52 906	66 306	81 354	97 173
	Urban Pop (in thousands)	6 223	9 643	14 738	21 767	31 091	42 636
	Urban (%)	19.9	23.6	27.9	32.8	38.2	43.9
RWANDA	Total Population (in thousands)	8 396	10 837	14 123	17 771	21 601	25 378
	Urban Population (in thousands)	1 253	2 596	4 736	7 383	10 186	13 349
	Urban (%)	14.9	24.0	33.5	41.5	47.2	52.6
SOUTH SUDAN	Total Population (in thousands)	6 653	9 941	13 853	17 297	20 940	24 760
	Urban Population (in thousands)	1 098	1 775	2 779	4 083	5 960	8 403
	Urban (%)	16.5	17.9	20.1	23.6	28.5	33.9

TANZANIA	Total Population (in thousands)	34 021	44 973	60 385	79 354	102 686	129 417
	Urban Population (in thousands)	7 590	12 644	21 218	33 257	48 986	68 569
	Urban (%)	22.3	28.1	35.1	41.9	47.7	53.0
UGANDA	Total Population (in thousands)	24 276	33 987	47 088	63 388	82 659	104 078
	Urban Population (in thousands)	2 933	4 925	8 423	13 952	22 116	33 367
	Urban (%)	12.1	14.5	17.9	22.0	26.8	32.1
TOTAL EAC	Total Population (in thousands)	111 304	149 880	200 934	260 509	330 321	407 496
	Urban Population (in thousands)	19 647	32 565	53 608	83 271	122 863	173 349
	Urban (%)	17.7	21.7	26.7	32.0	37.2	42.5

Country	Industry Value Added to GDP (2016) <sup>1</sup>	Urban Pop – Access to Electricity (2014) <sup>2</sup>	Total Pop – Access to Clean Fuels & Tech for Cooking (2014) <sup>3</sup>	Urban Pop – at least Basic Drinking Water (2015) <sup>4</sup>	Urban Pop – at least Basic Sanitation (2015) <sup>5</sup>	Length of Paved Road Network (km)	Solid Waste (kg/capita/day) <sup>6</sup>
Burundi	16.5%	52.1%	2.1%	88%	46%	1,438 (2011) <sup>7</sup>	0.55
Kenya	19%	68.4%	6.2%	83%	35%	13,900 (2015) <sup>8</sup>	0.3
Rwanda	17.6%	71.8%	2.0%	76%	57%	1,331 (2015) <sup>9</sup>	0.52
South Sudan	-	8.4%	3.1%	59%	27%	-	-
Tanzania	27.2%	41.2%	2.0%	79%	37%	9,989 (2015) <sup>10</sup>	0.26
Uganda	19.7%	51.4%	2.0%	72%	28%	3,919 (2015) <sup>11</sup>	0.34

EAC countries face a variety of sustainability challenges. In many respects, sectors like industrialization, transportation, solid waste, water, sanitation, and energy have not kept pace with the region's rapid population growth and urbanization. Some of these challenges are unique to the individual countries, but others are common across the EAC. A review of national strategic plans revealed four key urban sustainability challenges shared by all six EAC countries. These challenges were also reflected in the baseline data for the countries. The challenges are:

<sup>1</sup> (World Bank, 2017)

<sup>2</sup> (World Bank, 2017)

<sup>3</sup> (World Bank, 2017)

<sup>4</sup> (WHO/UNICEF, 2017)

<sup>5</sup> (WHO/UNICEF, 2017)

<sup>6</sup> (World Bank Group, 2012)

<sup>7</sup> (East African Community, 2016)

<sup>8</sup> (East African Community, 2016)

<sup>9</sup> (National Institute of Statistics of Rwanda, 2016)

<sup>10</sup> (East African Community, 2016)

<sup>11</sup> (East African Community, 2016)

1. **Diversification of the Economy:** All six countries highlighted the need to diversify the economy and, particularly, the need to build out the private sector in secondary and tertiary sectors, such as manufacturing and processing
2. **Constraints of Underdeveloped Transportation Infrastructure:** Transportation networks, particularly between major markets and urban areas, are constraining economic development and limiting the potential for competitive industries in the six EAC countries
3. **High Cost of Doing Business:** A significant barrier to diversifying the economy and developing industries and infrastructure is the high cost of doing business in these countries (energy/electricity costs, transportation, laws/governance, raw materials, etc.)
4. **Infrastructure/Technology for Basic Services:** Infrastructure/technology for basic services like electricity, clean cooking and lighting, water/sanitation, and solid waste are inadequate, particularly in informal settlements

## Chapter 2: Pilot City Selection Criteria and Recommendations

Due to a combination of population growth, economic development, government resource and capacity constraints, lack of data, relatively new strategic planning for urbanization, and national priorities, many of the EAC countries have primarily focused their urban development efforts on capital cities and other primary cities with large population and economic bases. Therefore, to provide a starting point for future projects that is aligned with national priorities, pilot city selection in this baseline study was based on population and strategic status. With that in mind, the selection of initial cities in each EAC country was based on the three most populous cities over 100,000 people with an emphasis on capital cities. The 14 cities selected were as follows:

City	Country	Population
Bujumbura	Burundi	497,166
Nairobi	Kenya	3,109,861
Mombasa	Kenya	925,137
Kisumu	Kenya	383,444
Kigali	Rwanda	1,132,686
Juba	South Sudan	230,195
Wau	South Sudan	118,331
Malakal	South Sudan	114,528
Dar es Salaam	Tanzania	4,364,541
Arusha	Tanzania	416,442
Dodoma	Tanzania	410,956
Kampala	Uganda	1,507,114
Nansana	Uganda	365,857
Kira	Uganda	317,428

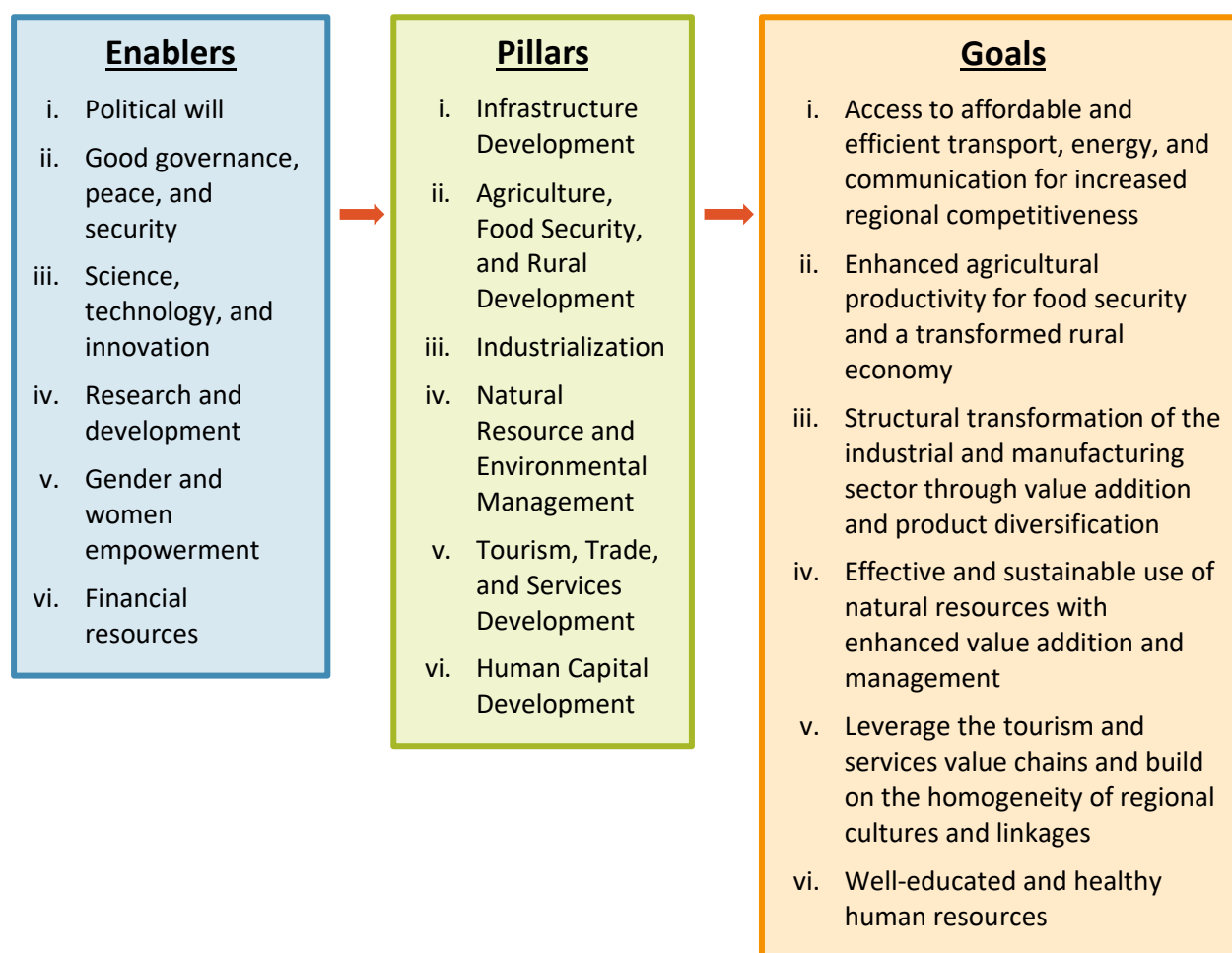
To better select cities and projects in the future, additional more targeted criteria can be explored provided some of the constraints listed above, particularly the lack of data at the city level, are addressed. Some of these potential programmatic criteria are: economic diversification, transportation capacity, climate change mitigation, urban water system sustainability, industrial/commercial activity, energy, waste management, institutional, financial, legislation, partnership approaches, planning and management capacities.

Future selection should also be based to some extent on what initiatives, projects, and programs are ongoing, planned, and completed in specific cities and in the country more broadly. Even though the

selection in this current study was primarily accomplished through population criteria as described above, there is still a need to consult with the respective governments to identify and explore initiatives in the shortlisted cities and at the national level to more effectively target and design pilot projects in urban sustainability. To that end, ongoing and planned initiatives related to the urban sectors presented in Chapter 1 (urbanization, industrialization, transport, solid waste, energy, and water/sanitation) are documented in the accompanying excel document (**EAC Initiatives, Stakeholders, and Policies in Urban Sustainability**).

### Chapter 3: Sustainable City Development in 2050

In 2016, the EAC developed the EAC Vision 2050, which laid out the community's overall development and strategic agenda out to 2050. As part of this, the Vision identifies key development concerns, outlines development goals, and provides a framework to achieve them.



The Vision lays out a strategy and goals for the entire region however many of the underlying enablers, pillars, and goals can be applied at the city-scale as well. At the city-level, to develop a model for urban sustainability the challenges identified for the six EAC countries can be combined with the goals and aspirations laid out for the region to encompass four main overlapping areas for achieving urban sustainability: (i) social development; (ii) economic development; (iii) environmental management; and (iv) effective governance.



The road towards building sustainable cities in EAC will necessitate investment in developing a strong enabling environment. There are several steps that need to be taken for creating a strong enabling environment for urban sustainability. The four main elements needed are:

- (1) Strong planning (steps 1 & 3);
- (2) Proactive policy, regulatory frameworks (steps 2 & 5);
- (3) Capacity development (step 4); and
- (4) Adequate financing to implement the plans, policies, and regulations (step 6).

While each step is given a number, these are not necessarily sequential steps and can be undertaken in parallel or at different times. The steps are also not exhaustive and depending on the city may or may not be applicable. They are however aligned with the goal of enabling investment in both infrastructure and urban resilience. Taken together the six steps/areas outlined below form the basis of creating a strong enabling environment.

### 1) Step 1: Sustainable city strategy integrated into long-term national development strategy

Urban development strategies need to be developed and integrated into the long-term national development strategy of a country and decided on and implemented coherently with the participation of local actors. To do this reliable data identifying and tracking key constraints, demographic shifts, and economic geography should be collected and developed into a widely available resource for all stakeholders

### 2) Step 2: Clarify Land Rights (Land Reform)

Urban land is the primary building block of cities. In the case of cities, the current mismatch between land and fiscal systems prevents governments, especially local governments, from undertaking the large-scale investments needed to shift urban development trajectories. The lack of transparency over urban land markets impedes effective and sustainable

personal and corporate investment, creates opportunities for political power bases to flourish outside of democratic structures, and makes land-based climate mitigation and adaptation measures difficult to enforce. In most countries, urban land reform should thus be a priority in the context of national urban strategies.

### 3) Step 3: National Infrastructure Investment Strategies (NITS)

Access to affordable energy, sanitation, solid waste, transport and health care services provide the means by which urban citizens become more productive. National Infrastructure Investment Strategies (NITS) are multi-sectoral policies that aim to address the needs for physical infrastructure to provide basic services and craft of adequate institutional frameworks to support the development.

### 4) Step 4: Build Public-sector Capacity

Effective multi-level governance requires new sets of skills, managerial approaches and institutional culture across all levels and dimensions of the public sector that implement or contribute to urban policies, but many governments lack the appropriate capacity. Filling this gap requires systematic capacity-building programs.

### 5) Step 5: Structural Transformation

Policy makers can integrate structural transformation across a number of urban activities that can eventually reduce a cities' environmental impact, examples include: land use planning, tax reform, transportation, energy, waste, and water.

### 6) Step 6: Mobilizing Finance

Mobilizing new finance is necessary to support national urban strategies and to finance structural transformation. The financing gap is large, and bridging it requires context-specific solutions that tap the opportunities available in different countries.

To track progress of sustainable city initiatives it is important to have a set of indicators to track and measure progress. Based on a review of key indicators from a number of international organizations, the table below presents the results area category for measuring sustainability with potential indicators to measure and track across selected cities in the EAC.

Results Category	Potential Indicators
Climate Change	<ul style="list-style-type: none"> <li>GHG emissions (MTCO<sub>2</sub>eq)</li> </ul>
Energy	<ul style="list-style-type: none"> <li>Access to electricity</li> <li>Reliability of electric service</li> <li>Cost of electric service</li> <li>Electricity consumption per capita</li> <li>Energy-use per capita</li> <li>Clean energy/renewable energy policy/investment</li> <li>Clean and affordable alternative fuels and technologies</li> </ul>
Land Use	<ul style="list-style-type: none"> <li>Population density</li> <li>Rate of growth of urban population</li> <li>Population living in informal settlements</li> <li>Green spaces per capita</li> </ul>



	<ul style="list-style-type: none"> <li>• Land use policy</li> </ul>
<b>Transport</b>	<ul style="list-style-type: none"> <li>• Modal split (# and average length of trips)</li> <li>• Automobile ownership</li> <li>• Traffic volumes</li> <li>• Public transportation network</li> <li>• Expenditures on road infrastructure</li> </ul>
<b>Waste</b>	<ul style="list-style-type: none"> <li>• Waste generated per capita</li> <li>• Composition of waste</li> <li>• Waste collection and disposal policy</li> </ul>
<b>Water</b>	<ul style="list-style-type: none"> <li>• Access to potable water</li> <li>• Water consumption per capita</li> <li>• Collection time</li> <li>• Water management policy</li> </ul>
<b>Sanitation</b>	<ul style="list-style-type: none"> <li>• Population with access to improved sanitation</li> <li>• Population practicing open defecation</li> <li>• Sanitation policy</li> </ul>
<b>Industry</b>	<ul style="list-style-type: none"> <li>• Investment in electricity grid</li> <li>• Investment in water/sanitation</li> <li>• Investment in transportation</li> <li>• Investment in communication (telecoms, internet, etc.)</li> </ul>
<b>Environmental Quality</b>	<ul style="list-style-type: none"> <li>• Air quality</li> <li>• Environmental hazard exposure</li> </ul>

# Introduction



**Central Kigali**

Source: <https://commons.wikimedia.org/wiki/File:CentralKigali.jpg>

## Introduction

UNIDO in cooperation with the East African Community (EAC) is preparing a concept for the sustainable cities project in the East African region to tackle pressing environmental issues confronting cities in Burundi, Kenya, Rwanda, Tanzania, Uganda, and South-Sudan. The concept will integrate climate change mitigation and adaptation perspectives into an integrated, low impact, low carbon, resilient and environmentally-friendly approach to urban planning, management, and institutional support in the East African region.

The envisaged project aims to assist the governments/administrations of selected cities in the East African region in developing energy security; reducing the dependence on fossil fuels, harmful emissions, and water pollution; and improving ecological balance. This will be done by (1) promoting renewable and efficient energy technologies, and (2) building up awareness and know-how in respect to clean energy usage, circular economy principles, and innovative technologies and programmes, to support the development of Integrated Solutions for a Sustainable Future.<sup>12</sup>

## Purpose

The purpose of this study is to develop a baseline for urban development, and particularly urban sustainability, in six countries in East Africa – Burundi, Kenya, Rwanda, South Sudan, Tanzania, and Uganda – which together form the regional intergovernmental organization known as the East African Community (EAC).

Included in this baseline is an analysis of the current contexts in a number of urban sectors, a discussion of key urban challenges, as well as an inventory of regional, national, and local planned/ongoing initiatives related to urban development, key stakeholder groups and organizations, and strategic plans, policies, and frameworks for each country and the region as a whole.

The hope is that this baseline can help better inform, target, and tailor both future and current urban development projects and programs in the EAC region. To that end, the report develops selection criteria and recommendations for potential pilot cities and lays out a set of indicators for measuring urban sustainability progress.

## Report Structure and Methodology

For the most part, this study was a desk review of available data sourced from a combination of international repositories and national publications in the six EAC countries. The study was supplemented by on the ground observations, in person reviews of non-electronic documents, and anecdotes from interviews with key officials from individual consultants in Burundi, Kenya, Rwanda, Tanzania, and Uganda.<sup>1314</sup>

The report is broken up into three chapters as follows:

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<sup>12</sup> (UNIDO, 2017)

<sup>13</sup> Tharcisse Harushimana – Burundi, Rachel Wanyoike – Kenya, Antje Ilberg – Rwanda, Shadrack Stephene – Tanzania, Steven Nyanzi – Uganda

<sup>14</sup> Unfortunately, a consultant in South Sudan could not be recruited for this study

## Chapter 1: Key Challenges and Baseline for Urban Development

Chapter 1 starts by highlighting at a national level the extreme population growth and urbanization that the EAC countries have already been experiencing and will likely face in the future. The chapter then focuses on key urban challenges and the baseline situation in a variety of urban sectors including industrialization, transportation, solid waste, energy, and water/sanitation for the six EAC countries and their capital cities. The urban challenges data is largely sourced from national strategic plans and reviews from multilateral institutions with some additional anecdotal evidence from conversations with country officials and stakeholders. The baseline data is drawn from a number of sources including, but not limited to, national statistical publications, EAC regional publications, international data repositories like the World Bank Development Indicators and AfDB's Africa Information Highway, and local reports and observations.

The chapter finishes with a look at the current 2030 and 2050 development targets for the EAC established under the EAC's Vision 2050 plan. Utilizing both EAC specific data and data from external sources, the chapter assesses the gaps that need to be addressed from now until 2030 and from 2030 to 2050 in order to reach the Vision's goals in a number of urban sectors including GDP/capita, industrialization, transportation, and electricity access.

## Chapter 2: Pilot City Selection Criteria and Recommendations

Chapter 2 establishes an initial selection of potential pilot cities in the EAC countries based primarily on population data from national censuses and government priorities/resources from strategic plans. The chapter then outlines more targeted impact criteria that can be employed in future pilot city selection. Even though the selection in this current study was primarily accomplished through population criteria as described above, the chapter finishes by summarizing relevant initiatives and projects implemented within the shortlisted cities to help inform pilot project development.

## Chapter 3: Sustainable City Development in 2050

Chapter 3 focuses first on outlining the enablers, pillars, and goals for development outlined in the EAC's strategic plan - EAC Vision 2050. Combining these with the urban challenges identified in Chapter 1, a framework for urban sustainability is developed addressing the balance between social, economic, environmental, and institutional development. With this framework, the chapter then outlines the critical steps that need to be taken in the EAC countries in order to develop a strong enabling environment for urban sustainability. Finally, the chapter suggests some potential indicators for measuring and tracking progress across the EAC.

## Limitations

While this study did incorporate some in-country observations and information via work from local consultants in five of the six countries, given the study's time and resource constraints, as well as the objective to create a baseline to drive future work, this study largely focused on high level data and detail leaving the more granular and deeper dives to the future more targeted projects that this study is meant to support.

As with any study availability, reliability, and usability of data is key to success. Many country level reports and institutions and even the more international repositories had dated or missing data and estimates for some of the urban sectors. In some cases, the electronic data suffered further from broken links, unreadable/processable data, and mislabeled information. Country level data also varied significantly in quality and quantity across the study countries which made it difficult to

establish structured, common, and comparable baselines for the countries. South Sudan in particular had a shortage of data compared to the other countries, and this shortage was accentuated further because unlike with the other countries, where lack of electronically accessible data could be overcome with observations and data from local consultants, a local consultant in South Sudan wasn't able to be recruited for this study. For most of the countries, sub-national data in the urban sectors is not well tracked, reported or catalogued which made it difficult to establish baselines and develop selection criteria for pilot cities.

On the ground, while most officials and institutions were very helpful, some of the local consultants reported experiencing further barriers or roadblocks in working with local officials/institutions and getting access to specific documents and reports. Some of the barriers noted was a lack of local level capacity, disorganization, and a skepticism of the study goals.



# Chapter 1: Key Challenges and Baseline for Urban Development



**Rainwater Drainage in Kampala**

Source: Steven Nyanzi – Local Consultant, Uganda

## Regional Overview

### Overall Population Growth and Urbanization

In the first half of the 21st century, the UN World Urbanization Prospects projects that the total population in the six EAC countries will grow from an estimated total of 111 million people to over 407 million people (an average growth rate of 4.5% per year) and the urban population will be nine times higher by 2050. As a result of this massive growth in urban populations in EAC countries, the urban proportion of the population in the EAC is projected to rise from just 17% in 2000 to 32% in 2030 and over 42% by 2050. While Rwanda and Tanzania are expected to be the most urbanized EAC countries (52.6% and 53% urban population in 2050, respectively), Burundi is expected to have the fastest urban growth rate at an average of 5.2% per year from 2000 to 2050 (Figure 1, Table 1,

Table 2, Figure 2).<sup>1516</sup>

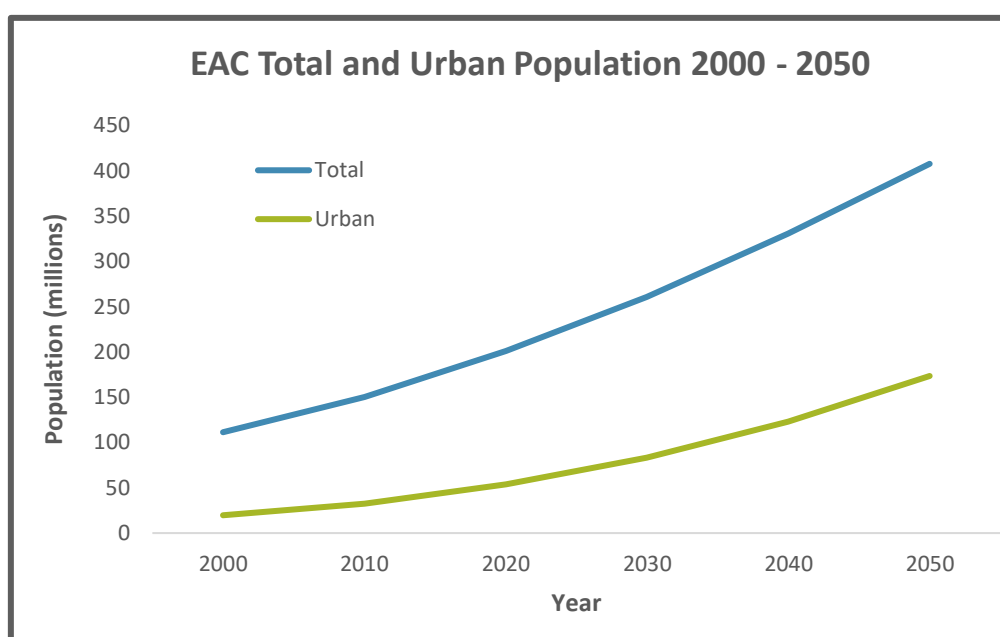


Figure 1: EAC Total and Urban Population 2000 - 2050

Table 1: Average Annual Urban Growth Rate by Decade 1950-2050

Country	1950-60	1960-70	1970-80	1980-90	1990-00	2000-10	2010-20	2020-30	2030-40	2040-50	2000-50
Burundi	3.77	5.45	6.17	6.98	4.58	5.97	5.73	5.14	4.80	4.50	5.23
Kenya	5.80	6.86	8.15	4.47	4.71	4.48	4.33	3.98	3.63	3.21	3.92
Rwanda	5.14	4.63	7.30	4.88	12.36	7.55	6.20	4.54	3.27	2.74	4.85
South Sudan	1.22	1.99	2.44	6.69	3.68	4.92	4.58	3.92	3.85	3.50	4.15
Tanzania	7.06	7.29	9.80	5.87	4.66	5.24	5.31	4.60	3.95	3.42	4.50
Uganda	7.50	7.70	4.15	7.46	4.21	5.32	5.51	5.18	4.71	4.20	4.98
Total EAC	5.47	6.43	7.56	5.67	4.89	5.18	5.11	4.50	3.97	3.50	4.45

<sup>15</sup> All of these tables and charts are reproductions of the tables and charts developed for UN Habitat's 2014 State of African Cities Report but with more recent data and a focus on the six EAC countries

<sup>16</sup> (United Nations Department of Economic and Social Affairs, Population Division, 2014)



Table 2: Total and Urban Populations for EAC Countries 2000 - 2050

COUNTRY	POPULATION	2000	2010	2020	2030	2040	2050
BURUNDI	Total Population (in thousands)	6 674	9 233	12 579	16 392	21 082	26 691
	Urban Population (in thousands)	550	982	1 715	2 829	4 524	7 025
	Urban (%)	8.2	10.6	13.6	17.3	21.5	26.3
KENYA	Total Population (in thousands)	31 285	40 909	52 906	66 306	81 354	97 173
	Urban Pop (in thousands)	6 223	9 643	14 738	21 767	31 091	42 636
	Urban (%)	19.9	23.6	27.9	32.8	38.2	43.9
RWANDA	Total Population (in thousands)	8 396	10 837	14 123	17 771	21 601	25 378
	Urban Population (in thousands)	1 253	2 596	4 736	7 383	10 186	13 349
	Urban (%)	14.9	24.0	33.5	41.5	47.2	52.6
SOUTH SUDAN	Total Population (in thousands)	6 653	9 941	13 853	17 297	20 940	24 760
	Urban Population (in thousands)	1 098	1 775	2 779	4 083	5 960	8 403
	Urban (%)	16.5	17.9	20.1	23.6	28.5	33.9
TANZANIA	Total Population (in thousands)	34 021	44 973	60 385	79 354	102 686	129 417
	Urban Population (in thousands)	7 590	12 644	21 218	33 257	48 986	68 569
	Urban (%)	22.3	28.1	35.1	41.9	47.7	53.0
UGANDA	Total Population (in thousands)	24 276	33 987	47 088	63 388	82 659	104 078
	Urban Population (in thousands)	2 933	4 925	8 423	13 952	22 116	33 367
	Urban (%)	12.1	14.5	17.9	22.0	26.8	32.1
TOTAL EAC	Total Population (in thousands)	111 304	149 880	200 934	260 509	330 321	407 496
	Urban Population (in thousands)	19 647	32 565	53 608	83 271	122 863	173 349
	Urban (%)	17.7	21.7	26.7	32.0	37.2	42.5

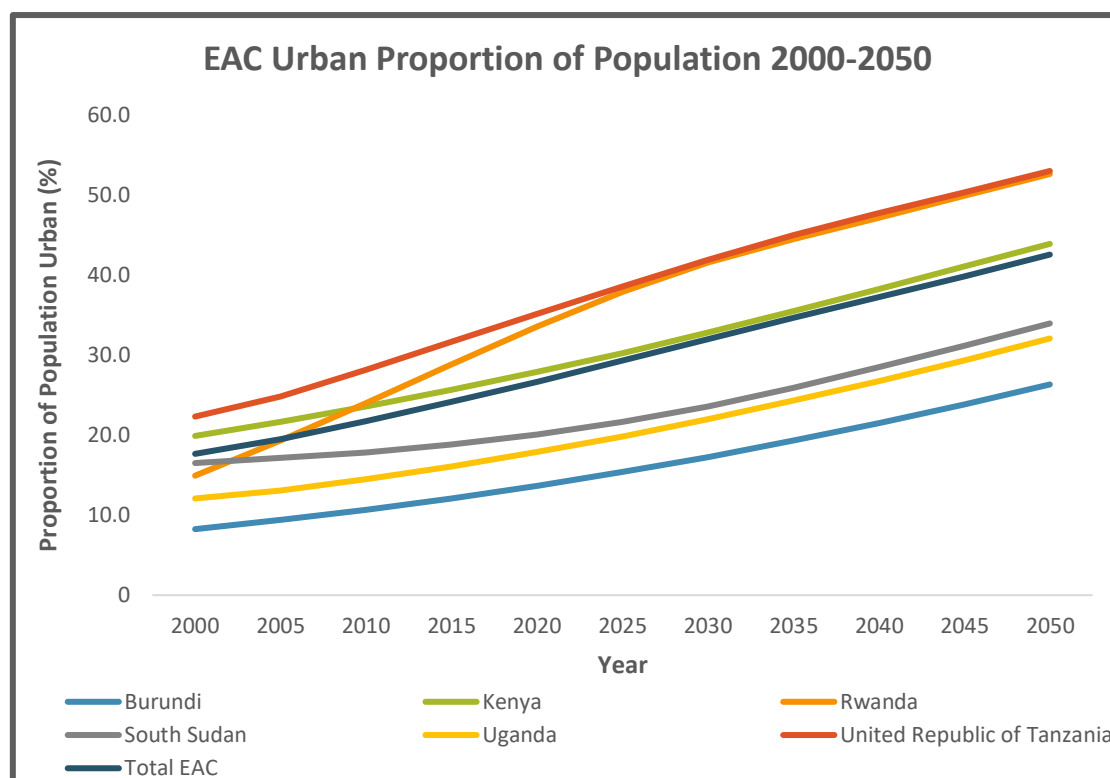


Figure 2: EAC Urban Proportion of Population 2000-2050

The capital cities in the EAC countries will likely play a large role in the rapid urbanization highlighted above. In 2015, these cities accounted for 14.4% - 61.1% of the total urban populations in country. Over the next 15 years, these cities are all projected to grow over 4% per year with Bujumbura leading the charge at 5.74% per year (Table 3).<sup>17</sup>

Table 3: Population of Capital Cities in the EAC 2015 - 2030

Country	City	2015 Pop (thousands)	2030 Pop (thousands)	Avg. Annual Growth Rate 2015 - 2030	Proportion of Urban Population in 2015
Burundi	Bujumbura	751	1 735	5.74%	61.1%
Kenya	Nairobi	3 915	7 140	4.09%	32.3%
Rwanda	Kigali	1 257	2 268	4.01%	37.5%
South Sudan	Juba	321	596	4.21%	14.4%
Tanzania	Dar es Salaam <sup>18</sup>	5 116	10 760	5.08%	30.0%
Uganda	Kampala	1 936	3 939	4.85%	29.9%

### Overview of Key Sectors

In many respects, urban sectors like industrialization, transportation, solid waste, water, sanitation, and energy have not kept pace with the region's rapid population growth and urbanization. In 2016, the contribution of the industrial sector to GDP in the six EAC countries ranged from 16.5% to just over 27%. Access to electricity amongst urban populations ranged from an estimated 8.4% in South Sudan to 71.8% in Rwanda in 2014. Access to basic service levels for drinking water and sanitation in

<sup>17</sup> (United Nations Department of Economic and Social Affairs, Population Division, 2014)

<sup>18</sup> Even though the capital has moved to Dodoma, Dar es Salaam was selected because of its role as the primary urban and industrial center in Tanzania.

the EAC countries range from 59%-88% and 27%-57%, respectively in 2015. For solid waste, per capita generation was estimated at between 0.26 and 0.55 kg/capita/day (Table 4).

Table 4: Overview of Urban Sectors in the EAC Countries

Country	Industry Value Added to GDP (2016) <sup>19</sup>	Urban Pop – Access to Electricity (2014) <sup>20</sup>	Total Pop – Access to Clean Fuels & Tech for Cooking (2014) <sup>21</sup>	Urban Pop – at least Basic Drinking Water (2015) <sup>22</sup>	Urban Pop – at least Basic Sanitation (2015) <sup>23</sup>	Length of Paved Road Network (km)	Solid Waste (kg/capita/day) <sup>24</sup>
Burundi	16.5%	52.1%	2.1%	88%	46%	1,438 (2011) <sup>25</sup>	0.55
Kenya	19%	68.4%	6.2%	83%	35%	13,900 (2015) <sup>26</sup>	0.3
Rwanda	17.6%	71.8%	2.0%	76%	57%	1,331 (2015) <sup>27</sup>	0.52
South Sudan	-	8.4%	3.1%	59%	27%	-	-
Tanzania	27.2%	41.2%	2.0%	79%	37%	9,989 (2015) <sup>28</sup>	0.26
Uganda	19.7%	51.4%	2.0%	72%	28%	3,919 (2015) <sup>29</sup>	0.34

### Summary of Key Urban Challenges

The six countries in the EAC face a variety of challenges for urban sustainability. Some of these challenges are unique to the individual countries, but others are shared or common challenges. A review of national strategic plans revealed four key challenges for urban sustainability shared by the six countries in the EAC. These challenges were also reflected in the baseline data for the countries. The challenges are:

1. **Diversification of the Economy:** All six countries highlighted to various extents the need to diversify the economy and particularly the need to build out the private sector in secondary and tertiary sectors like manufacturing and processing
2. **Constraints of Underdeveloped Transportation Infrastructure:** Transportation networks, particularly between major markets and urban areas, are constraining economic development and limiting the potential for competitive industries in the six EAC countries
3. **High Cost of Doing Business:** A significant barrier to diversifying the economy and developing industries and infrastructure is the high cost of doing business in these countries (energy/electricity costs, transportation, laws/governance, raw materials, etc.)
4. **Infrastructure for Basic Services:** Infrastructure/technology for basic services like electricity, clean cooking, water/sanitation, and solid waste are inadequate, particularly in informal settlements

<sup>19</sup> (World Bank, 2017)

<sup>20</sup> (World Bank, 2017)

<sup>21</sup> (World Bank, 2017)

<sup>22</sup> (WHO/UNICEF, 2017)

<sup>23</sup> (WHO/UNICEF, 2017)

<sup>24</sup> (World Bank Group, 2012)

<sup>25</sup> (East African Community, 2016)

<sup>26</sup> (East African Community, 2016)

<sup>27</sup> (National Institute of Statistics of Rwanda, 2016)

<sup>28</sup> (East African Community, 2016)

<sup>29</sup> (East African Community, 2016)

These challenges are unfortunately not new for these countries. A 2012 review from the UN Economic Commission for Africa, summarized in the Progress Towards Sustainable Development in Eastern Africa Report, highlighted key challenges for development in the region including: 1) A lack of a strong vibrant private sector in the region, particularly in the export; 2) Rapid increases in food and energy prices have limited urban development and advancement; 3) A lack of critical human, knowledge, logistical and technical resources to adopt and develop new approaches to production, distribution, and consumption; and 4) Dearth of the policy and institutional resources necessary for managing and developing infrastructure, capacity, and coordinated initiatives in urban sustainability sectors, particularly the energy and water sectors.<sup>30</sup>

### *Planned and Ongoing Initiatives in Urban Sustainability*

There are many initiatives related to urban sustainability both planned and ongoing in the EAC region. For a more complete look at planned and ongoing initiatives, stakeholders, and policy frameworks in the EAC please refer to the accompanying excel document (**EAC Initiatives, Stakeholders, and Policies in Urban Sustainability**), but a few select projects are highlighted in **Table 5** below:

*Table 5: Selected Urban Development Projects - EAC Region*

Location	Project	Description	Sponsors	Timeline
<b>Kenya, Burundi, Rwanda, Tanzania</b>	USAID East Africa Trade and Investment Hub <sup>31</sup>	The USAID East Africa Trade and Investment Hub (the Hub) partners with East African and U.S. businesses to attract investment that transforms the East African private sector into vibrant global trading partners. The Hub also promotes a more predictable, transparent and enabling business environment in East Africa by supporting adherence to intra-regional and international trade agreements and conformity to international standards. Improving the region's trade competitiveness, encouraging the diversification of exports beyond natural resources, and promoting broader, more-inclusive economic growth will lead to more food secure and resilient East African communities.	USAID; Development Alternatives Inc.	2014 - 2019
<b>Kenya, Burundi, Rwanda, Tanzania</b>	Promoting Energy Efficiency in Buildings in East Africa <sup>32</sup>	The project aims at assisting the five targeted countries in East Africa in improving and promoting energy efficiency in buildings, making the improvements in the building sector and the real estate market one of the solutions for addressing energy security. The project will also focus on green architecture, with the emphasis on effective policies, regulations and standards that integrate energy efficiency into building design.	UNHabitat; Organization International de la Francophonie, Politecnico Di Milano, UNEP/GEF, Urgana Martyrs University	Ongoing
<b>Kenya, Rwanda</b>	KawiSafi Ventures Fund <sup>33</sup>	Creating a new investment fund, KawiSafi, to drive off-grid solar power in East Africa. Investing in 10-15 clean energy companies, initially in Rwanda and Kenya, providing	Green Climate Fund	Pipeline

<sup>30</sup> (United Nations Economic Commission for Africa, 2012)

<sup>31</sup> (USAID, 2017)

<sup>32</sup> (UN Habitat, 2017)

<sup>33</sup> (Green Climate Fund, 2017)

household solar technologies. Aiming to drive a low-carbon paradigm shift and leapfrog fossil fuel grids to clean energy, using equity capital from GCF to leverage investment, and grant capital to set up a Technical Assistance Facility.

<b>Kenya, Uganda</b>	Promoting Sustainable Transport Solutions for East Africa <sup>34</sup>	The project aims to reduce growth in private motorized vehicles, thus reducing traffic congestion and GHG emissions in the capital cities of Uganda and Kenya. The envisaged strategic response is to upgrade their transit systems, implement improved non-motorized transport infrastructure and apply travel demand management as well as other supporting policies.	UNHabitat; UNEP/GEF
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## Burundi

### *Key Challenges for Urban Sustainability*

As part of its comprehensive strategic planning initiative, Vision Burundi 2025, the government of Burundi describes some of the significant challenges for urban sustainability in country and outlines goals and strategies to overcome them. Two of the central challenges related to urban development identified in the Vision document are:

- 1) **To diversify and promote a competitive and sound economy** – The Burundian economy is dominated by primary industry, particularly agriculture. Secondary and tertiary industries, however, suffer from a weak industrial framework, high costs of raw materials, transportation costs, geographic isolation, and an unfavorable tax policy – all of which serve to make industrial products non-competitive. To address this, Burundi needs to focus on the development of tertiary and secondary sectors, like agricultural processing and the service industry, as well as establishing of mining operations, providing more job opportunities, raising income per capita, reducing financial imbalances and foreign debt, and improving the terms of trade for growth. Additionally, Burundi will need to identify and develop new exports and set up a favorable environment for businesses to attract foreign capital and to promote the competitiveness of Burundian products on the market of the EAC.<sup>35</sup>
- 2) **To set up infrastructure for promoting production** – A main weakness of the economy in Burundi is the lack of infrastructure and support for production, particularly inadequate energy supply and poor maintenance of transportation systems. Improving and expanding existing infrastructure will allow for increased production and improved living standards for urban populations in Burundi. To that end, Burundi, in cooperation with other countries in the EAC, is planning to considerably invest in its road network and hydroelectric infrastructure.<sup>36</sup>

In addition to the challenges listed above, the Vision also highlights the need to make in-country regional planning a foundational aspect of future development, particularly focusing on the establishment of regional focal points of development to achieve economies of scale, concentrating social capital, providing for more effective distribution of basic social services while ensuring their accessibility, and improving quality of life.<sup>37</sup>

<sup>34</sup> (UN Habitat, 2017)

<sup>35</sup> (Government of Burundi; UNDP, 2011)

<sup>36</sup> (Government of Burundi; UNDP, 2011)

<sup>37</sup> (Government of Burundi; UNDP, 2011)

## Baseline for Urban Sectors

### Urbanization

In 1950, Burundi's total population stood at about 2.3 million people, but by 2016 the population swelled to over 11.1 million people growing at an average rate of 2.4% per year. Around the turn of the century, population growth, particularly urban population growth, in Burundi began to accelerate. In 2000, Burundi's total population was about 6.4 million people with about 8.2% or 550 thousand people living in urban areas. By 2016 total population had increased 74% to the estimated 11.1 million people and the urban population increased 150% to over 1.3 million people (**Figure 3**).<sup>38,39</sup>

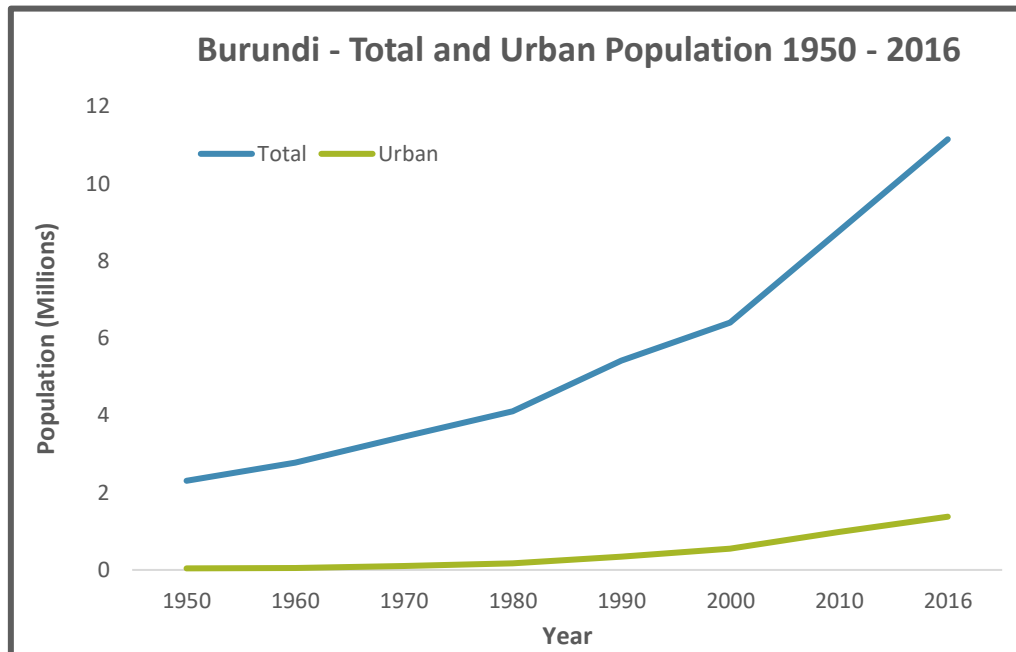


Figure 3: Burundi Total and Urban Population 1950 – 2016

Almost 59% of the urban population in Burundi lived in slums in 2014, which was down slightly from the 64% level in 2007. The urban population is also still heavily concentrated in Burundi's largest city, Bujumbura as 61% (over 797,000 people) of the total urban population in Burundi lived in Bujumbura in 2016.<sup>40</sup>

### Industrialization

Since 2000, Burundi's GDP has grown 57% to over \$2.3 billion (\$US-2010) in 2015. Over the same time period, industrial value added only grew by 9% while manufacturing value added actually declined by about 16% (**Figure 4**).<sup>41</sup>

<sup>38</sup> (United Nations Department of Economic and Social Affairs, Population Division, 2017)

<sup>39</sup> (United Nations Department of Economic and Social Affairs, Population Division, 2014)

<sup>40</sup> (World Bank, 2017)

<sup>41</sup> (World Bank, 2017)

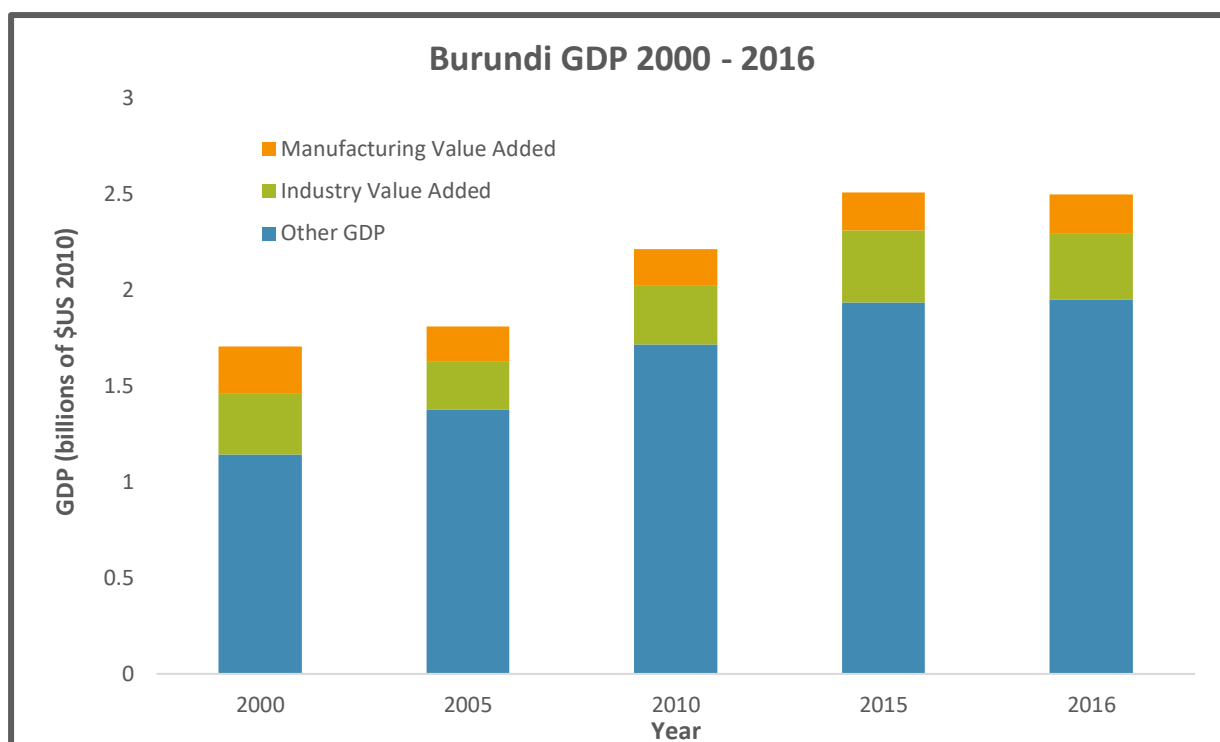


Figure 4: Burundi GDP 2000 - 2016

As a result of this decline, persons employed in manufacturing and other industries have declined 6.7% from about 40,000 people in 2003 to just over 12,000 people in 2015.<sup>42</sup> Despite this decline, electricity use in industrial/manufacturing applications has increased 16% since 2007 to over 22 GWh and in 2015 the sector still accounted for 37% (62.81 Gg of CO<sub>2</sub>) of the total CO<sub>2</sub> emissions from fuel combustion and 54% (48.3 Gg of CO<sub>2</sub>) of the total gasoline specific emissions.<sup>43</sup><sup>44</sup> Total GHG emissions from industrial processes have also increased dramatically from about .0066 MMTCO<sub>2</sub>e in 2000 to about .0807 MMTCO<sub>2</sub>e in 2014.<sup>45</sup>

<sup>42</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2015)

<sup>43</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2017)

<sup>44</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2017)

<sup>45</sup> (World Resources Institute, 2017)



### Transport

In Burundi in 2015, there was about 1.9 million kilometers of national roads and an additional 2.4 million km of provincial roads.<sup>46</sup> In 2014, the overall pump price for gasoline was 1.53 \$US/liter (1.01 \$US/liter in 2000) and for diesel fuels the pump price was 1.53 \$US/liter (1.01 \$US/liter in 2000).<sup>47</sup> The per capita consumption of diesel and gasoline has decline from 4.57 and 5.01 liters, respectively in 2002 to 3.2 and 2.35 liters, respectively in 2015.<sup>48</sup>

### Solid Waste

A 2012 World Bank study estimated that Burundi currently generates about 0.55 kg of solid waste per capita per day (a total of about 384 tonnes/day), but those values are projected to increase to 0.8 kg/capita/day and 2,062 tonnes/day by 2025.<sup>49</sup> The DHD indicators report for 2015 included a 1998 estimate that people in Burundi produce 6.1904 Gg of solid waste each year.<sup>50</sup> In 2016, the total waste managed and collected from households in Burundi was estimated at 4,473 tonnes.<sup>51</sup> The estimated GHG impacts from the waste sector have increased 42% since the turn of the century, growing from 0.2637 MMTCO<sub>2</sub>e in 2000 to about 0.3740MMTCO<sub>2</sub>e in 2014.<sup>52</sup>

### Household Energy/Electricity

In the residential sector energy usage is primarily composed of fuel use for cooking and lighting. For cooking, the majority of urban households in Burundi utilized charcoal (59.1%) or firewood for cooking (27.6%), while a very small proportion of households utilized electricity (1.5%) (**Figure 5**). For lighting, almost 40% of urban households in Burundi utilized electricity. The next major sources were candles (17.1%), lanterns (16.6%), oil lamps (16.3%), and firewood (6.6%) (**Figure 6**).<sup>53</sup>

**Project Spotlight:** Burundi Infrastructure Resilience Emergency Project

**Sponsor:** World Bank

**Timeline:** 2015 - 2019

**Description:** The Infrastructure Resilience Emergency Project for the Burundi seeks to enhance the climate resilience of key transport and drainage infrastructure in Greater Bujumbura while strengthening the country's capacity to manage and prevent natural disasters. The project has three main components:

- 1) Rehabilitation of roads and urban infrastructure;
- 2) Capacity strengthening in disaster risk management
- 3) Institutional support, project management and coordination

**Source:**

<http://projects.worldbank.org/P150929/?lang=en&tab=overview>

<sup>46</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2016)

<sup>47</sup> World Bank World Development Indicators

<sup>48</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2015)

<sup>49</sup> (World Bank Group, 2012)

<sup>50</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2015)

<sup>51</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2017)

<sup>52</sup> (World Resources Institute, 2017)

<sup>53</sup> (Burundi Ministere de L'Interieur, 2011)

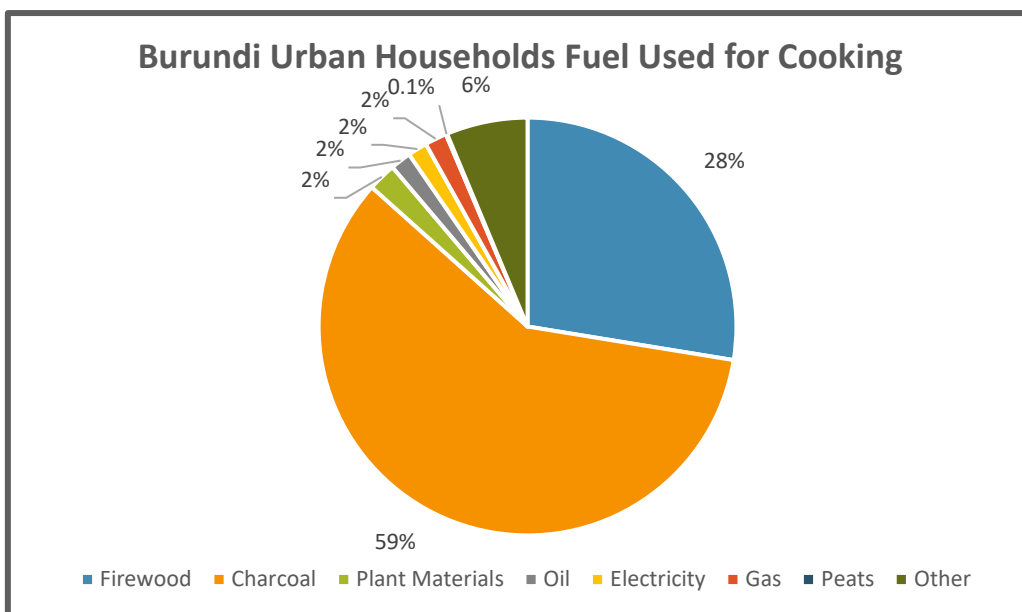


Figure 5: Burundi Urban Households Fuel Use for Cooking

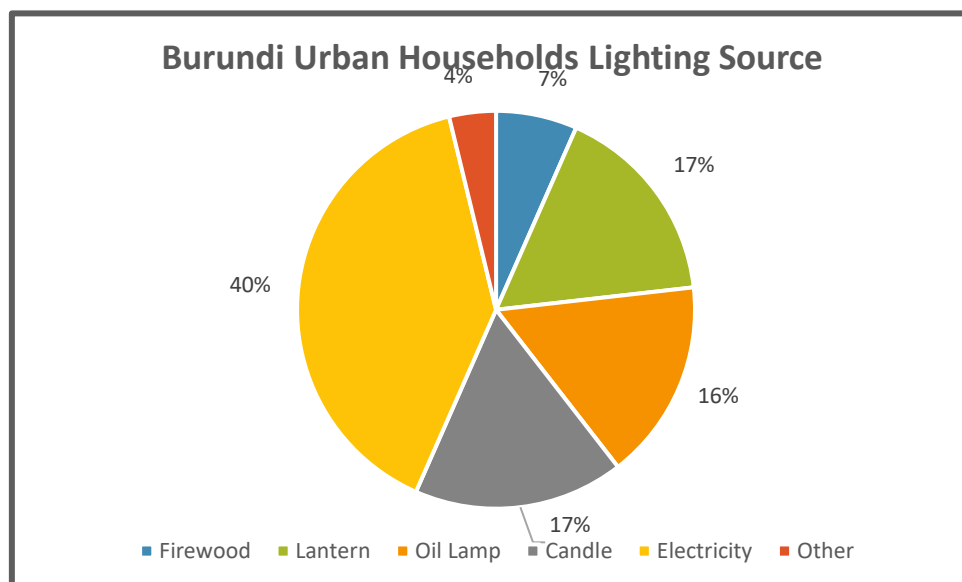


Figure 6: Burundi Urban Households Lighting Source

Electricity access amongst urban populations in Burundi has increased dramatically from just 38% in 2000 to an estimated 52.1% in 2014. This growth is highlighted further by the relatively slight growth in electricity access for the whole population growing from 3.9% in 2000 to just 7% in 2014.<sup>54</sup> Electricity consumption for households in Burundi fluctuated from 53 GWh in 2007 up to a peak of 74 GWh in 2014 and back down to 37 GWh in 2016.<sup>55</sup> Despite the growth in electricity usage for lighting, only about 2% of the total population had access to clean fuels for cooking in 2014.<sup>56</sup>

*National Energy/Electricity*

In Burundi, primary energy generation and consumption are dominated by firewood which accounts for 98% of the total primary energy generation and 97% of the total energy consumption with peat

<sup>54</sup> (World Bank, 2017)

<sup>55</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2017)

<sup>56</sup> (World Bank, 2017)

and charcoal making up the last 2-3%.<sup>5758</sup> Total GHG impacts from energy use in Burundi were estimated at 0.6251 MMTCO<sub>2e</sub> in 2014 down 22% from the level in 2000.<sup>59</sup>

Almost all of the electricity generation in Burundi comes from hydroelectric sources. In 2016, REGIDESO had 54,953 MW of installed hydroelectric capacity online representing over 167.5 GWh of electricity generation in 2016 (42% more hydro generation than 2007's 117.6 GWh).<sup>6061</sup>

Unfortunately, REGIDESO's electricity grid has also had relatively high line losses throughout their network ranging from 31% losses in 2006 down to a minimum of 14% losses in 2014 and back to 29% losses in 2015.<sup>62</sup> Additionally on the reliability end, firms in Burundi experienced an average of 16.6 power outages per month in 2014 at an average cost of 3.4% of total sales.<sup>63</sup> On access, it takes an average of 158 days to get access to electricity in 2016.<sup>64</sup>

Cost of electricity in Burundi has risen slightly for commercial and residential customers, while remaining constant or decreasing for industrial customers. In 2015, the estimated average electricity tariffs were 11 cents/kWh for commercial customers, 9 cents/kWh for residential customers, and 8 cents/kWh for industrial customers (**Figure 7**).<sup>65</sup>

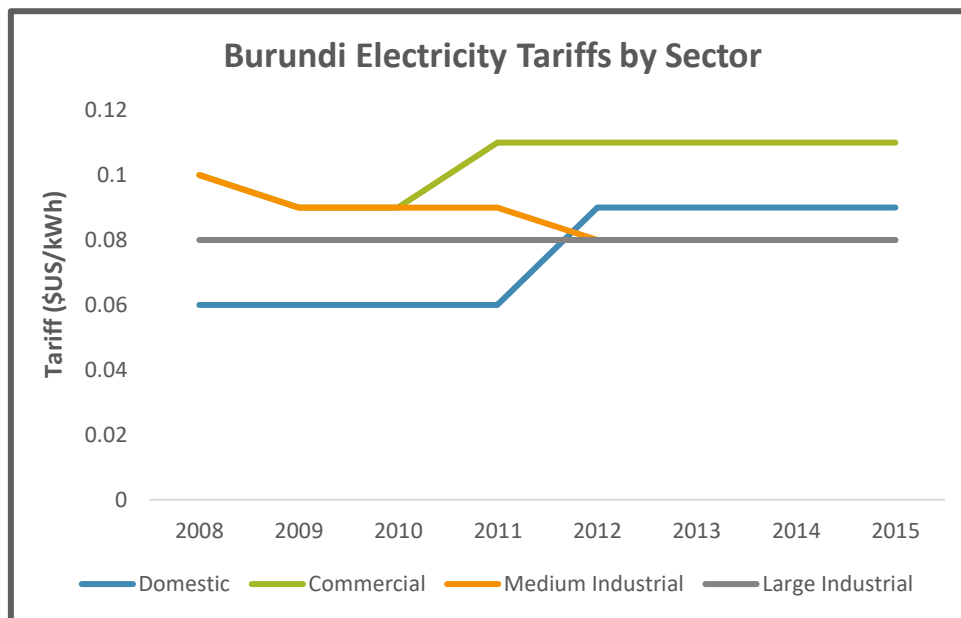


Figure 7: Burundi Electricity Tariffs by Sector

Despite this, total electricity meters also increased to over 111,000 in 2016 compared to just 43,000 in 2007 and total electricity consumption in Burundi increased from about 142.8 GWh in 2007 to 208.3 GWh in 2016 with prepaid electricity sales accounting for the largest proportion of

<sup>57</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2017)

<sup>58</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2017)

<sup>59</sup> (World Resources Institute, 2017)

<sup>60</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2017)

<sup>61</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2017)

<sup>62</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2016)

<sup>63</sup> (World Bank, 2017)

<sup>64</sup> (World Bank, 2017)

<sup>65</sup> (East African Community, 2016)

consumption followed by the residential, light commercial/general trade, and industrial sectors (Figure 8).<sup>6667</sup>

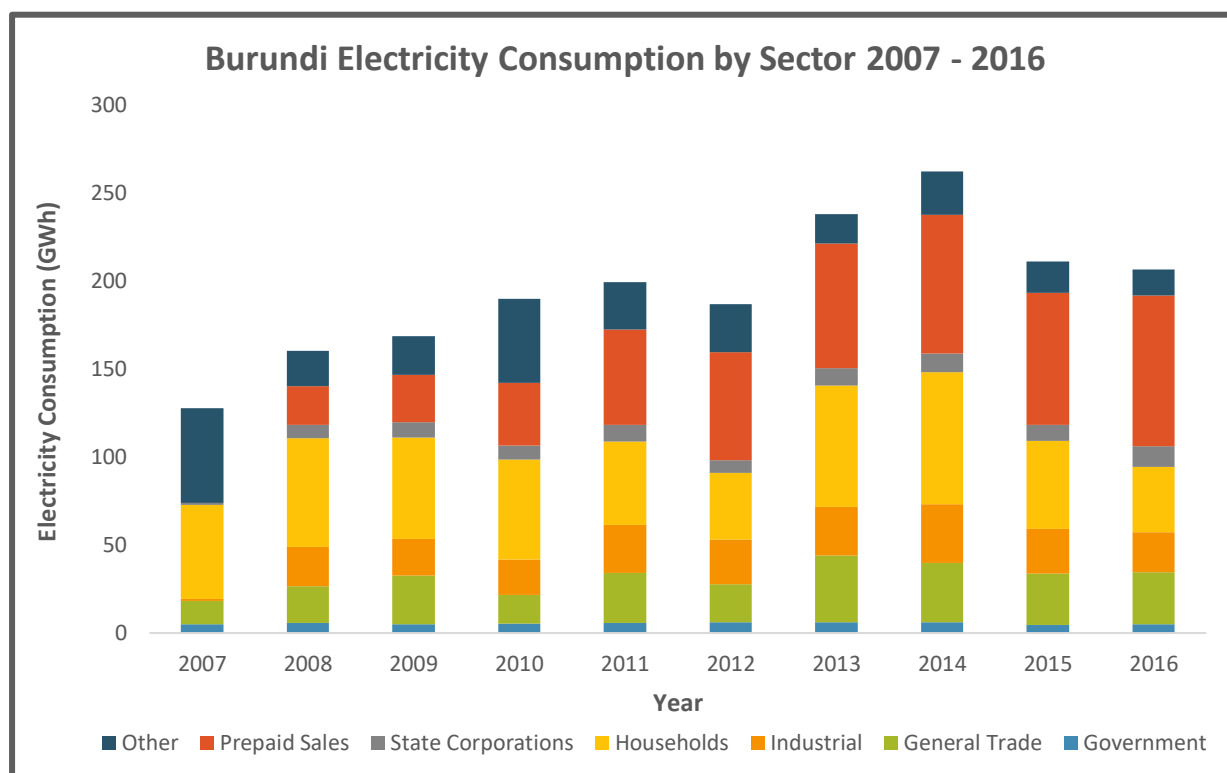


Figure 8: Burundi Electricity Consumption by Sector 2007 – 2016

### Water/Sanitation

The JMP estimated that in the year 2000, 82.4% of Burundi's urban population had access to at least basic level service<sup>68</sup> for drinking water compared to just 52% at the national level.<sup>69</sup> In 2015, 88.1% of urban households had basic service for drinking water, and the number of urban households utilizing surface water for drinking water had declined to just over 1% from 7.5% in 2000 (Figure 9).<sup>70</sup> In terms of drinking water facility type, 77% of the urban population had access to a piped in improved water source in 2015 and 11.9% of households had access to a non-piped in improved source.<sup>71</sup>

Total water customers in Burundi increased 136% from about 40,058 customers in 2007 to about 94,630 customers in 2016.<sup>72</sup> Correspondingly, total drinking water production also increased from about 38.8 million m<sup>3</sup> in 2007 to just over 51.8 million m<sup>3</sup> in 2016.<sup>73</sup>

<sup>66</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2017)

<sup>67</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2017)

<sup>68</sup> Basic level is defined by the JMP as drinking water from an improved source, provided collection time is not more than 30 minutes for a roundtrip including queuing

<sup>69</sup> (WHO/UNICEF, 2017)

<sup>70</sup> (WHO/UNICEF, 2017)

<sup>71</sup> (WHO/UNICEF, 2017)

<sup>72</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2017)

<sup>73</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2017)

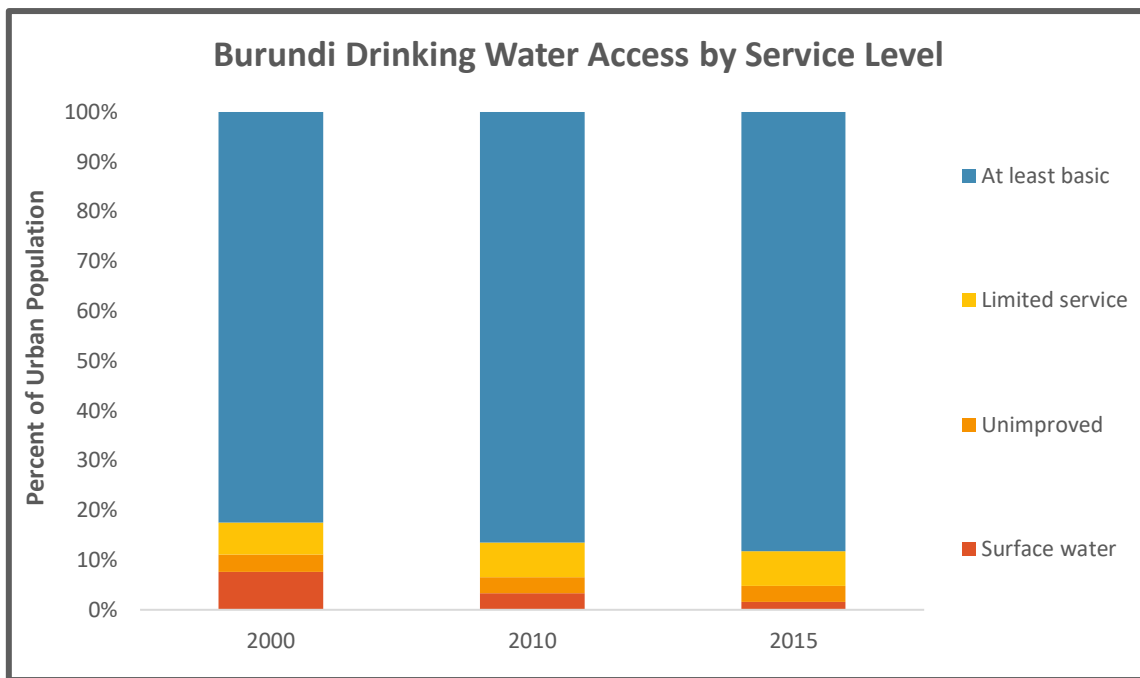


Figure 9: Burundi Access to Drinking Water by Service Level

For sanitation, the JMP estimated that just 33.9% of urban populations had access to at least basic sanitation<sup>74</sup> in 2000 and 46% had at least basic access in 2015.<sup>75</sup> For facilities, 31.3% of the urban population was covered by an improved latrine and 3.2% was covered by a sewerage system (Figure 10).<sup>76</sup> Finally, for hygiene, the JMP estimates that just 23% of the urban population in Burundi in 2014 had a handwashing facility on premises with soap and water.<sup>77</sup>

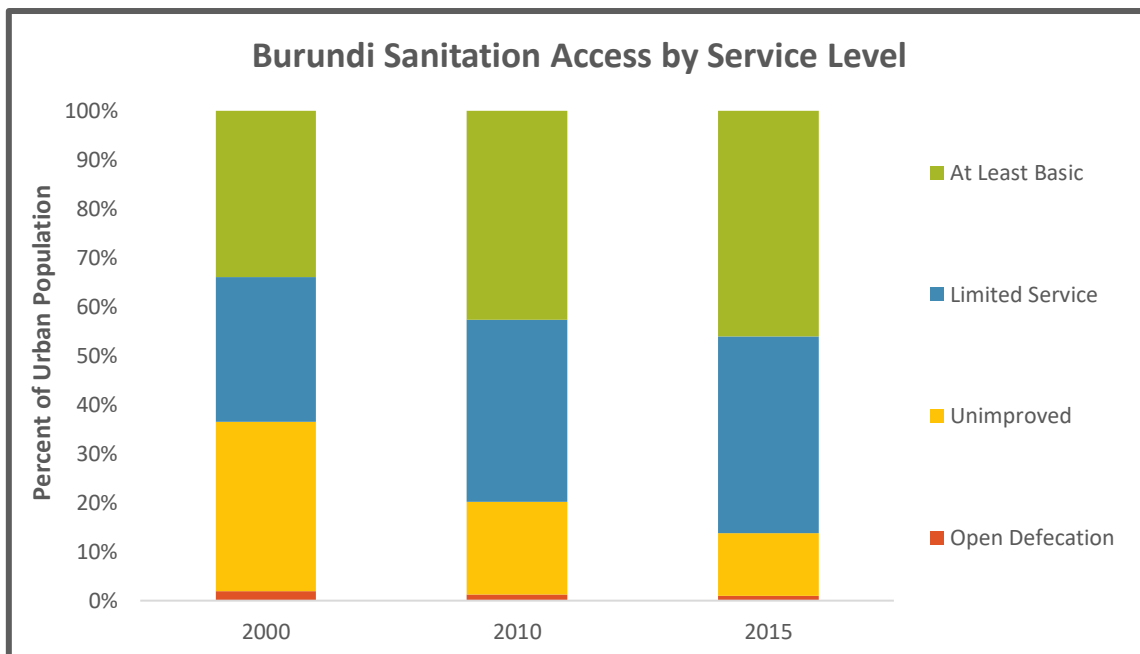


Figure 10: Burundi Sanitation Access by Service Level

<sup>74</sup> Basic level is defined by the JMP as the use of improved facilities which are not shared with other households

<sup>75</sup> (WHO/UNICEF, 2017)

<sup>76</sup> (WHO/UNICEF, 2017)

<sup>77</sup> Basic service level is defined by the JMP as the availability of a handwashing facility on premises with soap and water

### Capital City Spotlight

From 2002-2015 Bujumbura's population grew 74% (an average of 4.3% per year) to approximately 616,328 people.<sup>78</sup> By 2030, the UN projects that it will grow to 1.7 million people (**Figure 11**).<sup>79</sup>

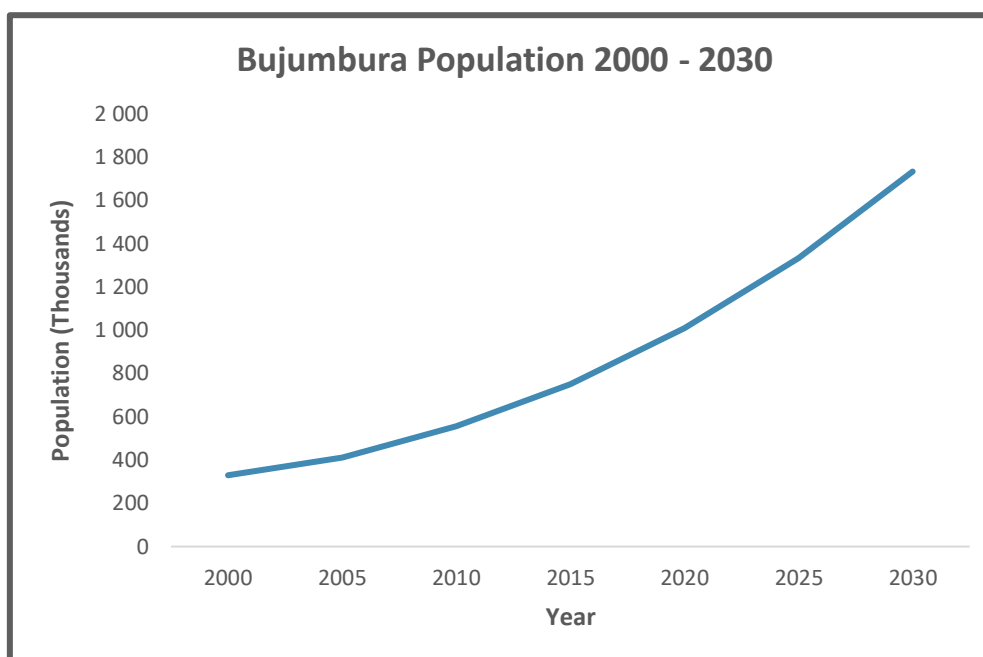


Figure 11: Bujumbura Population 2000 - 2030

In the electricity sector, Bujumbura saw a 44% growth in electricity consumption and a 149% growth in the number of electricity meters between 2007 and 2016. In 2016, the city's estimated 66,697 meters consumed over 149 GWh of electricity.<sup>80</sup>

Between 2007 and 2016 Bujumbura's total number of water users grew by an average of 8.9% per year from 24,308 to a total of 59,888. Water consumption correspondingly grew by an average of 2.4% per year to over 38 million m<sup>3</sup> in 2016.<sup>81</sup> For water service levels, estimates suggest that 91% of the city had access to basic drinking water, 5.8% had limited service, and 2.1% relied on surface water in 2012. For sanitation, in 2012 it was estimated that 39% of the city had access to basic sanitation, 54% had limited service, 5% had unimproved sanitation, and 1.5% practiced open defecation.<sup>82</sup>

Costs of services and resources related to energy, water, solid waste, and transportation can be seen below in **Table 6**.<sup>83</sup>

Table 6: Bujumbura Costs of Services and Resources in 2015

Item	Cost per unit (BIF - 2015)	Unit
Electricity - Tier 1 (0 to 50 kWh)	68	kWh
Electricity - Tier 2 (51 to 150 kWh)	138	kWh

<sup>78</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2016)

<sup>79</sup> (United Nations Department of Economic and Social Affairs, Population Division, 2014)

<sup>80</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2016)

<sup>81</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2016)

<sup>82</sup> (WHO/UNICEF, 2017)

<sup>83</sup> (Institut de Statistiques et D'Etudes Economiques du Burundi, 2016)

Electricity - Tier 3 (>150 kWh)	260	kWh
Lamp Oil Cost – Dealer	1632.8	Liter
Lamp Oil Cost – Station	2698.7	Liter
Charcoal	462.5	Kg
Garbage Removal	7898.6	Month
Water Tier 1 (0-10m <sup>3</sup> )	315	M <sup>3</sup>
Water Tier 2 (11-20m <sup>3</sup> )	614.3	M <sup>3</sup>
Water Tier 3 (0-10m <sup>3</sup> )	802	M <sup>3</sup>
Petrol	1894.2	Liter
Diesel	1896.7	Liter

A few areas of concern for Bujumbura were identified based on consultations with publicly available documents and meetings with people responsible for urban planning in Burundi. The main challenges are reliable energy and water supply at affordable prices. Solid waste management is also an issue. At the moment, there is no reliable collection, recycling or disposal of solid waste. In Bujumbura, for the last three years, solid waste was collected by different associations in different quarters. Some associations have disposed the solid waste at the city's main landfill (Buterere), but many have discarded the waste elsewhere to save on transport costs. An attempt to award solid waste management business to one private company has failed after 3 months of service, so the city is again trying associations with little success. Storm water is also becoming a challenge as the city's drainage system is old or inexistent. The missing waste collection leads to obstruction of drainage systems and storm water arrives in the Tanganyika Lake without any treatment.<sup>84</sup>

### *Planned and Ongoing Initiatives in Urban Sustainability*

There are many initiatives related to urban sustainability both planned and ongoing in Burundi. A few select projects are highlighted in **Table 7** below, but for a more complete look at planned and ongoing initiatives, stakeholders, and policy frameworks in Burundi please refer to the accompanying excel document (**EAC Initiatives, Stakeholders, and Policies in Urban Sustainability**).

*Table 7: Selected Urban Development Projects in Burundi*

Location	Project	Description	Sponsor	Timeline
Bujumbura	Hands on Training on Energy Efficiency and Renewable Energy for Youth Empowerment <sup>85</sup>	Objective is to involve the youth in the green economy that is contributing to climate change mitigation. Modules covered include: Conducting energy audits, Green building and passive building designs, Tubular biogas digester systems, Improved cook stoves and gasifier stoves, Sustainable charcoal briquette production to substitute charcoal and firewood, Assembling and installation of solar bulb lights.	UNHabitat; Ministère de l'Énergie et des Mines (MEM)	Ongoing
National	Improving Water Supply and Sanitation <sup>86</sup>	The programme supports water sector reforms introduced by the Government of Burundi to improve the institutional and legal framework. These reforms also incorporate the decentralization process into the water sector,	GIZ; Ministère de l'Eau, de l'Environnement, de l'Aménagement	2007-2020

<sup>84</sup> Local Consultant - Tharcisse Harushimana

<sup>85</sup> (UN Habitat, 2012)

<sup>86</sup> (GIZ, 2017)



		thereby strengthening municipal capacities to improve supply security for the poor population.	du Territoire et de l'Urbanisme (MEEATU); Ministère de l'Énergie et des Mines (MEM)	
<b>National</b>	Local Development for Jobs Project <sup>87</sup>	The objective of the Local Development for Jobs Project for Burundi is to create income generating opportunities for individuals and businesses and improve access to basic infrastructure in selected regions, targeting vulnerable populations and MSMEs in selected value chains.	World Bank; Ministère de l'Eau, de l'Environnement, de l'Aménagement du Territoire et de l'Urbanisme (MEEATU)	2017 - 2022

## Kenya

### *Key Challenges for Urban Sustainability*

In its review of urbanization in Kenya, the World Bank highlighted several key challenges Kenya needs to address related to urban development and sustainability.

The overarching urbanization challenge in Kenya is that few urban services are keeping pace with the rapid urban population growth. In the water and sanitation sector, better integrated planning and coordination remain major challenges, particularly with respect to cascading planning from national to county to provider levels, developing planning and investment capacity for new providers, and planning and operating urban infrastructures in the midst of fragmented county systems. On the financing side, Kenya's water sector in urban environments has two simultaneous and competing problems in that connection fees for urban water systems are too high, particularly for poor households, but also urban water supply is underpriced and consequently water service providers tend to fall below O&M cost coverage and under invest in needed infrastructure. For the electricity sector, the biggest challenges are the need for significant capital investment to meet national plans for electrification and electricity access. In solid waste, unclear policy and market frameworks and devolution have resulted in a lack of coordination and direction for all parties. This coupled with a shortage of public funding for solid waste management leaves future planning and investment short of where it needs to be.<sup>88</sup>

There is also the challenge of inequity between formal and informal settlements. Targeting of infrastructure and services by Kenyan authorities and utilities have tended to avoid informal areas because of unclear ownership and unclear or unprofitable opportunities. Consequently, informal settlements, where most of the poor live, have much lower access to services than more formal settlements. With a few exceptions, the disparity holds for access to in-house electricity, water and sanitation services, access to solid waste collection services, and quality of internal access roads.<sup>89</sup>

In order to increase access to services, special measures to improve affordability, investment, and access will need to be developed and implemented. These could include lowering the costs of connecting to networked services by connecting all at once, offering loans for connections that can

<sup>87</sup> (World Bank, 2017)

<sup>88</sup> (World Bank, 2016)

<sup>89</sup> (World Bank, 2016)

be repaid over time, and providing subsidies to residents of poor neighborhoods. Unfortunately, these strategies and programs will be constrained by another significant challenge in Kenya - devolution, which has developed new institutions, but has often left them without necessary capacity, resources, or strategic direction. Devolution also may lead to underfunding of urban areas as fiscal constraints and bias at the county level tends to favor investment in rural areas. The shift from a centralized to a more decentralized architecture also poses considerable challenges to consistent and accountable service delivery, particularly in the water and sanitation sector.<sup>90</sup>

In addition to these challenges for provision of services, the review also highlights significant issues related to congestion, transportation access and infrastructure, spatial development, and mobility that impact the long-term health and competitiveness of cities, industries, housing, and development in country. In the short run, as Kenya's urban economy is dominated by lower range often informal service occupations, the value lost due to commute times and accessibility is relatively low. However, as Kenya looks to develop more formal industries and secondary and tertiary economies, the opportunity cost and impact of poor transportation planning and development increases significantly. As the review sees it, Kenya has two options: 1) to build its way out of congestion by investing in more roads to serve the increasing motorization rate while managing traffic through regulation and pricing mechanisms; or 2) investing in public transport networks, using careful land use planning to promote a more compact and transit-oriented urban area.<sup>91</sup>

In its national planning through Kenya Vision 2030, the Kenyan government has developed the Second Medium Term Plan which documented additional urban development challenges that need to be addressed through projects and investment:

- High energy costs – of up to 21 US cents per kWh – compared to approximately 6 US cents per kWh in India and China;
- High costs of finance – high bank lending rates and wide interest rates spread;
- Inefficiencies in rail and port operations, inhibiting regulations and procedures to business and investors;
- Slow structural transformation exemplified by low and declining share of manufacturing to GDP and low share of export to GDP;
- Narrow range of exports and the slow growth in their value compared to the growth of imports;
- Threats emanating from climate change.<sup>92</sup>

The Second Medium Term Plan also looks to expand investment in urban infrastructure, particularly targeting cheaper and adequate electricity; local and regional rail and road networks that provide safe, efficient and cost-effective transport; adequate water for households and industry; affordable quality housing and sustainable environmental management.<sup>93</sup>

## ***Baseline for Urban Sectors***

### *Urbanization*

Over the past two decades Kenya's total population grew by over 16 million people to an estimated 47.9 million people in 2016. The urban population over the same time period doubled from 6.2

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<sup>90</sup> (World Bank, 2016)

<sup>91</sup> (World Bank, 2016)

<sup>92</sup> (Government of Kenya, 2013)

<sup>93</sup> (Government of Kenya, 2013)

million people (~20% of the total population) in 2000 to 12.4 million people (26.6% of the population) in 2016.<sup>94,95</sup> In 2014, about 56% of Kenya's urban population lived in slums and about 32% of the total urban population lived in the largest city of Nairobi (**Figure 12**).<sup>96</sup>

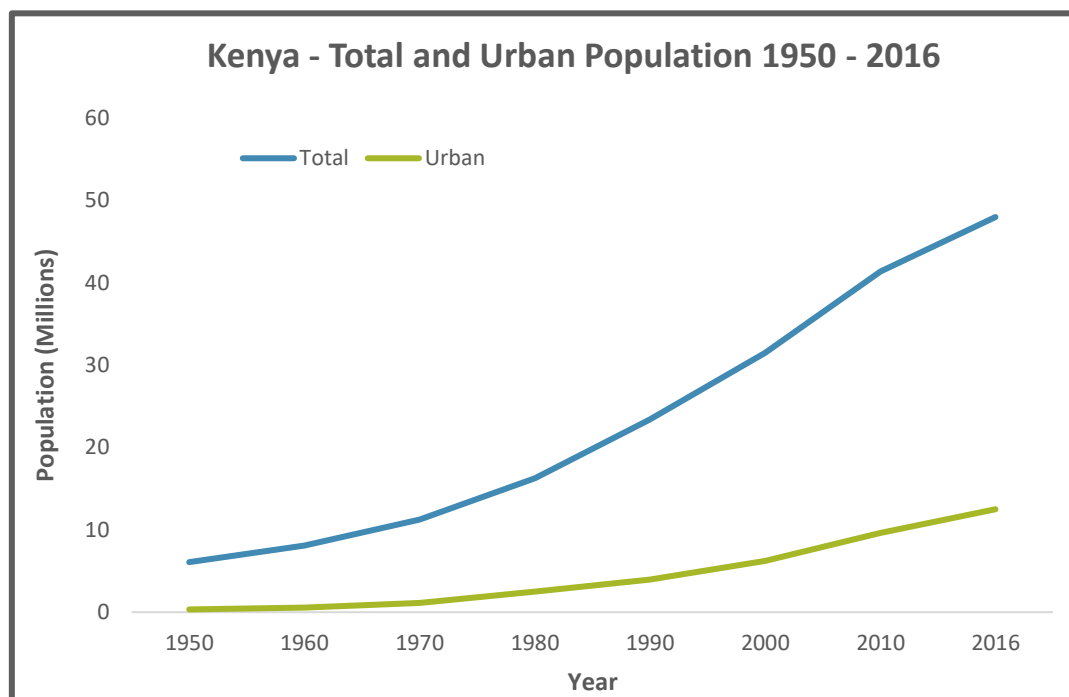


Figure 12: Kenya Total and Urban Population 1950 – 2016

### Industrialization

In 2000 GDP in Kenya was about \$26.1 billion (\$US-2010) with industry, including manufacturing, contributing \$4.7 billion (\$US-2010) (~18%) and the manufacturing sector alone contributing \$3.2 billion (\$US-2010) or 12.5%. By 2016, GDP in Kenya had more than doubled to \$55.3 billion (\$US-2010) with industry as a whole contributing \$10.5 billion (~19%) and manufacturing alone contributing 10% or about \$5.5 billion (**Figure 13**).<sup>97</sup>

<sup>94</sup> (United Nations Department of Economic and Social Affairs, Population Division, 2017)

<sup>95</sup> (United Nations Department of Economic and Social Affairs, Population Division, 2014)

<sup>96</sup> (World Bank, 2017)

<sup>97</sup> (World Bank, 2017)

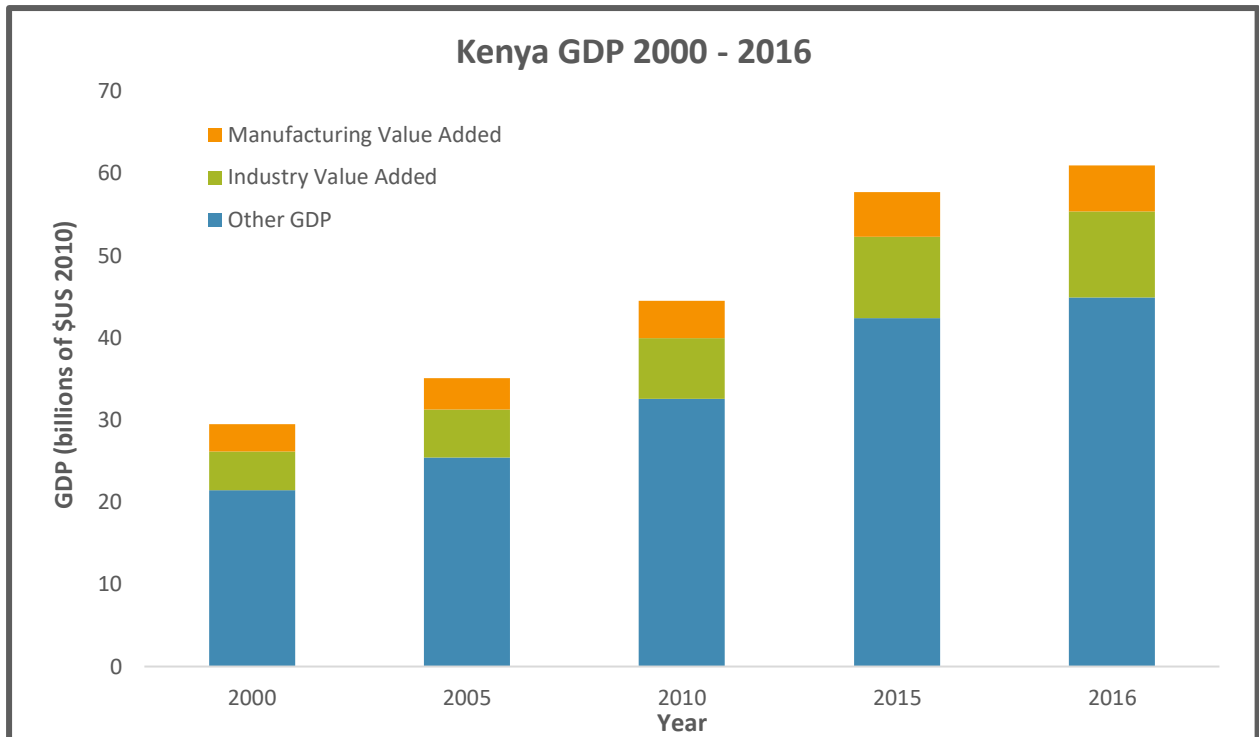


Figure 13: Kenya GDP 2000 – 2016

In 2014, an estimated 23% of Kenya's total CO<sub>2</sub> emissions from fuel combustion came from manufacturing and industry.<sup>98</sup> From 2000-2014, GHG emissions from industrial processes in Kenya have increased by a factor of 5 from .6193 MMTCO<sub>2</sub>e in 2000 to 3.0488 MMTCO<sub>2</sub>e in 2014. Add to this the 2.94 MMTCO<sub>2</sub>e from energy related emissions in the Manufacturing sector and industry/manufacturing accounted for 5.94 MMTCO<sub>2</sub>e in Kenya in 2014 which was about 20% of Kenya's estimated emissions in 2014.<sup>99</sup>

#### Transportation

The road network in Kenya totaled 61,594 km in 2011 with 14% of the network paved. In 2015 the network had increased slightly to 62,067 km with 18.3% paved.<sup>100</sup> Total registered vehicles in Kenya increased by 74.8% from 2011 to 2015. Of the 2.4 million vehicles registered in Kenya in 2015, 34% were cars and 40% were motorcycles (**Figure 14**).<sup>101</sup>

<sup>98</sup> (World Bank, 2017)

<sup>99</sup> (World Resources Institute, 2017)

<sup>100</sup> (Kenya National Bureau of Statistics, 2016)

<sup>101</sup> (Kenya National Bureau of Statistics, 2016)

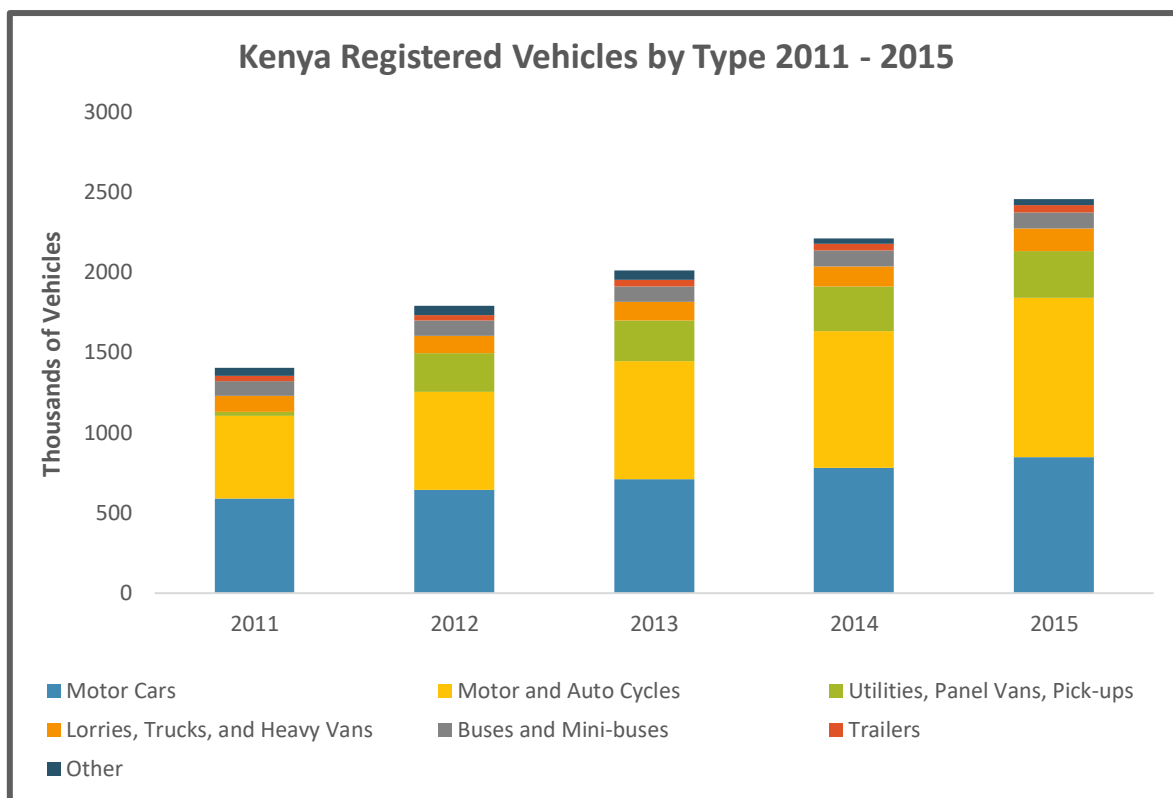


Figure 14: Registered Vehicles in Kenya 2011 - 2015

An estimated 52% of total CO<sub>2</sub> emissions from fuel combustion in Kenya came from the transport sector in 2014 which is up significantly from the 34% estimated in 2000.<sup>102</sup> Correspondingly, the estimated GHG impact from the transportation sector has nearly tripled since 2000 to 6.53 MMTCO<sub>2</sub>e. This 6.53 MMTCO<sub>2</sub>e represented about 34% of the total energy emissions in Kenya in 2014.<sup>103</sup>

<sup>102</sup> (World Bank, 2017)

<sup>103</sup> (World Resources Institute, 2017)

### *Solid Waste*

A 2012 World Bank study in Kenya estimated that urban populations were responsible for 0.3 kg of solid waste/day for a total of about 2000 tonnes/day. The study further estimated that by 2025 per capita waste generation could double and Kenya could produce over 10,000 tonnes of solid waste per day.<sup>104</sup> A second study estimated that 83% of waste in Kenya is mismanaged and 2% is littered.<sup>105</sup> The waste sector was responsible for approximately .8810 MMTCO<sub>2e</sub> of GHG emissions in 2014.<sup>106</sup>

### *Household Energy/Electricity*

An estimated 6.1% of Kenya had access to clean cooking fuels in 2014 compared to just 3% in 2000.<sup>107</sup> In 2015, most of the energy use in the residential space was from biomass (94%), but oil products and electricity also accounted for 3.7% and 1.9%, respectively of total final energy consumption.<sup>108</sup> Electricity access by comparison was estimated to be about 68.4% for urban populations in Kenya in 2014 up from 58% in 2000.<sup>109</sup> Overall the residential building sector accounted for an estimated 8.3% of all fuel related emissions in Kenya in 2014.<sup>110</sup>

In the residential sector, most of the energy use was for cooking and lighting. A 2013 study from the Society for International Development and the Kenya National Bureau of Statistics highlighted that in urban households, the majority of households utilized charcoal (32.8%), paraffin (28.3%), or firewood (22.7%) as their primary cooking fuel with alternative fuels and technologies like electricity, solar, LPG, and biogas accounting for a total of about 15% of fuel use for cooking (12.3% NG, 1.8% electricity, 1.4% biogas) (**Figure 15**).<sup>111</sup>

**Project Spotlight:** Sustainable conversion of waste into clean energy to reduce GHG emissions

**Sponsor:** UNIDO/GEF

**Timeline:** 2015 - 2019

**Description:** The proposed project activities promote the use of Waste to Energy (WTE) technologies. This area was selected due to their rapid scaling up and greenhouse gas (GHG) emissions reduction potential. More specifically the project aims at promotion of bio-waste to energy technologies, with a focus on biogas generation & utilization and landfill methane recovery & utilization. The proposed project covers one of the strategic focal area objectives that focuses on technologies at the stage of market demonstration and commercialization in Kenya.

**Source:** <https://open.unido.org/projects/KE/projects/120568>

<sup>104</sup> (World Bank Group, 2012)

<sup>105</sup> (Jambeck, et al., 2014)

<sup>106</sup> (World Resources Institute, 2017)

<sup>107</sup> (World Bank, 2017)

<sup>108</sup> (International Energy Agency, 2015)

<sup>109</sup> (World Bank, 2017)

<sup>110</sup> (World Bank, 2017)

<sup>111</sup> (Society for International Development; Kenya National Bureau of Statistics, 2013)

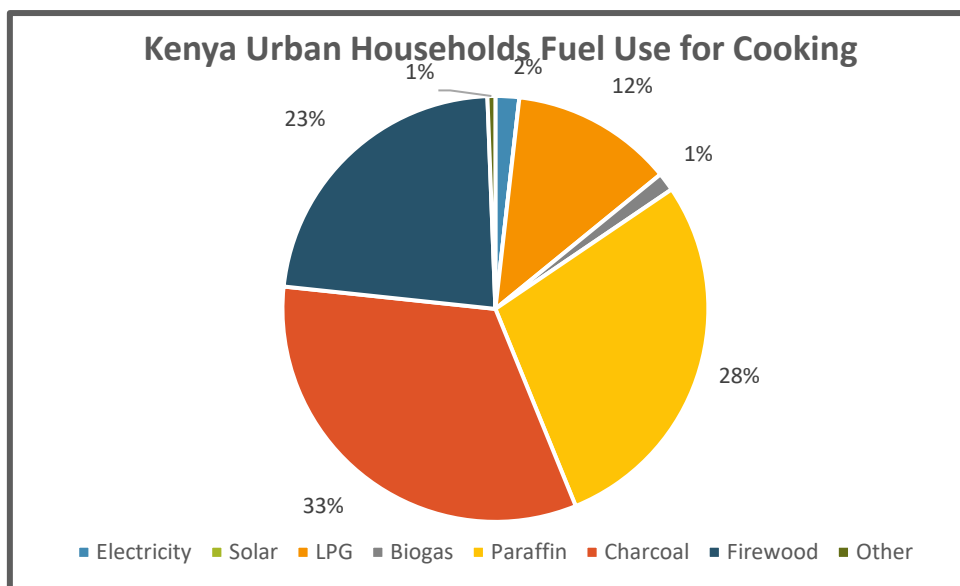


Figure 15: Kenya Urban Households Fuel Use for Cooking

Lighting sources were also surveyed indicating that the majority of lighting for urban households comes from electricity (51.4%), followed by lanterns (24%) and tin lamps (22%) (Figure 16).<sup>112</sup>

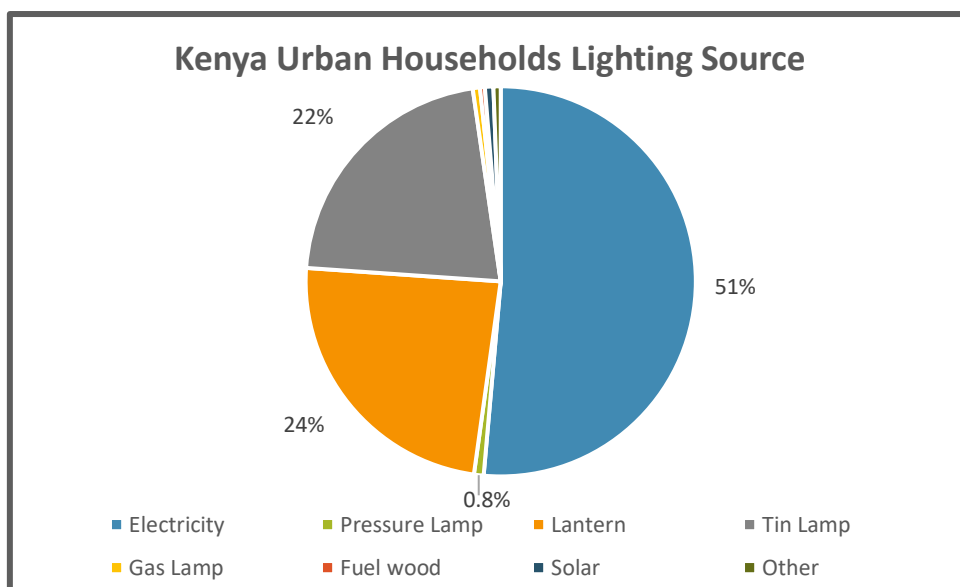


Figure 16: Kenya Urban Households Lighting Source

### National Energy/Electricity

In 2015, total final energy consumption for Kenya amounted to 15,753 ktoe with 68.3% coming from biomass and waste, 25% coming from oil products, and 4.3% and 2.2% coming from electricity and coal, respectively (Figure 17). The vast majority of this consumption (73.5%) came from the residential sector. Transportation and industry were the next largest sectors at 17% and 8.6%, respectively (Figure 18). By comparison, in 2010 total final energy consumption was around 12,928 ktoe with 72.9% from biomass and waste, 21.6% from oil products, and 4% and 1% from electricity and coal (Figure 17). In 2010, the majority of consumption (76.7%) was also from the residential

<sup>112</sup> (Society for International Development; Kenya National Bureau of Statistics, 2013)



sector with the transport sector accounting for 12.7% and the industrial sector accounting for 8.8% of total final energy consumption (**Figure 18**).<sup>113</sup>

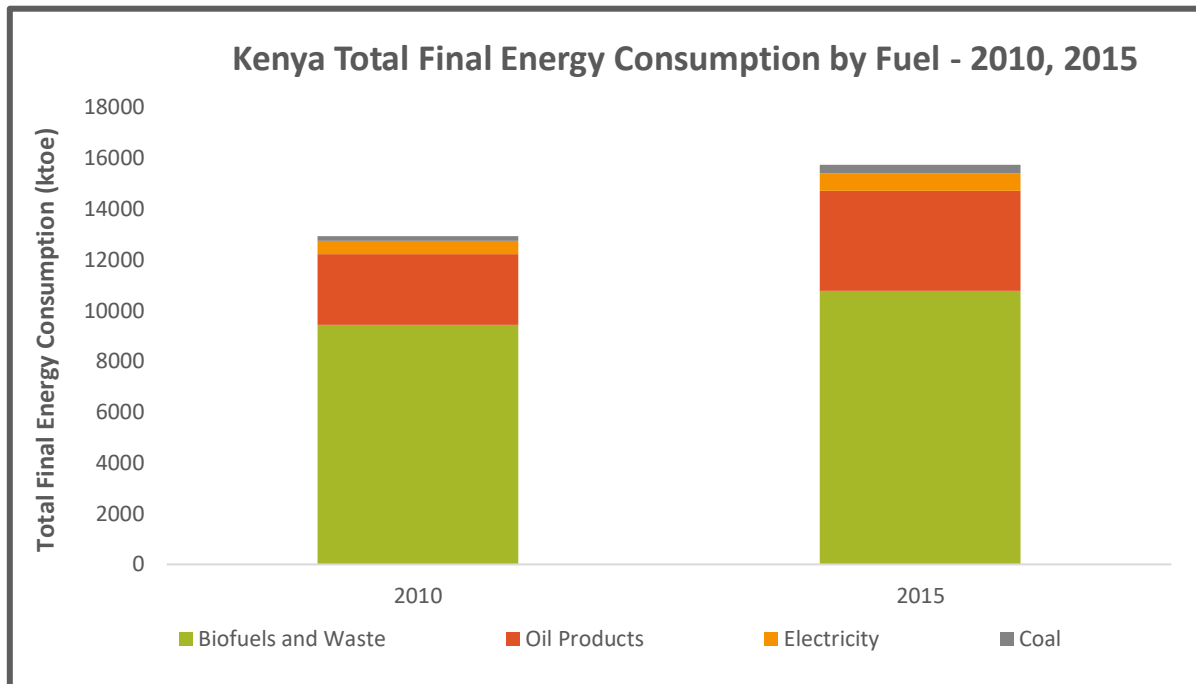


Figure 17: Kenya Total Final Energy Consumption by Fuel - 2010, 2015

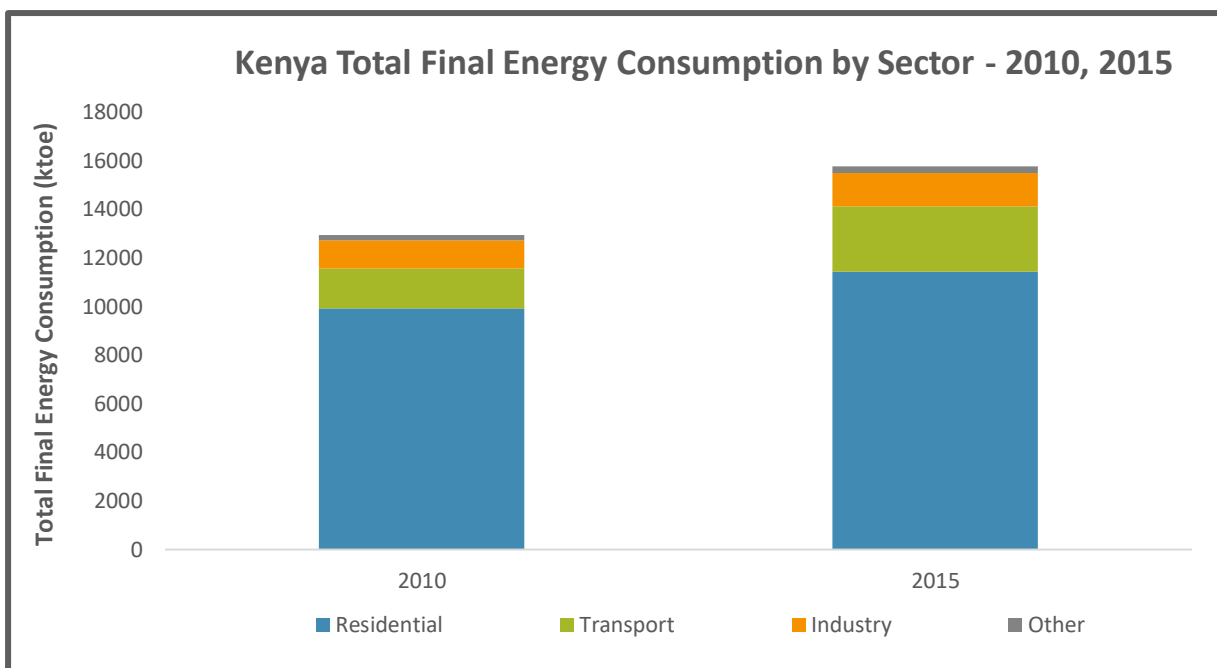


Figure 18: Kenya Total Final Energy Consumption by Sector - 2010, 2015

For electricity, in 2006 Kenya’s largest electricity provider, Kenya Power and Light Company (KPLC), had 1,177 MW of installed capacity (57% hydro, 31% thermal, and 10% geothermal), but by 2015,

<sup>113</sup> (International Energy Agency, 2015)

total installed capacity had increased 96% to 2307 MW (35% hydro, 36% thermal, and 27% geothermal) (Figure 19).<sup>114</sup>

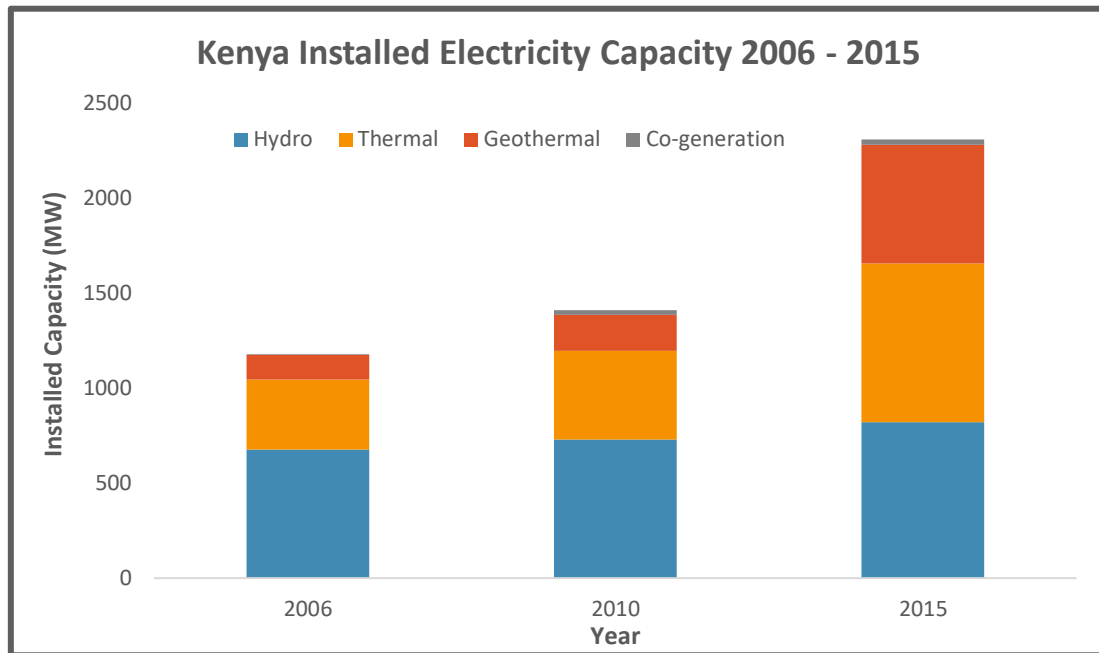


Figure 19: Kenya Installed Electricity Capacity 2006 – 2015

Electricity generation for KPLC tells a similar story increasing from 5906 GWh in 2006 to 9514 GWh in 2015 with geothermal accounting for the most generation at 4520 GWh (47.5%), followed by hydro at 3463 GWh (36.3%) and thermal at 1,412 GWh (14.8%) (Figure 20).<sup>115</sup> Total electricity consumption also grew from 4462 GWh in 2005 to an estimated 7,926 GWh in 2015. Though the industrial sector was the largest user (53%) in 2015, the residential sector was the fastest growing (45% growth from 2005 at an average rate of 7.8% per year).<sup>116</sup>

<sup>114</sup> (Kenya National Bureau of Statistics, 2016)

<sup>115</sup> (Kenya National Bureau of Statistics, 2016)

<sup>116</sup> (International Energy Agency, 2015)

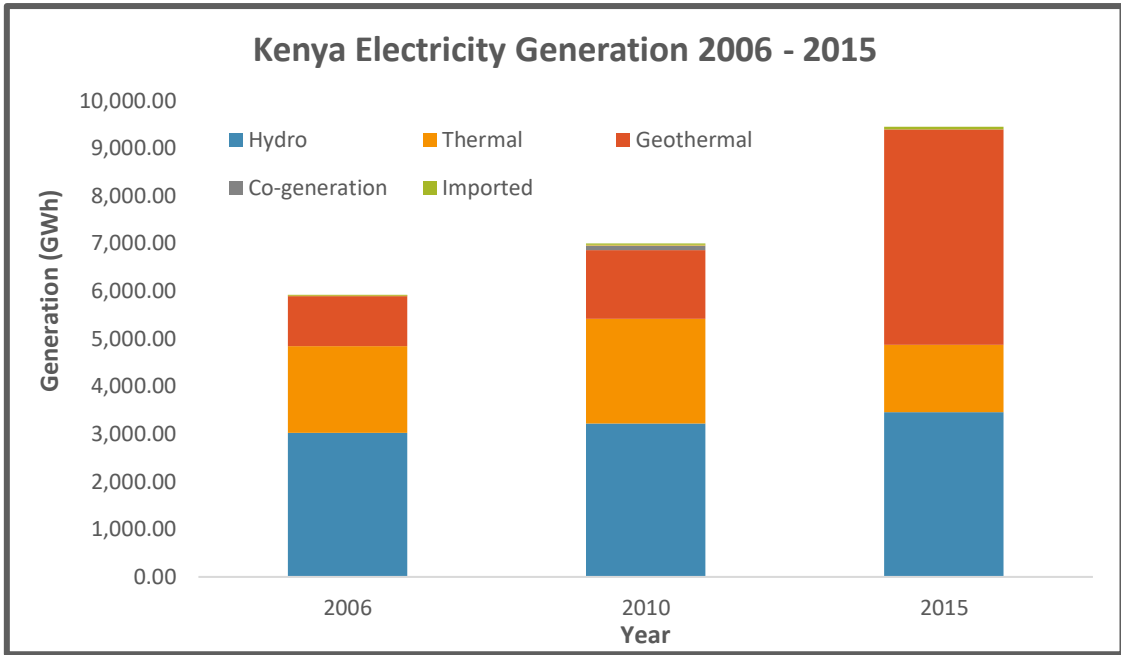


Figure 20: Kenya Electricity Generation 2006 – 2015

The costs of electricity use for the different customer types have been decreasing slightly over the last few years. In Kenya in 2015, the average electricity tariff for residential customers was 14 cents/kWh with other sectors at about 12 cents/kWh (Figure 21).<sup>117</sup>

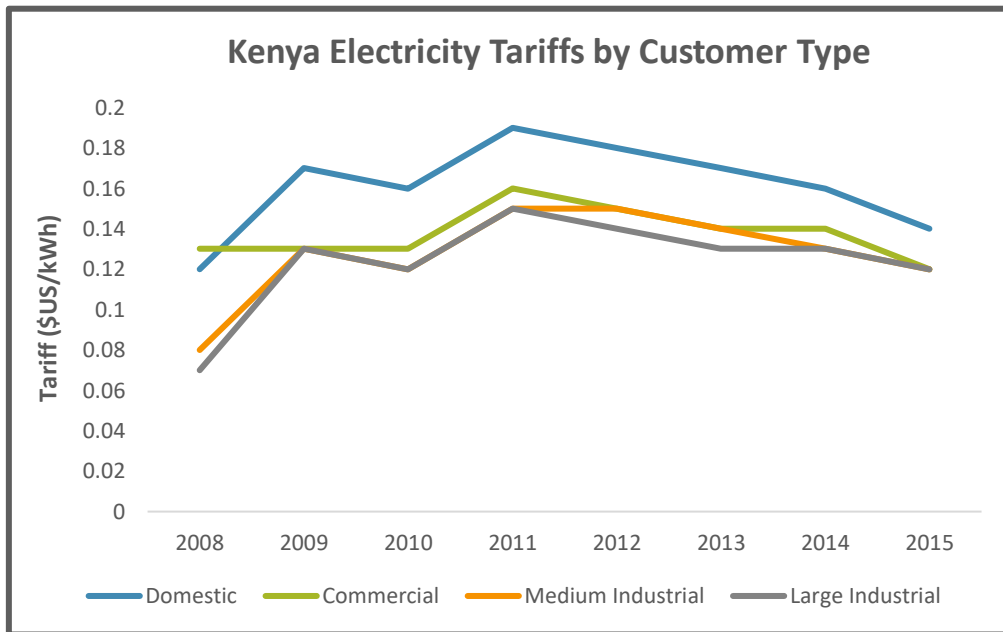


Figure 21: Kenya Electricity Tariffs by Customer Type

CO<sub>2</sub> emissions from electricity and heat production have declined from 28.2% of total fuel related emissions in 2000 to 13.3% in 2014.<sup>118</sup> Despite this, energy related GHG emissions in Kenya have

<sup>117</sup> (East African Community, 2016)

<sup>118</sup> (World Bank, 2017)

increased from 13.5 MMTCO<sub>2</sub>e in 2000 to 19.4 MMTCO<sub>2</sub>e in 2014 with direct electricity and heat production accounting for an estimated 8% of those emissions.<sup>119</sup>

### Water/Sanitation

In Kenya, an estimated 62% of people living in urban areas had access to safely managed drinking water<sup>120</sup> with an additional 25.9% of the urban population with access to at least basic service level.<sup>121</sup> By 2015, the proportion of the urban population with safely managed service levels declined to 54% and the proportion with access to basic service levels increased slightly to 28.9%. On the other end of the spectrum the proportion of the urban population utilizing surface water sources increased from 1.3% in 2000 to 6.9% in 2015. In 2000, 85.5% of the urban population had access to a piped-in improved drinking water source, but that number dropped significantly to 61.4% in 2015 (Figure 22).<sup>122</sup>

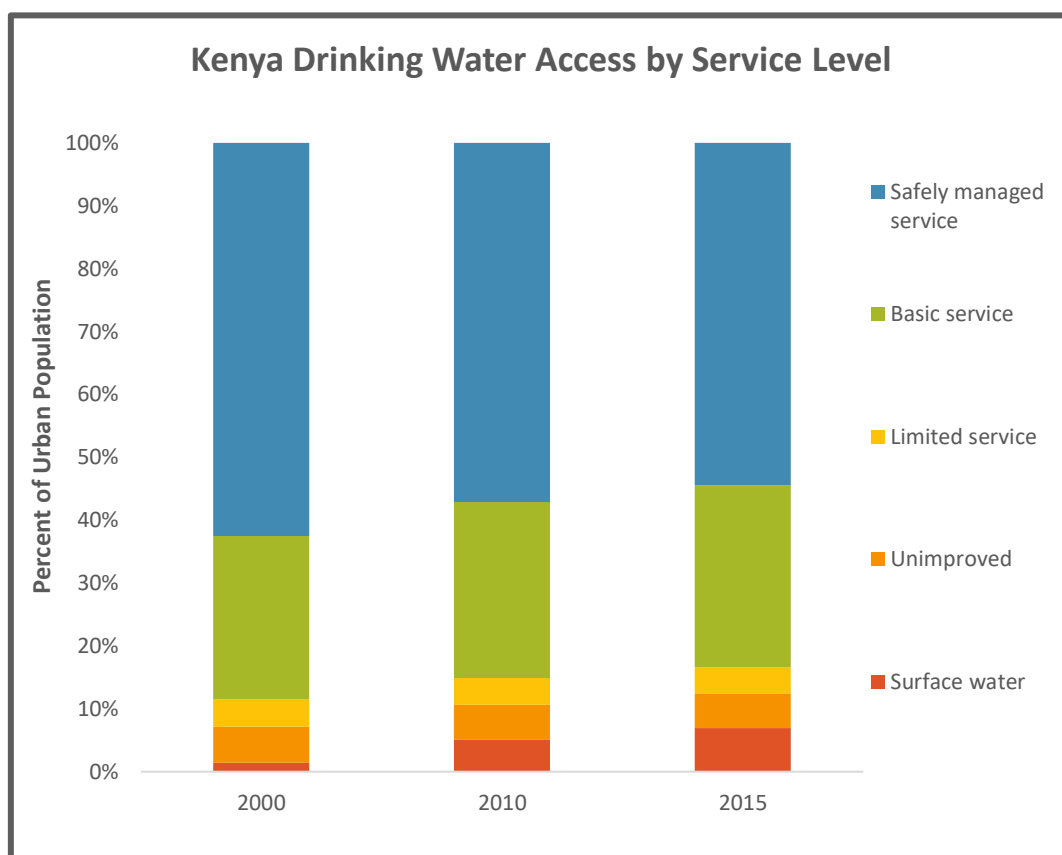


Figure 22: Kenya Drinking Water Access by Service Level

For sanitation, an estimated 35% of Kenyans had access to at least basic service levels<sup>123</sup> in 2015 and only 2.6% of the population practiced open defecation. Both of these figures are up slightly from 2000 where 33% of the population had at least basic service and 2.4% practiced open defecation. For facility type, proportion of the population with access to septic tanks and sewerage decreased

<sup>119</sup> (World Resources Institute, 2017)

<sup>120</sup> Safely managed is defined by the JMP as drinking water from an improved water source which is located on premises, available when needed and free from fecal and priority chemical contamination

<sup>121</sup> Basic level is defined by the JMP as drinking water from an improved source, provided collection time is not more than 30 minutes for a roundtrip including queuing

<sup>122</sup> (WHO/UNICEF, 2017)

<sup>123</sup> Basic level is defined by the JMP as the use of improved facilities which are not shared with other households

from 4.7% and 15.2%, respectively in 2000 to 4.3% and 9.1%, respectively in 2015 (**Figure 23**).<sup>124</sup> Finally, on hygiene, 26% of the urban population in Kenya had access to basic service<sup>125</sup> in 2010 while 56.9% had no access to a handwashing facility. In 2015, those estimates remained changed.<sup>126</sup>

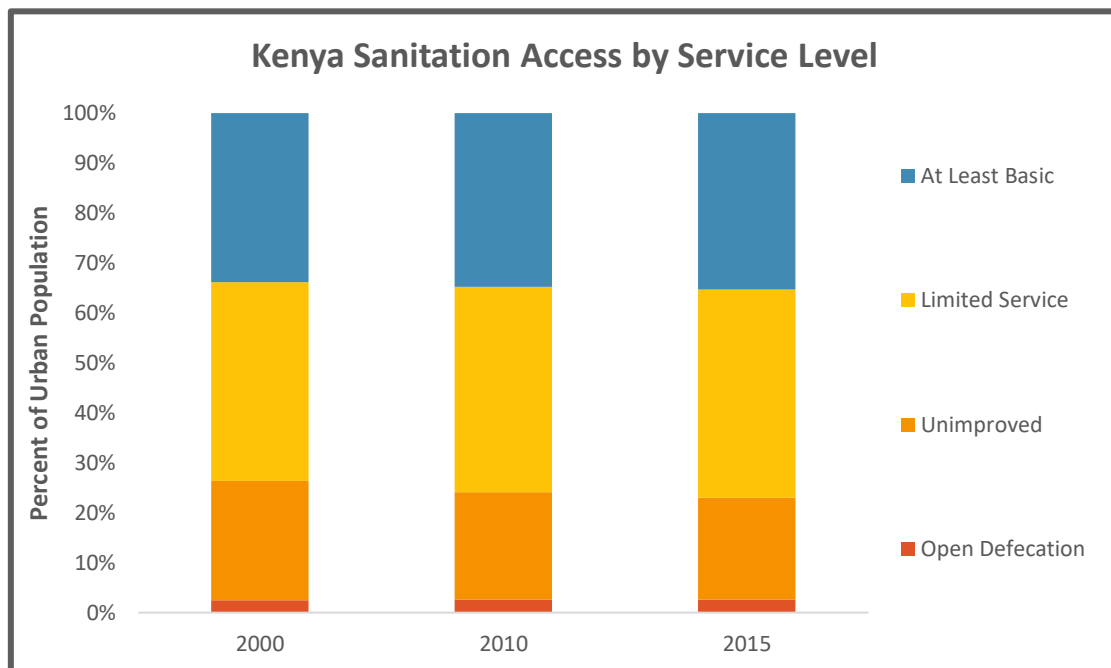


Figure 23: Kenya Sanitation Access by Service Level

### Capital City Spotlight

An estimated 2.2 million people lived in Nairobi in 2000. By 2015, that number had grown to 3.9 million people, and by 2030 over 7.1 million people could live in Nairobi (**Figure 24**).<sup>127</sup>

<sup>124</sup> (WHO/UNICEF, 2017)

<sup>125</sup> Basic service level is defined by the JMP as the availability of a handwashing facility on premises with soap and water

<sup>126</sup> (WHO/UNICEF, 2017)

<sup>127</sup> (United Nations Department of Economic and Social Affairs, Population Division, 2014)

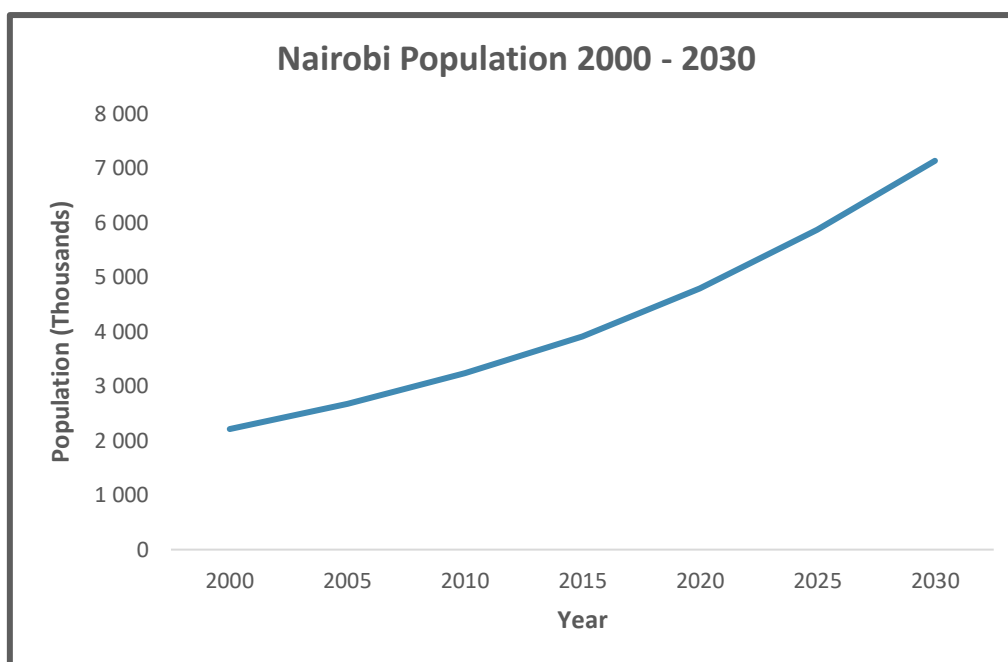


Figure 24: Nairobi Population 2000 – 2030

In 2009, Nairobi was estimated to have 98% coverage for basic drinking water and 47% coverage for basic sanitation.<sup>128</sup>

Electricity sales in Nairobi stood at about 3758 GWh in 2014/2015 with roughly 2/3 of those sales going to large industrial and commercial customers and 1/3 going to domestic customers.<sup>129</sup> In 2014, Nairobi was estimated to have just over 1 million residential customers and 48,000 commercial customers.<sup>130</sup> For lighting sources, the majority of households utilized electricity (72.3%), followed by lanterns (13.1%), and tin lamps (12.6%).<sup>131</sup> Average fuel prices were 112.53 KSh/liter for super petrol, 103.21 KSh/liter for diesel, and 82.58 KSh/liter for kerosene.<sup>132</sup>

### Planned and Ongoing Initiatives in Urban Sustainability

There are many initiatives related to urban sustainability both planned and ongoing in Kenya. A few select projects are highlighted in **Table 8** below, but for a more complete look at planned and ongoing initiatives, stakeholders, and policy frameworks in Kenya please refer to the accompanying excel document (**EAC Initiatives, Stakeholders, and Policies in Urban Sustainability**).

Table 8: Selected Urban Development Projects - Kenya

Location	Project	Description	Sponsor	Timeline
Nairobi	Switch Africa Green – Kenya <sup>133</sup>	The overall objective of SWITCH Africa Green is to support countries in Africa to achieve sustainable development by engaging in transition towards an inclusive green economy which has the potential to generate growth, create jobs and reduce poverty. The specific objective is to develop green business	European Union, UNEP, UNDP, UNOPS	Ongoing

<sup>128</sup> (WHO/UNICEF, 2017)

<sup>129</sup> (Kenya National Bureau of Statistics, 2016)

<sup>130</sup> (Kenya National Bureau of Statistics, 2015)

<sup>131</sup> (Society for International Development, 2017)

<sup>132</sup> (Kenya National Bureau of Statistics, 2015)

<sup>133</sup> (Switch Africa Green, 2017)

		entrepreneurship and the use of green economy and SCP practices in targeted sector(s) like leather/tanning, tourism, medicinal plants, etc.		
<b>National</b>	Urban Water and Sanitation OBA Fund for Low-Income Areas <sup>134</sup>	The objective of the Kenya Urban Water and Sanitation OBA Fund for Low-income Areas is to increase the number of people in low income areas with access to improved water supply and sanitation services. This objective will be realized by incentivizing urban WSPs to invest in water supply and sanitation improvement subprojects to benefit households in low income areas by applying one-off OBA subsidies to make water and sanitation access affordable.	World Bank; Water Services Trust Fund	2014 - 2018
<b>National</b>	National Urban Transport Improvement Project <sup>135</sup>	The objectives of the National Urban Transport Improvement Project for Kenya are to: (a) improve the efficiency of road transport along the Northern corridor; (b) improve the institutional capacity and arrangements in the urban transport sub-sector; and (c) promote the private sector participation in the operation, financing and management of transport systems.	World Bank; Ministry of Roads	2012 - 2018

## Rwanda

### *Key Challenges for Urban Sustainability*

In developing the country's national strategic plan, Rwanda Vision 2020, the government identified key urban sustainability challenges to address:

- **Transportation network constraints for economic development:** Given its geography and lack of regional railways, most trade related travel in Rwanda is conducted by road, but lack of investment and maintenance in road infrastructure has led to poor quality and effectiveness of the road network. All of this has resulted in high transportation and logistics costs, which inflates the price of domestically manufactured products and raises the price of raw materials and inputs thereby lowering the competitiveness of the manufacturing and industrial sectors in Rwanda.
- **Low infrastructure development:** While the governance and regulatory environments for doing business in Rwanda have improved, there remains a major challenge in reducing the infrastructure-related cost of doing business, especially the high cost of electricity and low level of energy production.
- **Private sector development and economy diversification:** For Rwanda's development, the emergence of a viable private sector that can take over as the principle growth engine of the economy is absolutely key. In addition to bringing about economic growth, particularly related to developing new and innovative secondary and tertiary sectors to diversify the heavily agricultural economy in Rwanda, private sector actors can also help to ensure the emergence of a middle class, accountability in governance, and access to services.
- **Urban planning and access to services:** Due to a lack of coordination and planning at local and regional levels, particularly in urban areas, Rwanda Vision set out to develop and update

<sup>134</sup> (World Bank, 2017)

<sup>135</sup> (World Bank, 2017)



urban master plans for basic infrastructure in urban centers. Unplanned, disorganized, and/or informal settlements have constrained Rwanda's rollout of infrastructure, particularly in water access, sanitation and sewage, and electricity supply; however, planning for more localized capacity and resources to address these issues should facilitate more sustainable outcomes.<sup>136</sup> There is also still insufficient awareness and understanding of urban planning tools, and capacity to adequately follow up on the rightful elaboration and implementation of urban planning documents.

Additional challenges have been identified, particularly ensuring that electricity supply meets the demand from end-users, including industrial users, and reduce the consumption of biomass and energy losses through inefficiency. Currently, energy-intensive industries do not produce at optimal levels due to insufficient allocation of electricity. According to International Growth Centre (IGC) and Laterite in 'Understanding Rwanda's Agribusiness and Manufacturing Sectors'<sup>137</sup>, constraints in energy consumption especially in manufacturing and agribusiness include the geographic coverage of electricity; difficulties of implementing energy-intensive manufacturing or agribusiness activities; and challenges to smaller firms that have not grown sufficiently to cover their fixed electricity costs.

### *Baseline for Urban Sectors*

#### *Urbanization*

Rwanda's total population has increased six-fold since 1950 growing at an average annual growth rate of about 2.6%. Looking closer at the last decade, Rwanda's overall population grew 26% (average annual growth rate ~2.6%/year) from about 9.4 million people (382 people/km<sup>2</sup>) in 2007 to over 11.9 million people (483 people/km<sup>2</sup>) in 2016. While Rwanda is still a predominantly rural country, over the same time period the urban population in Rwanda increased by 69% (~6.0%/year) from about 21% of the total population (2 million people) in 2007 to well over 29% of the population (3.5 million people) in 2016 (**Figure 25**).<sup>138139</sup>

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<sup>136</sup> (Republic of Rwanda, 2012)

<sup>137</sup> (Gathani & Stoelinga, 2013)

<sup>138</sup> (United Nations Department of Economic and Social Affairs, Population Division, 2017)

<sup>139</sup> (United Nations Department of Economic and Social Affairs, Population Division, 2014)

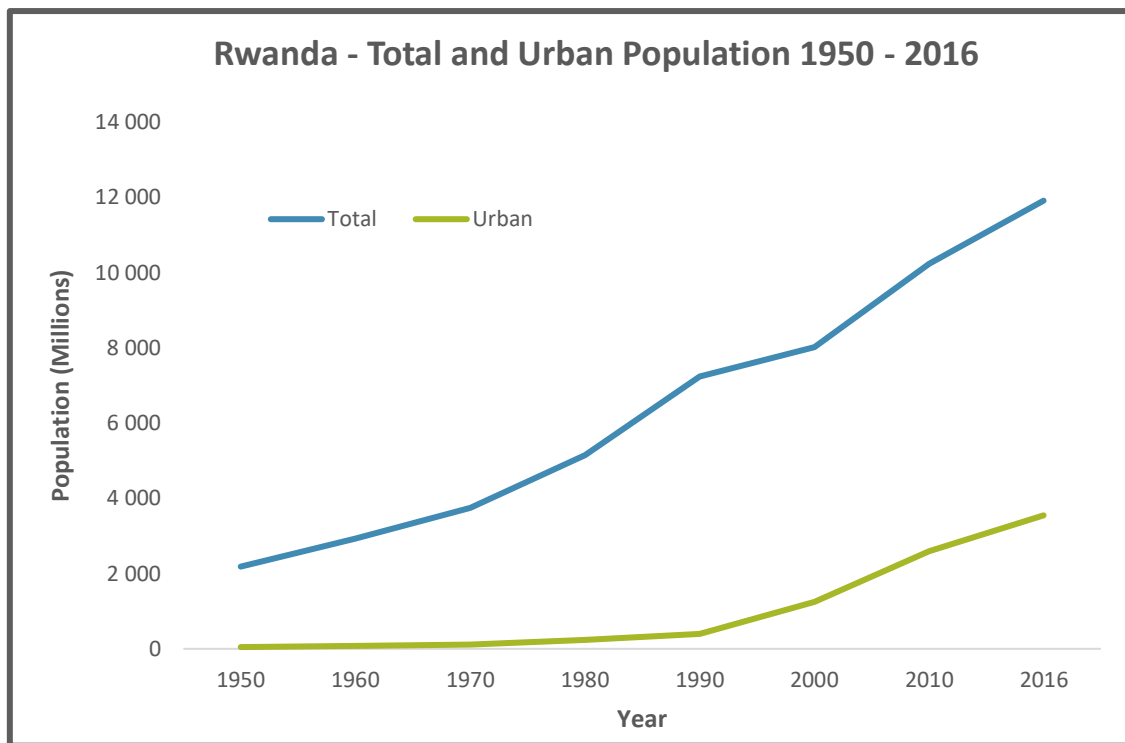


Figure 25: Rwanda Total and Urban Population 2007-2016

As of 2014, over 53% of the urban population in Rwanda still lived in slums, but that figure had declined significantly from the over 68% of the urban population living in slums in 2007. The urban population is also still heavily concentrated in Rwanda's largest city, Kigali. In 2007, Kigali alone accounted for 46% of the total urban population, but by 2016 that proportion dropped to about 36% of the total urban population.<sup>140</sup>

### Industrialization

Rwanda's GDP has more than doubled since the turn of the century to over \$8.8 billion (\$US 2010) in 2016. In that time the industrial sector (including manufacturing) has tripled in size to over \$1.5 billion (\$US 2010) representing approximately 17% of the Rwandan economy and 6.75% of the total employment in 2016. While the manufacturing sector still represents about 6% of the total GDP and the value added from the manufacturing sector has increased 226% since 2000, the proportion of the industrial sector value added from manufacturing has declined from 46% in 2000 to only 34% in 2016 (Figure 26).<sup>141</sup>

<sup>140</sup> (World Bank, 2017)

<sup>141</sup> (World Bank, 2017)

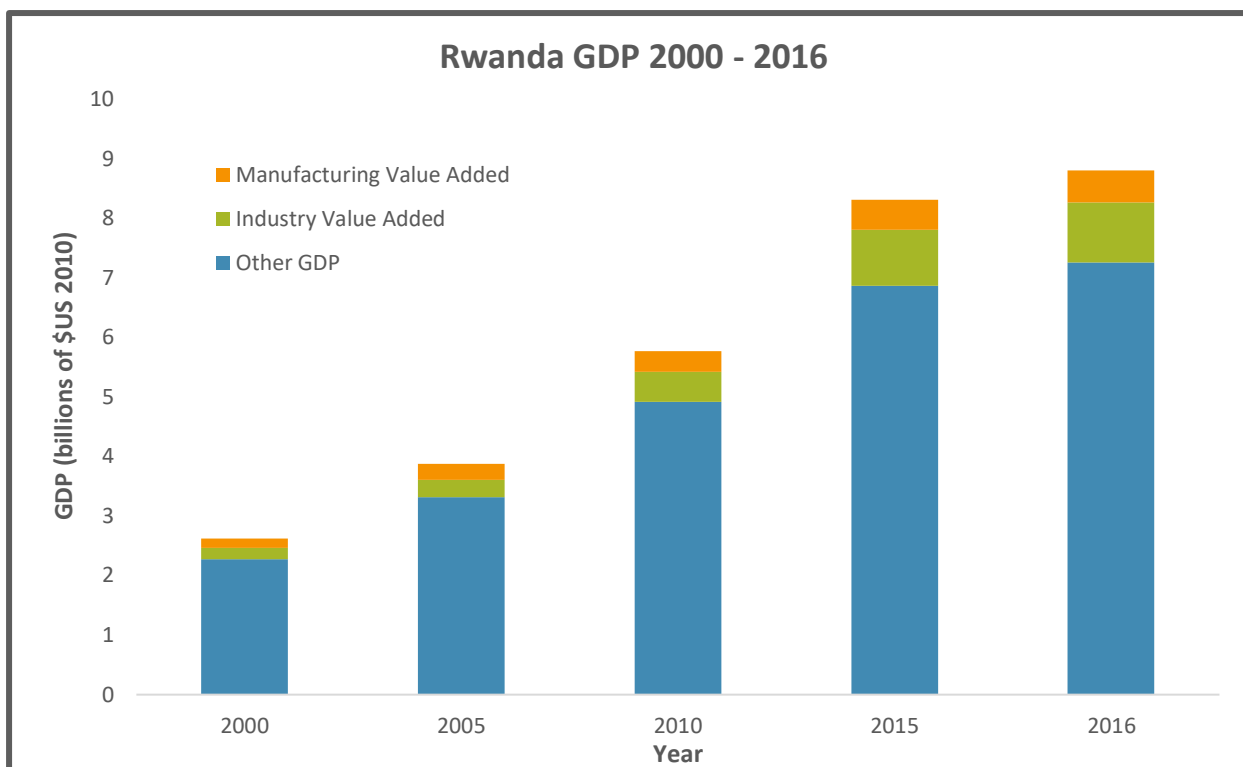


Figure 26: Rwanda GDP and Industrial/Manufacturing Value Added 2000 - 2016

With the growth in industrial output, Rwanda has also seen an increase in GHG emissions from industrial processes. In 2000, Rwanda’s industrial processes emitted an estimated 0.0419 MMTCO<sub>2e</sub>, but by 2014 that number had more than doubled to 0.1038 MMTCO<sub>2e</sub>.<sup>142</sup>

### Transportation

Of the overall population in Rwanda in 2014, a total of about 17.6% of households owned a transportation asset (15.8% of households owned a bicycle, .9% owned a motorcycle, and .9% owned a personal car), but looking solely at urban populations only 16% of households owned a transportation asset, but the number owning motorized transport, particularly cars increased substantially (9.7% bicycle, 1.8% motorcycle, 4.5% car).<sup>143</sup> Overall in 2015, there were about 7200

<sup>142</sup> (World Resources Institute, 2017)

<sup>143</sup> (National Institute of Statistics of Rwanda, 2014)

**Project Spotlight:** MobiliseYourCity: 100 Cities Engaged in Sustainable Urban Mobility Planning to Reduce Greenhouse Gas Emissions

**Sponsor:** Cooperation for Urban Mobility in the Developing World (CODATU)

**Timeline:** 2015 - 2020

**Description:** The project's aim is to support developing and transition cities and countries in better urban mobility planning to design more livable and prosperous cities for all, reduce congestions, road fatalities, noise and air pollution, and CO<sub>2</sub> emissions through the elaboration or revision of Sustainable Urban Mobility Plans between 2016 and 2020

**Source:**

[http://climateinitiativesplatform.org/index.php/MobiliseYourCity:\\_100\\_Cities\\_Engaged\\_in\\_Sustainable\\_Urban\\_Mobility\\_Planning\\_to\\_Reduce\\_Greenhouse\\_Gas\\_Emissions](http://climateinitiativesplatform.org/index.php/MobiliseYourCity:_100_Cities_Engaged_in_Sustainable_Urban_Mobility_Planning_to_Reduce_Greenhouse_Gas_Emissions)

registered buses, minibuses, or minibuses and over 147,800 registered cars, motorcycles, pick-ups, and jeeps in Rwanda.<sup>144</sup>

Compared to the total population which Over 81% of the urban population in Rwanda frequently utilizes public transportation (59.6% regularly, 22% often) despite almost 30% of households requiring 20-60 minutes of walking to reach public transportation. Compared to the total population where just over 50% frequently utilize public transportation (31.8% regularly, 18.3% often).<sup>145,146</sup>

In Rwanda in 2014 there was an estimated 6655 km of roads with national and district level paved

roads accounting for about 20% of the total network.<sup>147</sup> In 2014, the overall pump price for gasoline and diesel fuels was 1.41 \$US/liter down from about 1.73 \$US/liter in 2012.<sup>148</sup>

### *Solid Waste*

A 2012 World Bank study estimated that Rwanda currently generates about 0.52 kg of solid waste per capita per day (a total of about 822 tonnes/day), but those values are projected to increase to 0.85 kg/capita/day and 3,256 tonnes/day by 2025.<sup>149</sup>

For the country as a whole, the primary method of waste disposal (51.6% of households) is a compost heap with discarding waste in bushes/fields as the next highest disposal method (40.2% of households). In total about 6.2% of households at the national level utilize a collection service. Looking just at urban populations, collection services are the most common disposal method (35.8% of households) followed by discarding in bushes/fields (29.8% of households) and compost heap (29.5% of households).<sup>150</sup>

The estimated GHG impacts from the waste sector have increased 48% since the turn of the century, growing from 1.2604 MMTCO<sub>2</sub>e in 2000 to about 1.8718 MMTCO<sub>2</sub>e in 2014.<sup>151</sup>

### *Household Energy/Electricity*

While just 20% of the total population in Rwanda had access to electricity in 2014, the urban population with access to electricity has increased from about 39% in 2000 to over 71% in 2014.<sup>152</sup>

<sup>144</sup> (National Institute of Statistics of Rwanda, 2016)

<sup>145</sup> (National Institute of Statistics of Rwanda, 2014)

<sup>146</sup> (National Institute of Statistics of Rwanda, 2014)

<sup>147</sup> (National Institute of Statistics of Rwanda, 2016)

<sup>148</sup> (World Bank, 2017)

<sup>149</sup> (World Bank Group, 2012)

<sup>150</sup> (National Institute of Statistics of Rwanda, 2014)

<sup>151</sup> (World Resources Institute, 2017)

<sup>152</sup> (World Bank, 2017)

Consequently, in 2014 71.8% of the urban population utilized grid electricity for household lighting with the next largest lighting sources for urban populations being candles (9%), batteries (6.9%), and lanterns (6.7%) (Figure 27).<sup>153</sup>

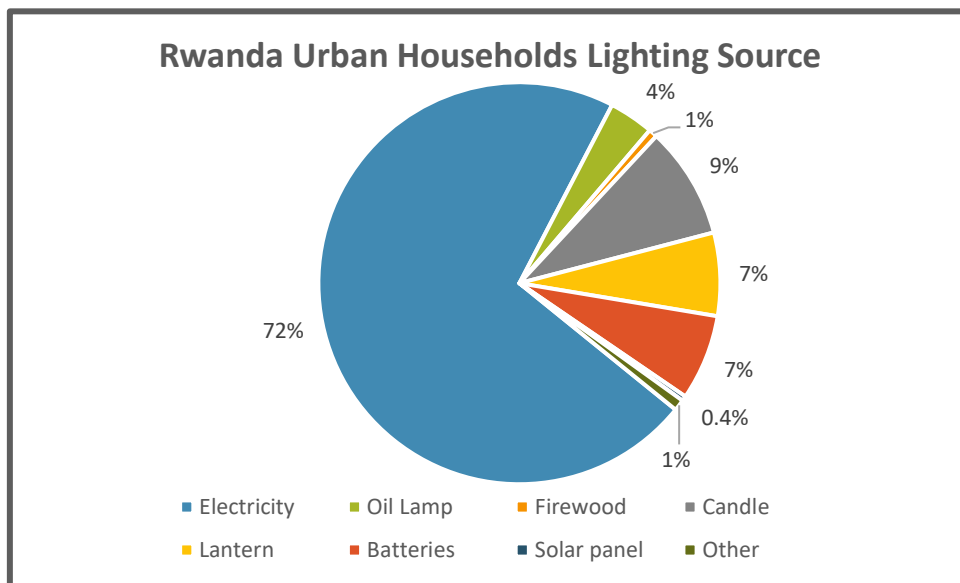


Figure 27: Rwanda Urban Households Lighting Source

Despite the growth in electricity usage for lighting, only about 2% of the total population had access to clean fuels for cooking in 2014.<sup>154</sup> At the national level, the vast majority of households utilize firewood (83.3%) or charcoal (15.2%) for cooking, but in urban populations those figures flip with 67.4% utilizing charcoal and 29.3% utilizing firewood in 2014 (Figure 28).<sup>155</sup>

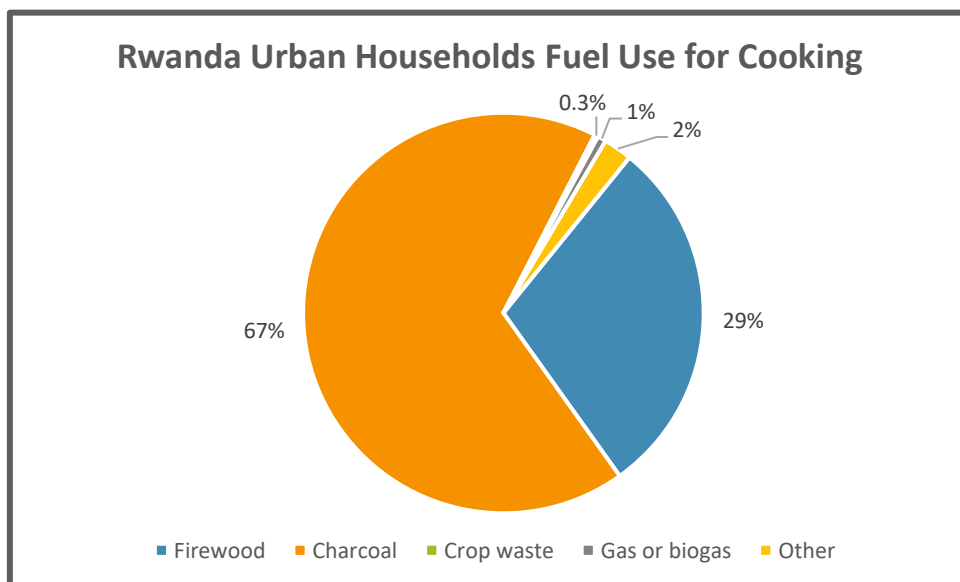


Figure 28: Rwanda Urban Households Fuel Use for Cooking

<sup>153</sup> (National Institute of Statistics of Rwanda, 2014)

<sup>154</sup> (World Bank, 2017)

<sup>155</sup> (National Institute of Statistics of Rwanda, 2014)

### National Energy/Electricity

In 2014, total energy consumption in Rwanda was dominated by wood fuels (57%) followed by charcoal (23%), petroleum (11%), peat (6%), and electricity (3%) (**Figure 29**).<sup>156</sup> Total GHG impacts from energy use in Rwanda were estimated at 1.7564 MMTCO<sub>2</sub>e in 2014 up 25% from the level in 2000.<sup>157</sup>

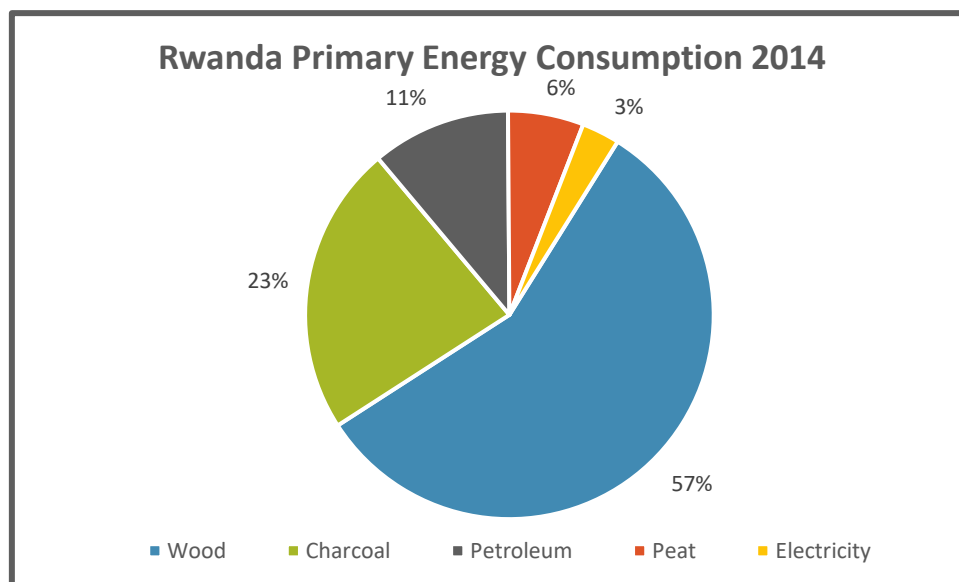


Figure 29: Rwanda Primary Energy Consumption by Fuel in 2014

For electricity, the government owned Rwanda Energy Group (REG) produces the overwhelming majority of electricity used in Rwanda. REG increased production 51.5% from over 345 GWh in 2011 to over 523 GWh in 2015.<sup>158</sup> Total customers also increased by about 111% to 562,950 in 2015.<sup>159</sup> Over the same time period industrial consumption saw a 42% increase in electricity consumption and a 20% increase in price to 96.2 GWh and 126 Rwfs/kWh, while residential consumption declined 9% to 233.3 GWh and increased 62.5% in price to 182 Rwfs/kWh.<sup>160</sup> For reliability of service, industrial/commercial customers were estimated to have an average of 4 outages per month costing about 2.6% of total sales in 2011.<sup>161</sup>

Currently, Rwanda's Utility Regulatory Authority (RURA's) total on-grid generation capacity stands at about 208.75 MW with thermal generation (diesel) accounting for the largest proportion at 40% followed by hydro at 25%. Despite this, the generation mix is 39% hydroelectric, 28% methane gas, and only 2% thermal (**Figure 30**).<sup>162</sup> Rwanda plans to achieve 512MW installed power generation capacity by 2023/24, and universal access (100%) by 2023/24, with on grid connections representing 52% and off-grid 48% by 2023/24.<sup>163</sup>

<sup>156</sup> (Lund & Tilahun, 2015)

<sup>157</sup> (World Resources Institute, 2017)

<sup>158</sup> (National Institute of Statistics of Rwanda, 2016)

<sup>159</sup> (National Institute of Statistics of Rwanda, 2016)

<sup>160</sup> (National Institute of Statistics of Rwanda, 2016)

<sup>161</sup> (World Bank, 2017)

<sup>162</sup> (Rwanda Utilities Regulatory Authority, 2017)

<sup>163</sup> (Rwanda Development Board, 2017)

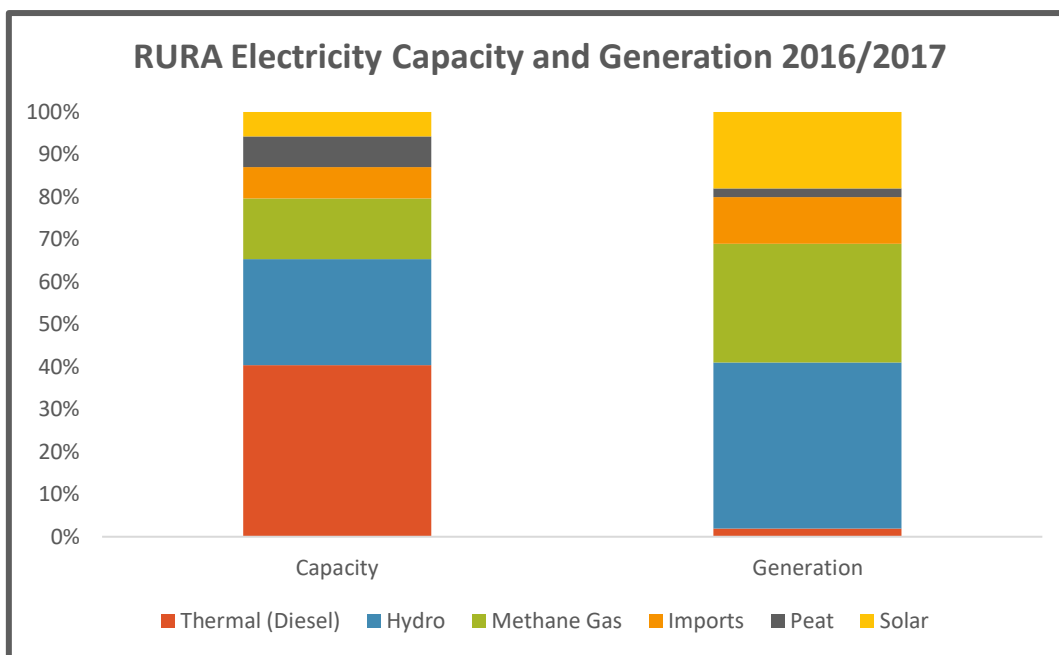


Figure 30: Rwanda Electricity Capacity and Generation Mix 2016-2017

Electricity tariffs in Rwanda are high compared to other countries in the EAC staying relatively constant at about 23 cents/kWh for large industrial customers, 20 cents/kWh for residential customers, and 19 cents/kWh for commercial customers (Figure 31).<sup>164</sup> More detailed tariff information can be seen in Table 9 below.<sup>165</sup>

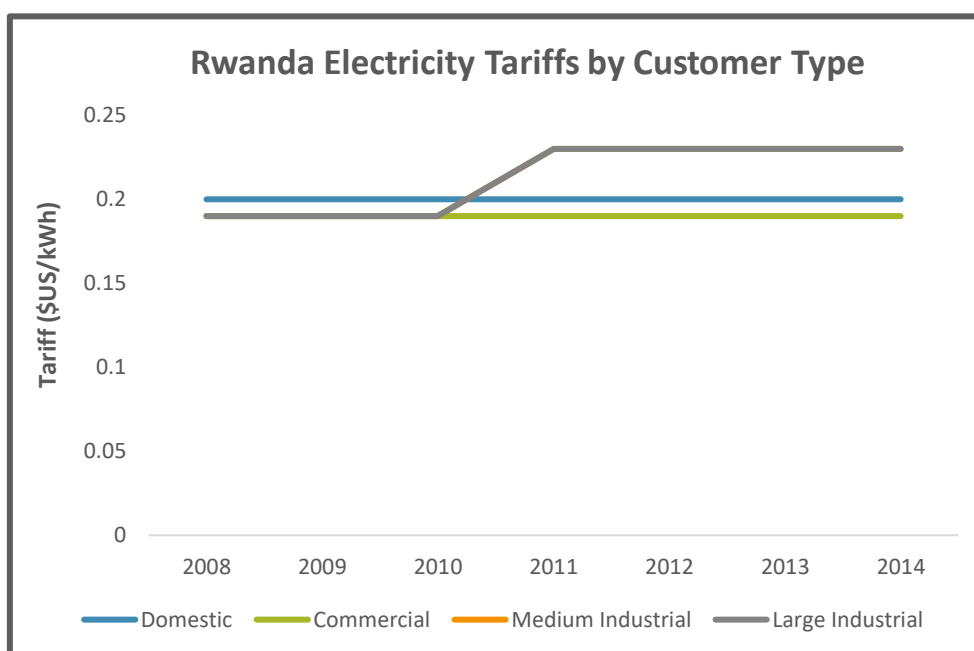


Figure 31: Rwanda Electricity Tariffs by Customer Type

Table 9: Rwanda Detailed Electricity Tariffs by Customer Class

<sup>164</sup> (East African Community, 2016)

<sup>165</sup> (Rwanda Development Board, 2017)



Customer Class	Fixed charge RWF	Description of Energy Charge	Energy charge (RWF/kWh) VAT Exclusive
Residential Customers	N/A	0-15 kWh	89/ (0.10 USD)
		15 – 500 kWh	182/ (0.21 USD)
		>50	189/ (0.22 USD)
Non-Residential Customers	N/A	0-100	189/ (0.22 USD)
		>100	192/ (0.224 USD)
Industrial Customers (Small Industries including water treatment plants, water pumping stations and telecom towers)	N/A	N/A	126/ (0.147 USD)
Industrial Customers (Medium Industries: 0.4 kV<V≤15 kV)	3,125	N/A	90/ (0.105 USD)
Industrial Customers (Medium Industries: 15 kV<V≤33 kV)	3,125	N/A	83/ (0.097 USD)

Grid loss is still a significant problem for Rwanda's electricity grid. REG prepared a Grid Loss Reduction Plan in 2014, which aims at reducing grid energy losses from 23% to 15% by 2018 by targeting both technical and non-technical losses. Implementation is currently underway, with one project of EUR 23 million starting in 2015, funded by the EU, which expects to reduce grid losses to 17%. With reducing energy losses, costs would also be reduced. Economic analysis of major reduction in losses potential in CoK carried out in 2013 under the old name of REG Ltd (Energy Water and Sanitation Authority), found that there were potential savings of USD180 million.<sup>166</sup>

### *Water/Sanitation*

At the start of the century, the JMP estimated that 73.1% of urban households (47% at the national level) in Rwanda had access to at least basic access<sup>167</sup> to drinking water (almost 26% had safely managed access<sup>168</sup>). By 2015, 76.8% of urban households had at least basic access with over 36% having safely managed access (**Figure 32**). In terms of facility, 72% of the urban population had access to a piped in improved water source in 2015 and 16% of households had access to a non-piped in improved source.<sup>169</sup> The Integrated Household Living Conditions Survey EICV4 Thematic Report estimated a total of 90% of urban households utilized an improved drinking water source in 2014 with 42.6% of households using a public standpipe, 39.4% having water piped into their dwelling/yard, and 6.7% accessing a protected spring. Outside of the 39.4% with water pumped on-site, it was further estimated that 20.5% of urban populations in Rwanda were 0-200 meters from an

<sup>166</sup> Present Value of Savings from baseline value of 2011.

<sup>167</sup> Basic level is defined by the JMP as drinking water from an improved source, provided collection time is not more than 30 minutes for a roundtrip including queuing

<sup>168</sup> Safely managed is defined by the JMP as drinking water from an improved water source which is located on premises, available when needed and free from fecal and priority chemical contamination

<sup>169</sup> (WHO/UNICEF, 2017)

improved source and 12.2% were 201-500 meters from an improved source. For time to the improved source, 18.2% of urban households reported being 0-4 minutes away and 21.2% reported being 5-14 minutes away.<sup>170171</sup>

From 2011 to 2015, the Water and Sanitation Company (WASAC) in Rwanda saw a 62% increase in customers from 102,997 in 2011 to 167,265 in 2015.<sup>172</sup> Over the same time period, WASAC water production increased 33% from over 31.3 million m<sup>3</sup> in 2011 to over 42 million m<sup>3</sup> in 2015.<sup>173</sup> The cost of water consumption has also increased from 240 Rwfs/m<sup>3</sup> for the lowest consumption tier (740 Rwfs/m<sup>3</sup> for the highest tier and 593 Rwfs/m<sup>3</sup> for industry) in 2008 to 323 Rwfs/m<sup>3</sup> for the lowest tier (847 Rwfs/m<sup>3</sup> for the highest and 736 Rwfs/m<sup>3</sup> for industry) in 2015.<sup>174</sup>

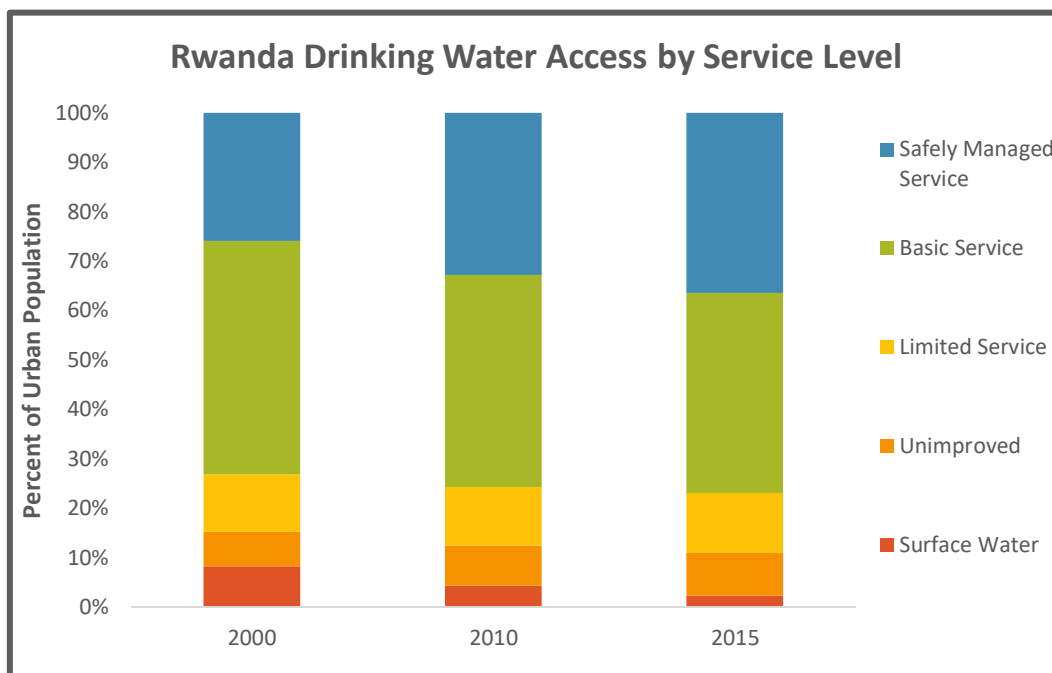


Figure 32: Rwanda Drinking Water Access by Service Level

For sanitation, the JMP estimated that 57.3% of urban populations (44% nationally) had access to at least basic sanitation<sup>175</sup> in 2000 and 2015.<sup>176</sup> For facilities, 52.3% of the urban population was covered by an improved latrine and 4% was covered by a sewerage system.<sup>177</sup> The Integrated Household Living Conditions Survey EICV4 Thematic Report estimated that 93.5% of the urban population in Rwanda utilized improved sanitation in 2014 with 47.2% not sharing with other households and 8.6% having a flush toilet (Figure 33).<sup>178</sup> Finally, for hygiene, the JMP estimates that over 89% of the urban population in Rwanda lacked access to a handwashing facility and only 7%

<sup>170</sup> (National Institute of Statistics of Rwanda, 2014)

<sup>171</sup> (National Institute of Statistics of Rwanda, 2014)

<sup>172</sup> (National Institute of Statistics of Rwanda, 2016)

<sup>173</sup> (National Institute of Statistics of Rwanda, 2016)

<sup>174</sup> (National Institute of Statistics of Rwanda, 2016)

<sup>175</sup> Basic level is defined by the JMP as the use of improved facilities which are not shared with other households

<sup>176</sup> (WHO/UNICEF, 2017)

<sup>177</sup> (WHO/UNICEF, 2017)

<sup>178</sup> (National Institute of Statistics of Rwanda, 2014)

had access to basic hygiene services.<sup>179</sup> In 2015 that figure improved to 12.6% with basic access and only 80% lacking access to a handwashing facility.<sup>180</sup>

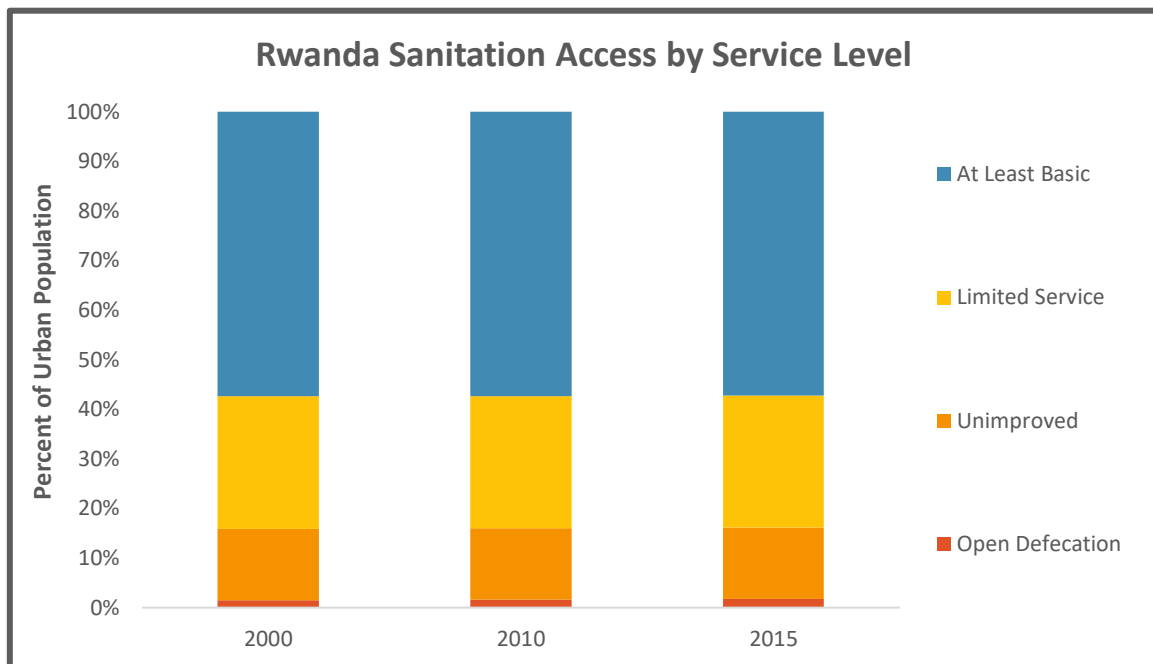


Figure 33: Rwanda Sanitation Access by Service Level

### Capital City Spotlight

The population of Kigali has more than doubled over the past 15 years from an estimated 578,000 people in 2000 to over 1.2 million people in 2015. Further, projections from the World Urbanization prospects suggest that by 2030, Kigali could be home to more than 2.2 million people (Figure 34).<sup>181</sup>

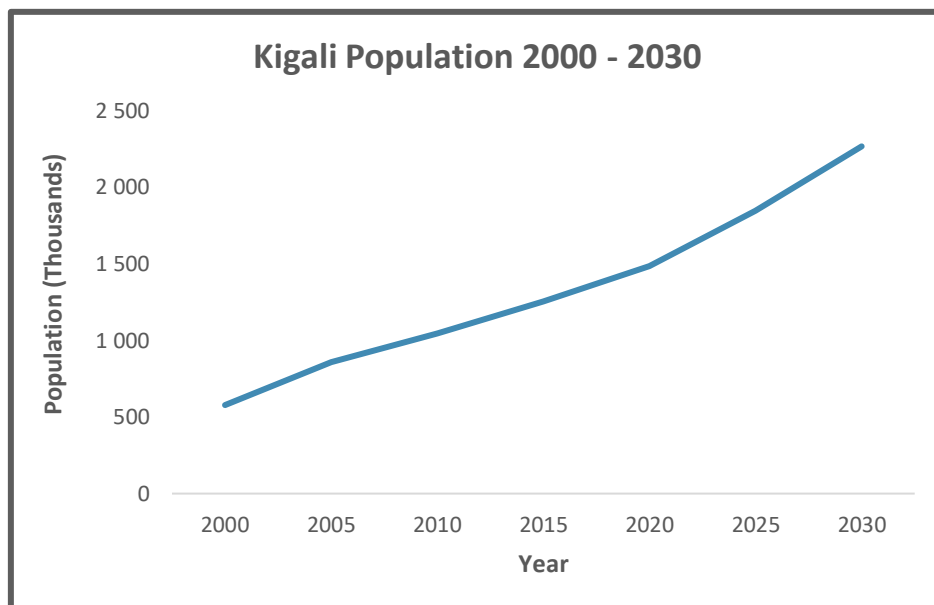


Figure 34: Kigali Population 2000 – 2030

<sup>179</sup> Basic service level is defined by the JMP as the availability of a handwashing facility on premises with soap and water

<sup>180</sup> (WHO/UNICEF, 2017)

<sup>181</sup> (United Nations Department of Economic and Social Affairs, Population Division, 2014)

In 2015, the city of Kigali had 188,490 electricity customers which was up 58% from 2011.<sup>182</sup> The majority of people (73.3%) in Kigali were using electricity from the grid for lighting in 2014. Other common lighting sources were candles (10.9%), batteries (9.5%), lanterns (2.2%), and oil lamps (2.2%) (Figure 35). For cooking, the predominant sources were charcoal (70.8%) and firewood (25.6%).

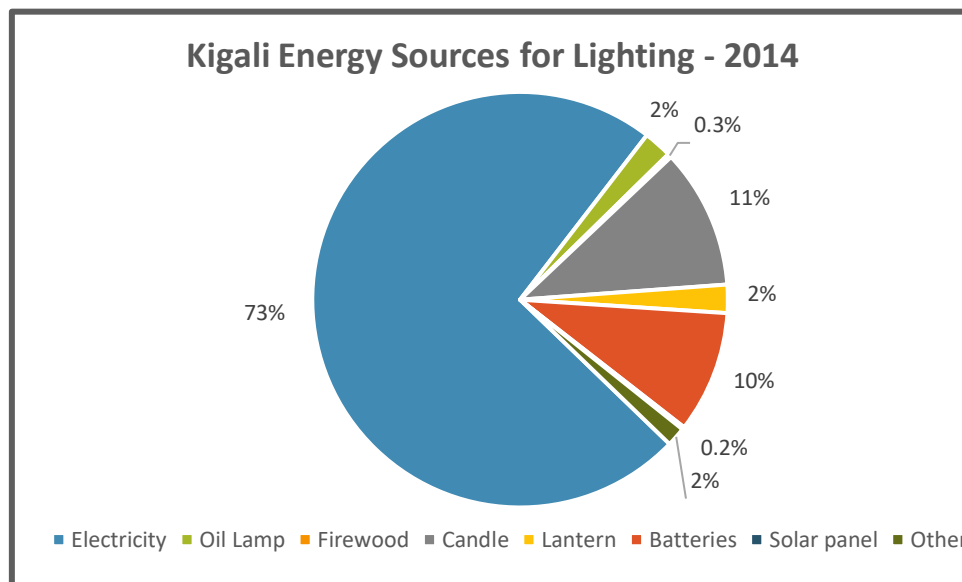


Figure 35: Kigali Energy Sources for Lighting - 2014

Water customers in Kigali increased from 59,187 in 2011 to 89,216 at the end of 2015.<sup>183</sup> In 2014, the most common water sources for Kigali were piped into yard/dwelling (36.8%) and public standpipe (35.6%), followed by protected spring (10.1%) (Figure 36). In total Kigali had 86% of its population with access to an improved water source in 2014. That access varied across households as 36.8% had access in their yard/dwelling, 15.6% had to travel up to 200 meters, 11.5% had to travel 201 – 500 m, 6.5% had to travel up to 1000 m, and 3% had to travel more than 1 km. Consequently, the mean travel time to access water in Kigali was 8.1 minutes with 31.4% of households needing to travel at least 5 minutes for water access and 5.2% needing to travel at least 30 minutes. In addition to this, 35.2% of households in Kigali had a rainwater catchment system. For sanitation, 42.2% of households in Kigali had an improved sanitation source not shared with other households and 8.5% had access to a flush toilet.<sup>184</sup>

<sup>182</sup> (National Institute of Statistics of Rwanda, 2016)

<sup>183</sup> (National Institute of Statistics of Rwanda, 2016)

<sup>184</sup> (National Institute of Statistics of Rwanda, 2014)

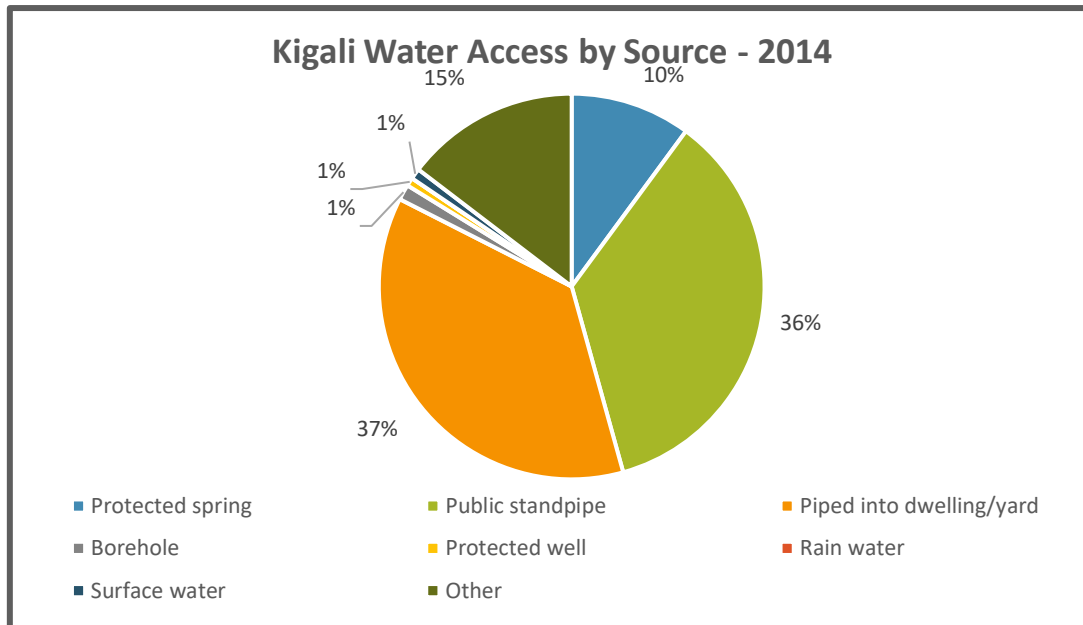


Figure 36: Kigali Water Access by Source – 2014

In the transportation sector, 85.7% of households in Kigali utilized public transit regularly or often in 2014 even though 36% of households were a 20-119 minute walk from the nearest public transportation. In Kigali, 14.2% of households owned a transportation asset (8.2% bicycle, 1.1% motorcycle, 4.9% personal motor vehicle).<sup>185</sup>

For waste management, 46.5% of households were served by a collection service in 2014 and 20.6% of households utilized a compost heap, but 30.7% of households discarded waste in fields and bushes.<sup>186</sup> Kigali generated an estimate 0.6 kg/capita/day of solid waste in 2012.<sup>187</sup>

### Planned and Ongoing Initiatives in Urban Sustainability

There are many initiatives related to urban sustainability both planned and ongoing in Rwanda. For a more complete look at planned and ongoing initiatives, stakeholders, and policy frameworks in Rwanda please refer to the accompanying excel document (**EAC Initiatives, Stakeholders, and Policies in Urban Sustainability**), but a few select projects are highlighted in **Table 10** below:

Table 10: Selected Urban Development Projects - Rwanda

Location	Project	Description	Sponsor	Timeline
<b>Kigali and Secondary Cities</b>	Rwanda Urban Development Project <sup>188</sup>	The objective of the Urban Development Project for Rwanda is to provide access to basic infrastructure and enhance urban management in selected urban centers of the participating districts. Eligible investments are those that are directly under the mandate of the district governments such as roads, drainage, solid waste management, and sanitation.	World Bank; Ministry of Infrastructure	2016 - 2021
<b>National</b>	Climate Resilient Green	Climate Resilient Green Cities project includes: 1) Designing a low carbon and climate resilient strategic	GGGI; Ministry of Infrastructure	Ongoing

<sup>185</sup> (National Institute of Statistics of Rwanda, 2014)

<sup>186</sup> (National Institute of Statistics of Rwanda, 2014)

<sup>187</sup> (World Bank Group, 2012)

<sup>188</sup> (World Bank, 2017)

	Cities and Technical Support to the Rwanda Environment and Climate Change Fund Facility <sup>189</sup>	and technical action plans to develop Rwandan cities as poles of job-creation, green infrastructure and investments; 2) Conducting baseline analysis of six secondary Rwandan cities; 3) Developing a green growth framework and guidelines to assist policymakers and practitioners implement green urban development; 4) Developing a National Roadmap to support a coordinated and efficient promotion of secondary cities; 5) Facilitating knowledge sharing programs in order to enhance in-house capacity	(MININFRA); Ministry of Finance and Economic Planning (MINECOFIN); Ministry of Natural Resources (MINIRENA); Rwanda Environment Management Authority(REMA)	
<b>Kigali</b>	Kigali Bulk Water Project <sup>190</sup>	The project is expected to have strong development outcomes by: 1) providing clean potable water to the population therefore contributing to improving public health, 2) addressing Rwanda's growing demand in industry sector for reliable water, 3) economic growth due to improved productivity particularly for women and redeployment of Government budgetary savings to the Health sector and other economic sectors. and 4) strong demonstration effect given this is the country's first Independent Water Producer ("IWP") project on a large scale in the continent therefore contributing to private sector development.	AfDB	Ongoing

## South Sudan

### *Key Challenges for Urban Sustainability*

South Sudan's most recent Development Plan outlines several economic development objectives to overcome challenges in country. First, the plan looks to expand and diversify private sector involvement in the economy to drive growth, employment, and livelihoods. This will include reforms in governance and regulatory frameworks that remove key constraints on private sector development, strengthen financial services, and invest in infrastructure to extend and upgrade current transportation networks to support more connected and effective markets, particularly for agricultural trade. Water and sanitation services and electrification will also receive priority attention due to their impact on poverty, growth, and human well-being. Both will receive resources to continue expanding access to these basic services and to strengthen operations and maintenance.<sup>191</sup>

South Sudan's 2012 Millennium Development Goals Status Report highlighted additional challenges for environmental sustainability in the country, namely:

<sup>189</sup> (Global Green Growth Institute, 2017)

<sup>190</sup> (Africa Development Bank, 2015)

<sup>191</sup> (Government of South Sudan, 2011)

- Lack of resources to facilitate investment in conservation, water quality and monitoring. Available information indicates that problems of sustainability are often due to inappropriate choice of technology type, location or design;
- Inadequate public awareness of sanitation or hygiene issues. Effective integration of sanitation and hygiene education with water supply interventions will depend on co-ordination and collaboration mechanisms between water sector agencies and other agencies such as education and health;
- Increased deforestation due to firewood and charcoal usage as there is no adequate alternative energy sources that do not use solid fuels;
- Lack of community participation in environment and natural resources management;
- Poor quality of surface and ground water; and
- Inequitable promotion of improved sanitation facilities.<sup>192</sup>

### Baseline for Urban Sectors

#### Urbanization

After its independence from Sudan in 2011, South Sudan had a total population of about 10 million people with about 1.7 million of those people (18%) living in urban areas. By 2016, total population in South Sudan had risen to an estimated 12.5 million people with 2.3 million (19%) living in urban areas (**Figure 37**).

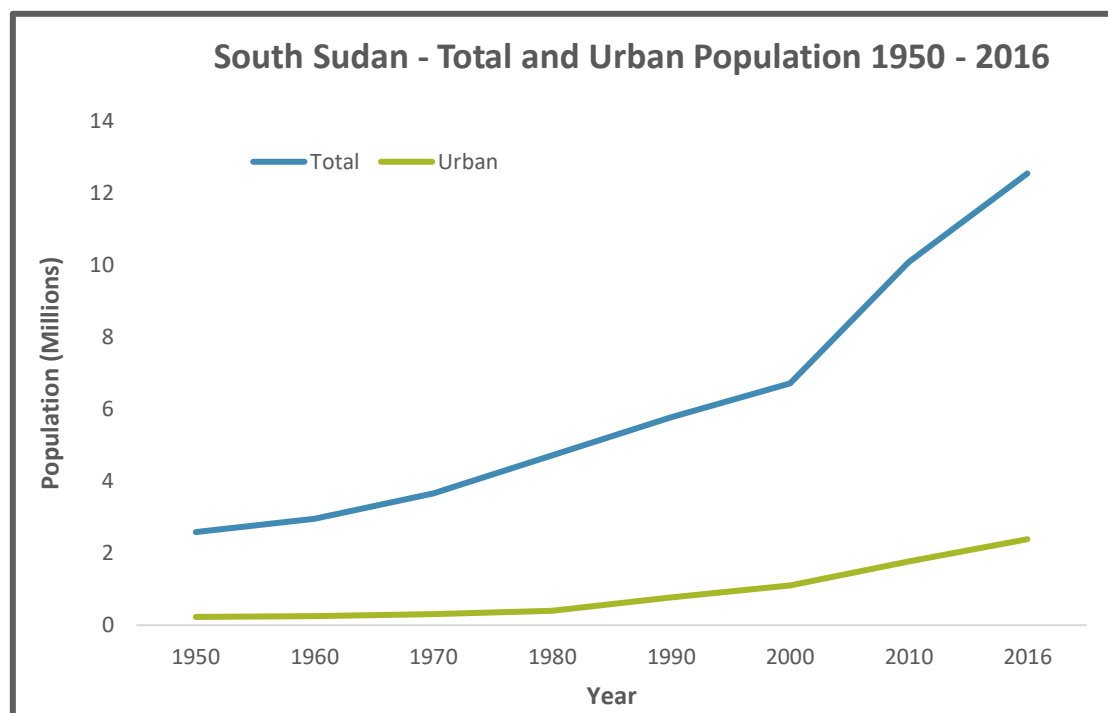


Figure 37: South Sudan Total and Urban Populations 1950 – 2016

The overwhelming majority (95.6%) of the urban population in South Sudan lived in slums in 2014, but the total urban population was relatively distributed as only 14.4% (336,232 people) of the total urban population lived in the largest city, Juba, in 2016.<sup>193</sup>

<sup>192</sup> (South Sudan National Bureau of Statistics, 2012)

<sup>193</sup> (World Bank, 2017)



### Industrialization

GDP in South Sudan stood at about \$8 billion (\$US-2010) in 2012 following its independence the year prior. GDP rose substantially over the next two years to more than \$9.4 billion (\$US-2010) in 2014 before falling to \$8.8 billion (\$US-2010) in 2015. In 2014, manufacturing and industrial processes played a very minor role in CO<sub>2</sub> emissions in South Sudan contributing only 0.6% of all emissions (~9,800 MTCO<sub>2</sub>) (Figure 38).<sup>194</sup>

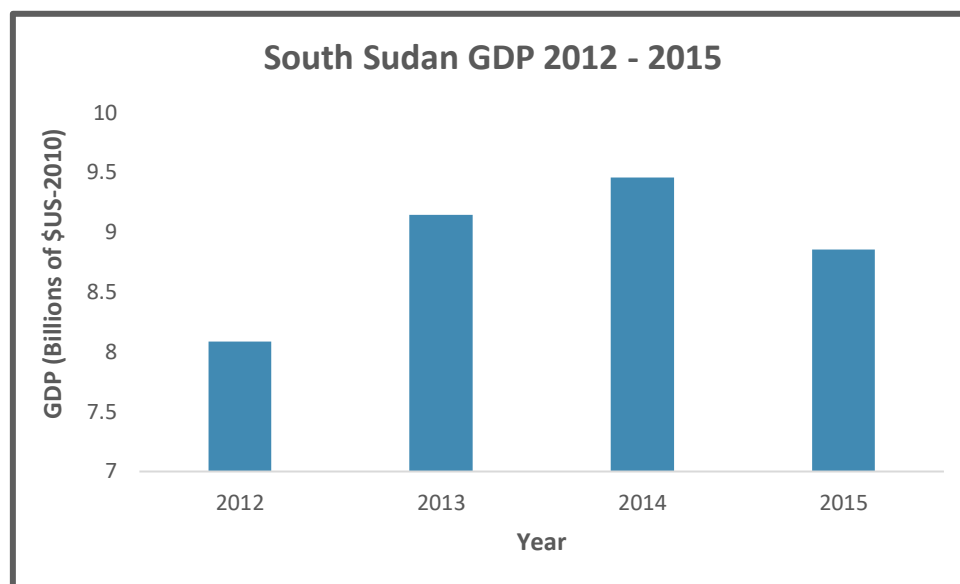


Figure 38: South Sudan GDP 2012 - 2015

### Transportation

For personal transportation, bicycles were the most common vehicle as 35% of urban households in South Sudan owned a bicycle in 2009. The next most common items were motorcycles/rickshaws (11%), motor vehicles (6%), animals (3%), and canoe/boat (1%).<sup>195</sup> Despite relatively low motor vehicle penetration, the transport sector in South Sudan accounted for 65% of total fuel related CO<sub>2</sub> emissions in 2014 (~974,000 MTCO<sub>2</sub>).<sup>196</sup>

### Solid Waste

Estimates for solid waste production in South Sudan were not available, but the most common method of solid waste disposal in urban populations in South Sudan was burning (54.9%), followed by heaping (16.8%), and pits (12.1%).<sup>197</sup>

### Household Energy/Electricity

In 2014, 8.3% of the urban population in South Sudan had access to electricity and only 3.14% had access to clean fuels for cooking.<sup>198</sup> Breaking this down further, in urban areas in South Sudan, the main sources of lighting in 2010 were wax candles (23.9% of urban households), paraffin lamps (22.7% of urban households), firewood (10.4% of urban households), electric generators (9.6%), and public electricity (7%) with almost 17% of households having no lighting at all (Figure 39).<sup>199</sup> For

<sup>194</sup> (World Bank, 2017)

<sup>195</sup> (South Sudan National Bureau of Statistics, 2011)

<sup>196</sup> (World Bank, 2017)

<sup>197</sup> (South Sudan National Bureau of Statistics, 2011)

<sup>198</sup> (World Bank, 2017)

<sup>199</sup> (South Sudan National Bureau of Statistics, 2011)

cooking, charcoal and firewood accounted for the vast majority of fuel use for cooking (53.7% and 43.7%, respectively) in 2010 (Figure 40).<sup>200</sup>

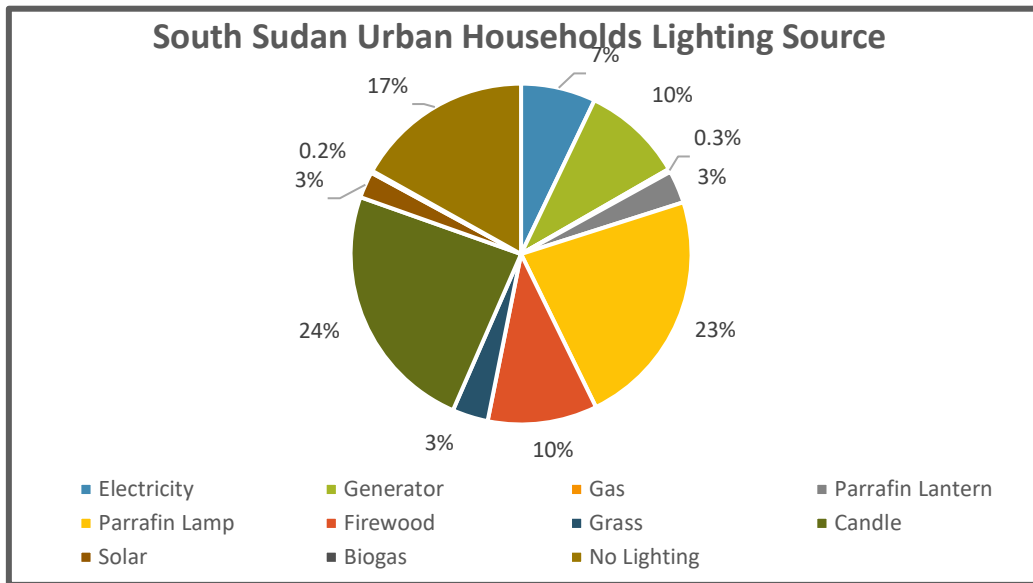


Figure 39: South Sudan Urban Households Lighting Source

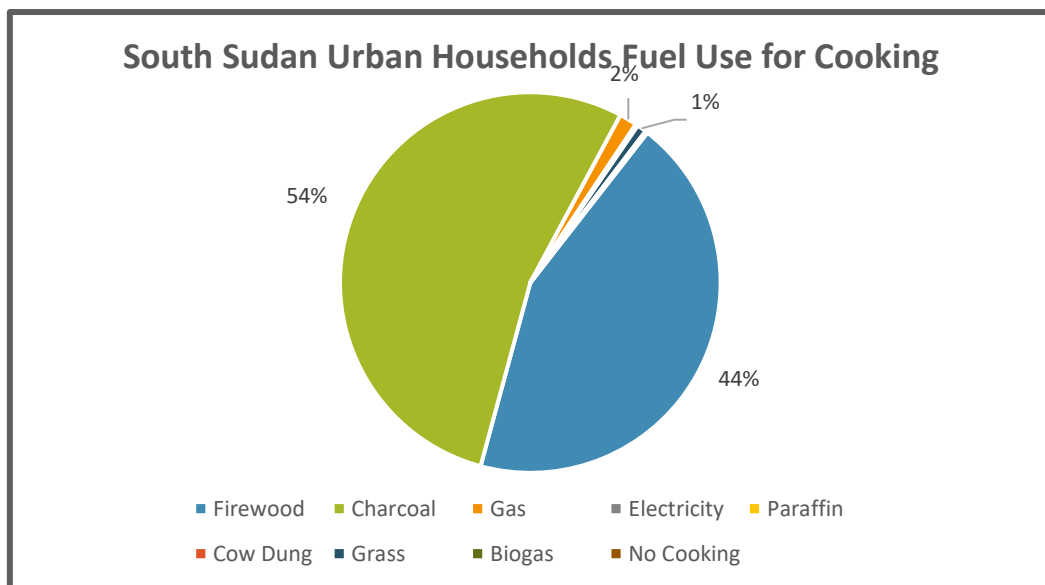


Figure 40: South Sudan Urban Household Fuel Use for Cooking

<sup>200</sup> (South Sudan National Bureau of Statistics, 2011)

### *National Energy/Electricity*

Electricity consumption and energy consumption per capita in South Sudan stood at about 39.8 kWh and 60.7 kg of oil eq. in 2014.<sup>201</sup>

In 2010, total power plant capacity for the Southern Sudan Electricity Corporation was 29 MW and its total customer connections was 16,619 with another 3200 connections expected.<sup>202</sup> 99% of the electricity production in South Sudan came from oil, gas, and coal sources and electricity line losses were estimated at 5.7% in 2014.<sup>203</sup>

In 2014, electricity and energy production accounted for an estimated 30.9% of all fuel related CO<sub>2</sub> emissions in South Sudan (~462,000 MTCO<sub>2</sub>).<sup>204</sup>

### *Water/Sanitation*

In South Sudan, 51% of the urban population had access to basic service for drinking water, 6.8% had limited service, and 13% were using surface water in 2011. In 2015, urban households covered by basic service for drinking water increased to 59% while the proportion of the urban households using surface water and unimproved sources decreased dramatically to 2% and 4.6% respectively (**Figure 41**). In 2015, 12.1% had access to a piped in improved source of drinking water.<sup>205</sup>

**Project Spotlight:** South Sudan Energy Sector Technical Assistance Project

**Sponsor:** World Bank

**Timeline:** Ongoing

**Description:** The proposed Project includes five components constituting a total investment of US\$15 million to allow for a rapid and sustained capacity/institution building in the preparation and management of strategic energy infrastructure projects. The components are designed with a long-term goal of access enhancement through a well-functioning and strong energy sector that supports investment and participation from the private sector.

**Source:** <http://projects.worldbank.org/P145581/energy-sector-technical-assistance-project?lang=en&tab=overview>

<sup>201</sup> (World Bank, 2017)

<sup>202</sup> (South Sudan National Bureau of Statistics, 2011)

<sup>203</sup> (World Bank, 2017)

<sup>204</sup> (World Bank, 2017)

<sup>205</sup> (WHO/UNICEF, 2017)

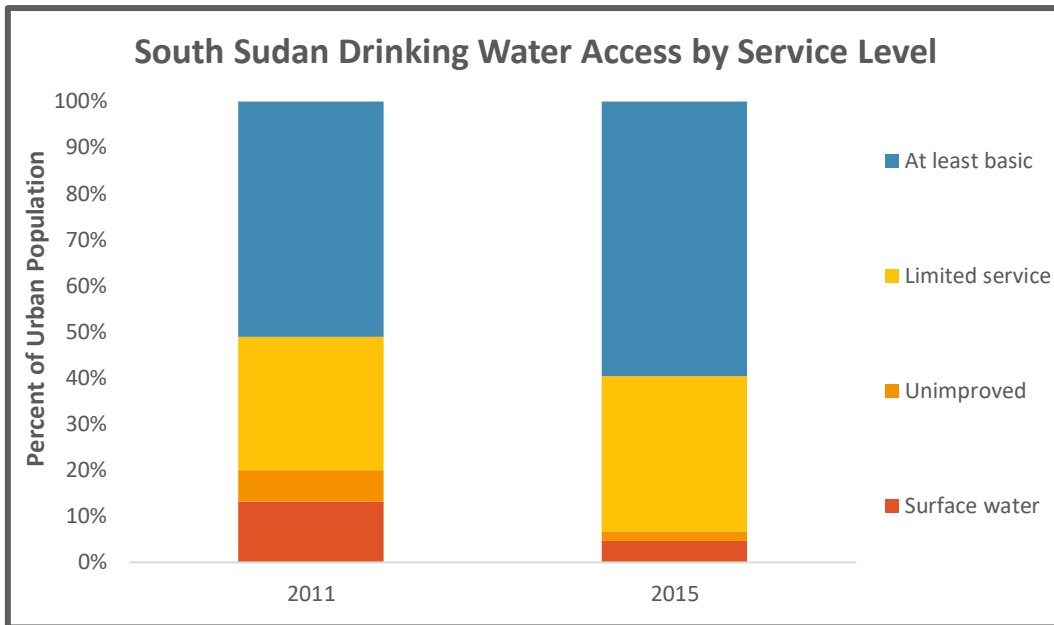


Figure 41: South Sudan Drinking Water Access by Service Level 2011, 2015

A more detailed breakdown of water sources for urban populations in South Sudan can be found in the South Sudan Statistical Yearbook. In 2010 the most commonly used water sources in urban areas were hand pumps (29.5% of households), deep boreholes (28% of households), and open water sources (15% of households) (Figure 42).<sup>206</sup> In urban areas the time to drinking water varies significantly. In 2010, 14% of the urban population had no time to drinking water, 28% had 1-9 minutes, 31% had 10-29 minutes, 18% had 30-59 minutes, and 10% had more than an hour.<sup>207</sup>

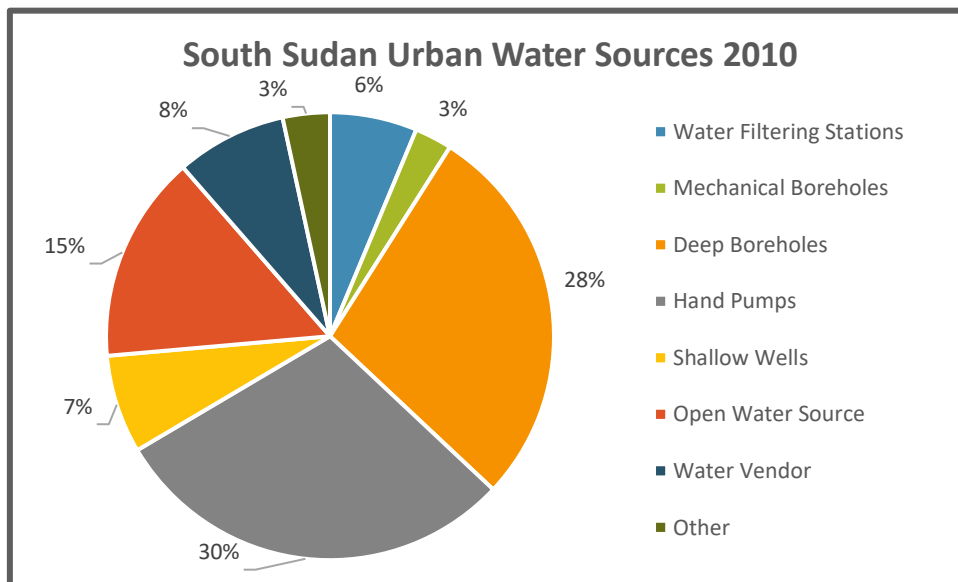


Figure 42: South Sudan Urban Water Sources - 2010

Access to sanitation was more limited as only 19% of the urban population had basic level sanitation and 40% were practicing open defecation in 2011. By 2015, the proportion of urban households with access to basic sanitation increased to 27% and the proportion practicing open defecation dropped

<sup>206</sup> (South Sudan National Bureau of Statistics, 2011)

<sup>207</sup> (South Sudan National Bureau of Statistics, 2011)

to 21% (**Figure 43**).<sup>208</sup> A further breakdown from the 2010 statistical yearbook estimated that 36.9% of urban households had a private latrine, 12.9% had a shared latrine, 3.6% had a flush toilet, and 46.4% had no toilet facility.<sup>209</sup>

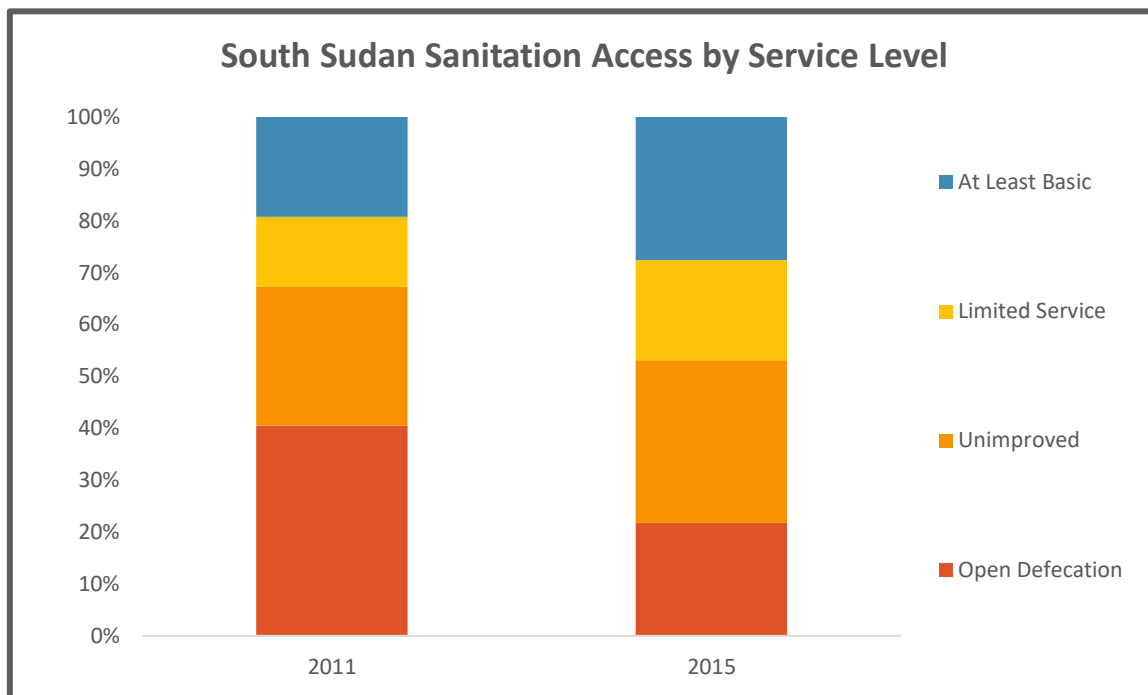


Figure 43: South Sudan Sanitation Access by Service Level

### Capital City Spotlight

Juba’s population in 2015 stood at an estimated 321,000 people (up from about 160,000 in 2000). By 2030, the UN World Urbanization Prospects projects that Juba’s population will grow to over 596,000 people (**Figure 44**).<sup>210</sup>

<sup>208</sup> (WHO/UNICEF, 2017)

<sup>209</sup> (South Sudan National Bureau of Statistics, 2011)

<sup>210</sup> (United Nations Department of Economic and Social Affairs, Population Division, 2014)

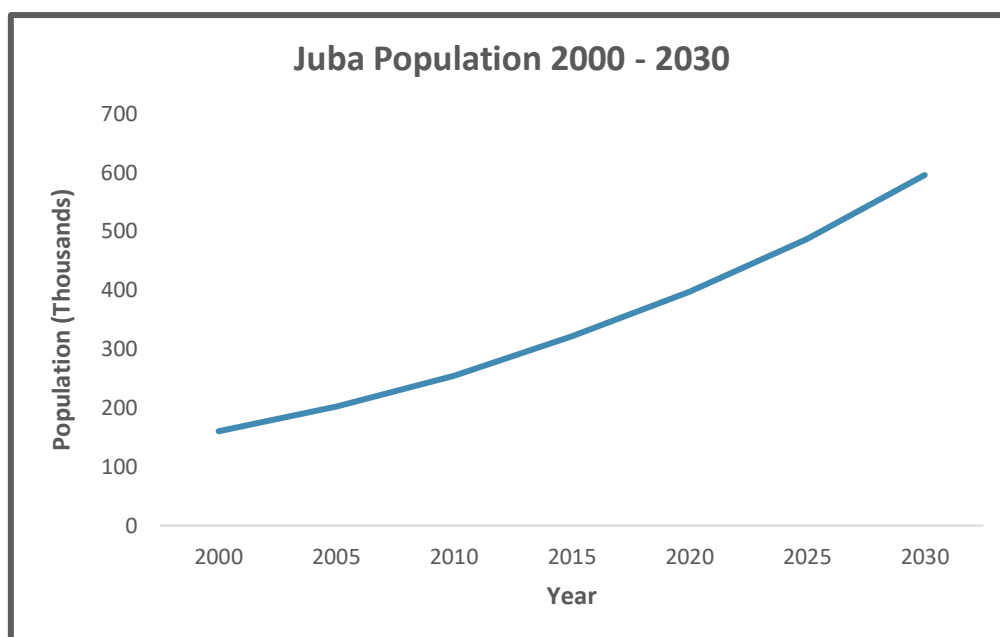


Figure 44: Juba Population 2000 – 2030

### Planned and Ongoing Initiatives in Urban Sustainability

There are many initiatives related to urban sustainability both planned and ongoing in South Sudan. A few select projects are highlighted in **Table 11** below, but for a more complete look at planned and ongoing initiatives, stakeholders, and policy frameworks in South Sudan please refer to the accompanying excel document (**EAC Initiatives, Stakeholders, and Policies in Urban Sustainability**).

Table 11: Selected Urban Development Projects - South Sudan

Location	Project	Description	Sponsor	Timeline
Juba	Juba Distribution System Rehabilitation and Expansion Project <sup>211</sup>	The main development objective of the Project is to strengthen the distribution networks in Juba in order to provide reliable electricity and increase access in the city which is currently at a very low level. The supply of electricity will improve the quality of life of the residents; improve the performances of the public and private service providers; and promote businesses, thus contributing to economic growth and poverty reduction in South Sudan.	AfDB; South Sudan Electricity Corporation	Ongoing
Juba	Project for Improvement of Water Supply Systems of Juba in South Sudan <sup>212</sup>	The Project aims to improve the capacity of the water supply system of Juba by constructing water intake facilities, a purification facility, a distribution reservoir, transmission pipelines, 120 public tap stands and eight water tanker filling stations. Upon completion of the Project, SSUWC will be able to provide clean and safe drinking water to over 400,000 people in Juba.	JICA; Ministry of Water Resources and Irrigation, South Sudan Urban Water Corporation (SSUWC)	Ongoing

<sup>211</sup> (Africa Development Bank, 2017)

<sup>212</sup> (Japan International Cooperation Agency, 2013)

<b>National</b>	Development of the Urban Water and Sanitation Sector <sup>213</sup>	The provision of drinking water and sanitation services for the poor urban population is improved. GIZ is cooperating with the main stakeholders in the water sector at all levels and supports them in performing their tasks. In its first phase, the project advised the water ministry on drafting a water law that sets out a comprehensive legal framework for institutional reform in the water sector, and on formulating an investment plan.	GIZ; Ministry of Water Resources and Irrigation (formerly the Ministry of Electricity, Dams, Irrigation and Water Resources)	Ongoing
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## Tanzania

### *Key Challenges for Urban Sustainability*

Tanzania's current five-year development plan analyzed the country's development performance to date and laid out some challenges to overcome before 2020. Among those challenges are:

- Constraints to trade and industrialization:** Tanzania's economy is characterized by narrow production and export base dominated by low-value and low-tech products such as raw materials and primary commodities, high trading costs, tariff and non-tariff barriers to intra-regional trade, and low access to international markets. Consequently, Tanzania is looking to address three issues: intensifying production and trade in intermediate and final consumer products; establishing, aligning and upgrading along national, regional, and global value chains; and increasing the share of trade in services, such as travel and transportation.
- Constrained private sector:** The private sector faces considerable hurdles with respect to construction permits and paying taxes. Policy and institutional constraints, energy shortfalls, shortages of skills, and problematic access to land for industrial purposes also impede growth of the private sector. In addition, in the absence of a one-stop window for most agencies (even at the TIC), the multiplicity of charges/fees imposed by various control and regulatory agencies will continue to increase cost of doing business in terms of finances and time.
- Slow growth in manufacturing sector:** Tanzania's manufacturing sector and, consequently, exports are growing. However, the sector's market performance is raising concerns regarding its capacity to expand and compete in regional and global value chains. Domestic manufacturing has shown limited signs of strong development of linkages across industries, and most firms have lagged behind the required pace to increase value addition and to diversify their production towards more advanced/high tech products. Other challenges facing the sector include low productivity and weak managerial skills, weak market conditions (quality standards, supply chains), inadequate finances, unfavorable international trading relations, low usage of advanced and modern technologies, challenging business environment, as well as capacity underutilization.

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<sup>213</sup> (GIZ, 2014)

- **Transportation constraints for competitiveness and development:** The transportation sector in Tanzania is plagued by operational inefficiencies and inadequate infrastructure, which constrain the country's economic competitiveness. Deteriorating railways have led shippers to switch to road transportation, but the roads subsector has experienced low performance, management inefficiencies, weak oversight, and incidences of over commitment beyond available resources. Notable progress was made in improving operational efficiency of ports, but these developments remain insufficient to adequately support economic transformation and industrialization.
- **Underperforming energy sector:** The main challenges characterizing the energy sector include low access to and high costs of power production, distribution and transmission. Government monopoly has stifled potential competition and efficiency in electricity supply. Moreover, inefficiencies of the power utility, TANESCO, and the costly emergency power production contracts have further constrained the sector's ability to accelerate industrialization and economic transformation.<sup>214</sup>

Another identified challenge is the lack of essential infrastructure to meet social needs in cities stemming largely from insufficient access to capital attributable in part to low municipal revenue bases and a limited domestic private sector. Low per capita incomes and capacity deficits have also contributed to ineffective urban planning and insufficient infrastructure investment, which in turn have led to urban sprawl and the growth of informal settlements.<sup>215</sup>

### *Baseline for Urban Sectors*

#### *Urbanization*

From 2000 to 2016 Tanzania added an estimated 19.6 million people bringing its total population to over 53.8 million. Over the same time period the urban population grew from just 7.5 million people and 22.3% of the total population to 17.4 million people and 32.3% of the population. In 2016, an estimated 30.1% of the urban population in Tanzania lived in the largest city, Dar es Salaam, and in 2014 about half of the urban population in Tanzania lived in slums (**Figure 45**).<sup>216</sup>

<sup>214</sup> (United Republic of Tanzania, 2016)

<sup>215</sup> Local Consultant – Shadrack Stephene

<sup>216</sup> (World Bank, 2017)



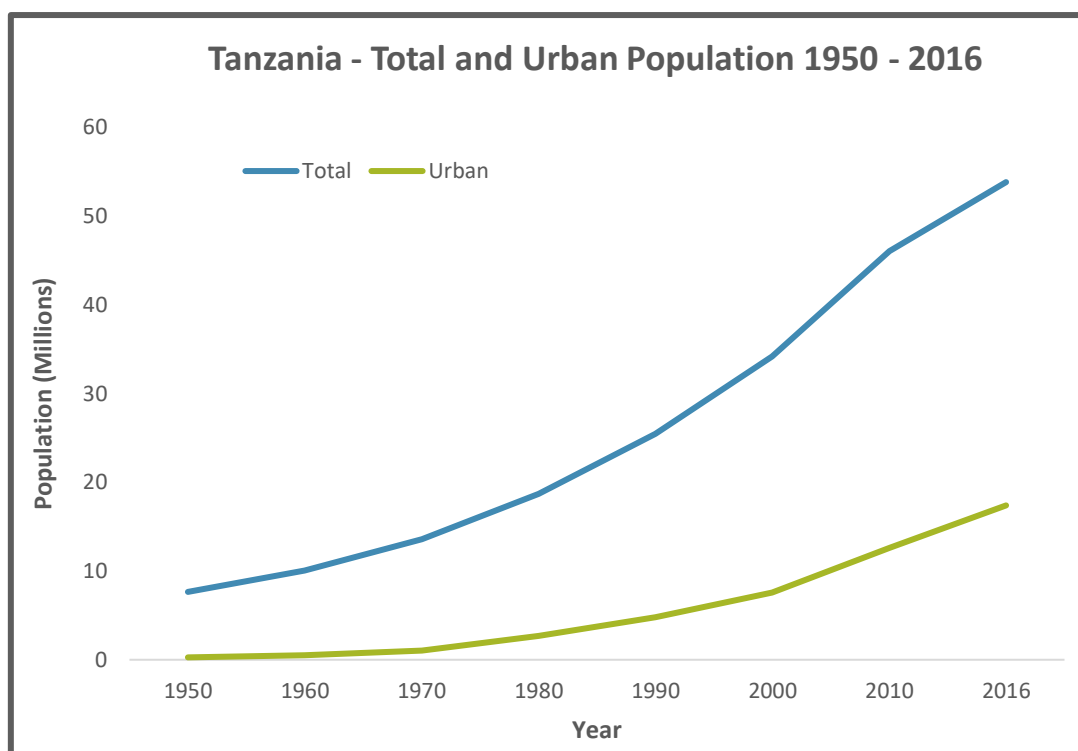


Figure 45: Tanzania Total and Urban Population 1950 – 2016

### Industrialization

In 2016, total GDP in Tanzania was estimated at just over \$46.7 billion (\$US-2010) with industry including manufacturing accounting for 22.5% (~\$7.4 billion) and manufacturing alone contributing 6.6% (\$3.1 billion) (Figure 46).<sup>217</sup> In 2014 Tanzania's industrial sector was responsible for 15.5% of CO<sub>2</sub> emissions from fuel combustion<sup>218</sup>, and industrial processes in Tanzania emitted an estimated 1.5271 MMTCO<sub>2</sub>e with an additional 1.61 MMTCO<sub>2</sub>e from energy emissions in manufacturing. In total, the industrial sector in Tanzania emitted an estimated 3.13 MMTCO<sub>2</sub>e in 2014 which is up significantly from the .83 MMTCO<sub>2</sub>e emitted in 2000.<sup>219</sup>

<sup>217</sup> (World Bank, 2017)

<sup>218</sup> (World Bank, 2017)

<sup>219</sup> (World Resources Institute, 2017)

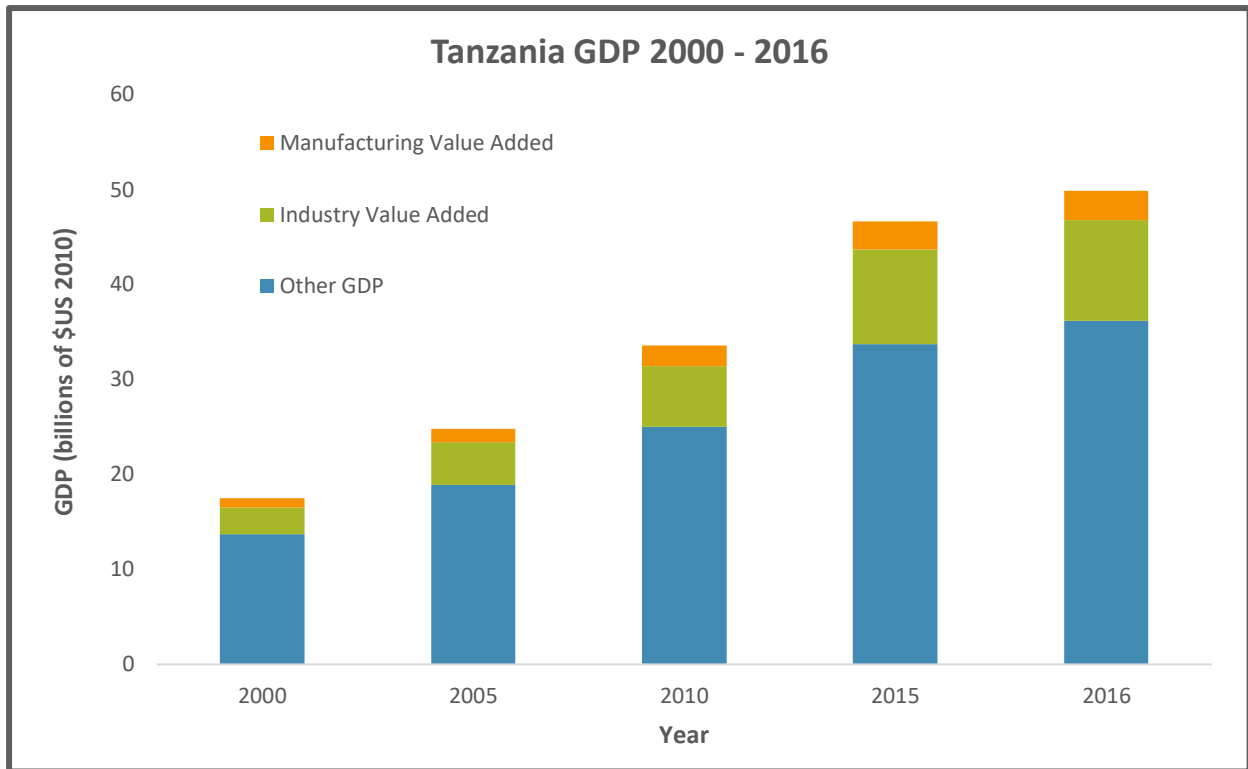


Figure 46: Tanzania GDP 2000 - 2016

### Transportation

As of December 2015, Tanzania had approximately 30,592 km of roads in its network of which 7,402 km were paved.<sup>220</sup> As for motorized transport, both motorcycle and private vehicle ownership has greatly increased in Tanzania since 2006. In 2015, had over 1 million motorcycles on the road and over 800,000 passenger vehicles (Figure 47).<sup>221</sup>

<sup>220</sup> (World Bank, 2017)

<sup>221</sup> (East African Community, 2016)

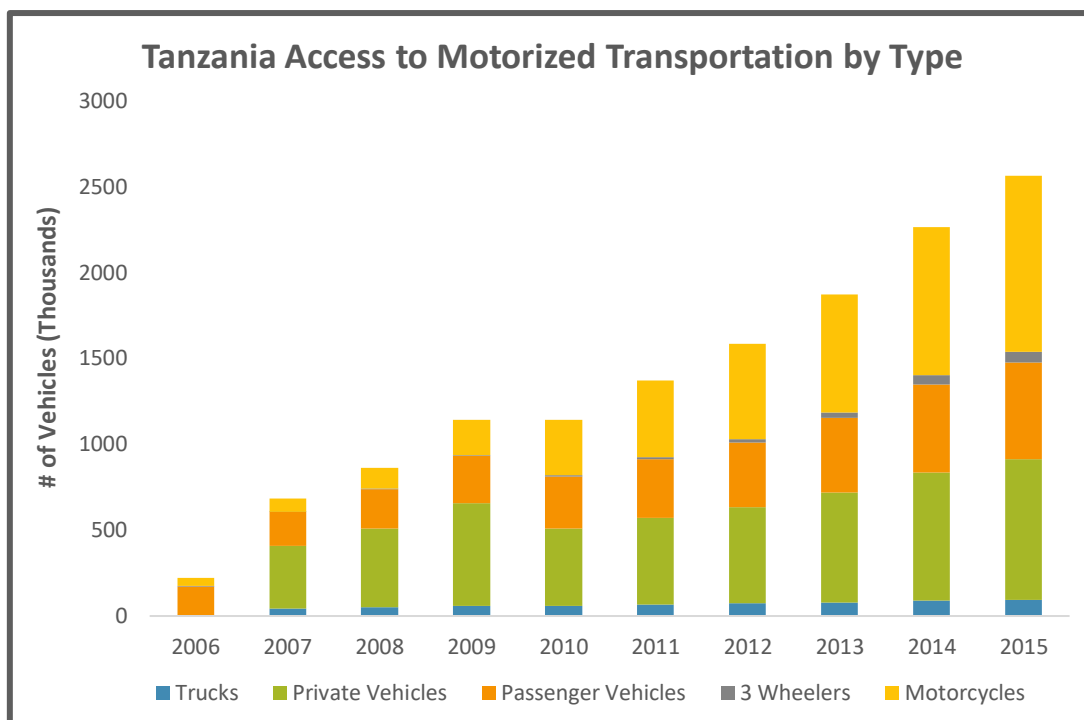


Figure 47: Tanzania Access to Motorized Transportation by Type

In 2014, the transportation sector in Tanzania accounted for approximately 57.5% of all CO<sub>2</sub> emissions from fuel combustion and an estimated total of 5.97 MMTCO<sub>2</sub>e of GHG emissions or about 27% of the emissions for the whole energy sector in Tanzania.<sup>222223</sup>

**Solid Waste**

A World Bank study estimated that Tanzania currently generates 0.26 kg of solid waste/capita for a total of 2,425 tonnes/day. By 2025 it is estimated that this will grow to 0.55 kg/capita and 11,566 tonnes/day.<sup>224</sup> Another study estimates that 84% of waste in Tanzania is mismanaged and 2% is littered.<sup>225</sup> In total the waste sector was estimated to produce GHG emissions equal to 4.6

MMTCO<sub>2</sub>e in 2014.<sup>226</sup> A 2012 demographics survey by the Tanzania Bureau of Statistics estimated that 35% of urban households in Tanzania buried or disposed of waste in a pit, 22.3% burnt their

**Project Spotlight:** Transport Sector Support Programme

**Sponsor:** AfDB

**Timeline:** Ongoing

**Description:** The Transport Sector Support Program consists of the following (i) the Upgrading of the Tabora (Pangale) - Koga - Mpanda Road (342.29 km), (ii) Upgrading of the Mbinga - Mbamba Bay road section of the Mtwara - Corridor (67 km), (iii) Rehabilitation of the Bububu - Mahonda - Mkokotoni Road (31km), a section of the Zanzibar Town Entry Roads (iv) Upgrading of Zanzibar Rural Roads (21.6 km), (v) complementary initiatives (feeder roads, market stalls, wells etc.); (vi) Feasibility studies for Roads, Airports and Railways

**Source:** <https://www.afdb.org/en/projects-and-operations/project-portfolio/p-tz-d00-002/>

<sup>222</sup> (World Bank, 2017)

<sup>223</sup> (World Resources Institute, 2017)

<sup>224</sup> (World Bank Group, 2012)

<sup>225</sup> (Jambeck, et al., 2014)

<sup>226</sup> (World Resources Institute, 2017)

waste, 18% dumped their waste, 15.6% had regularly collected waste disposal, and 9.1% had irregularly collected waste disposal.<sup>227</sup>

### Household Energy/Electricity

In 2014, roughly 2% of the population in Tanzania had access to clean fuels and technologies for cooking. In 2015, most of the energy use in the residential space was from biomass (97%), but oil products and electricity also accounted for 0.7% and 1.3%, respectively of total final energy consumption.<sup>228</sup> For electricity in urban areas, an estimated 41% of people had access to electricity, but that figure has grown slightly since 2000 when it stood at 37.7%.

For in-home lighting specifically, a 2012 demographic survey conducted by the National Bureau of Statistics suggests that 46.2% of urban households utilized grid electricity, 22.7% utilized kerosene lanterns, 20.1% utilized kerosene wick lamps. Other lighting sources included rechargeable lamps (4.8%), acetylene (2.3%), candles (2.1%), and solar (1%) (**Figure 48**).<sup>229</sup> For cooking, charcoal was the dominant fuel (62.1%) followed by firewood (24.5%), paraffin (5.3%), electricity (4.2%), and industrial gas (2.4%) (**Figure 49**).<sup>230</sup>

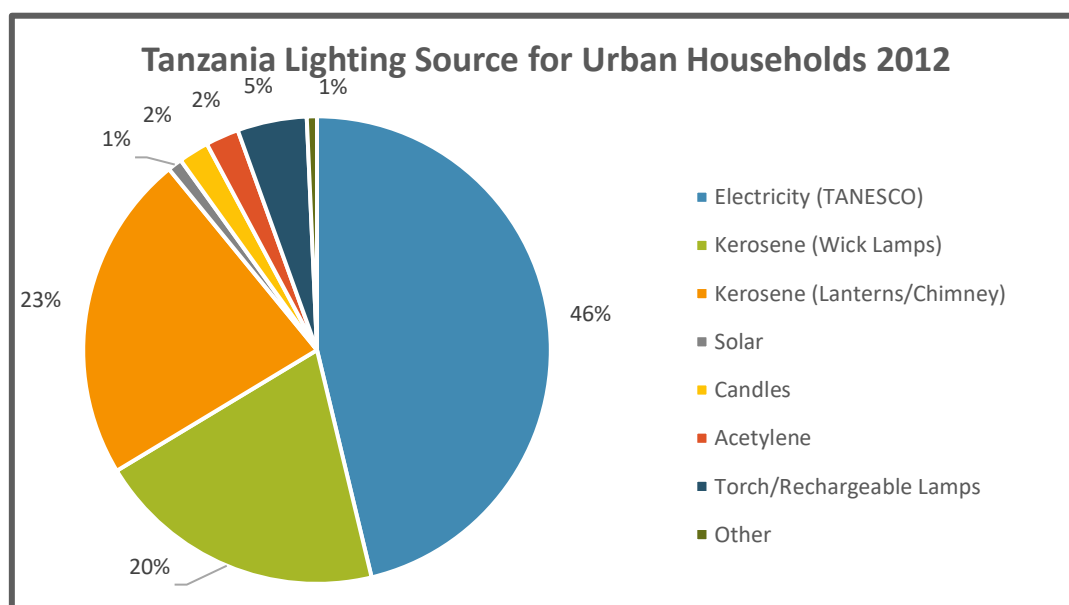


Figure 48: Tanzania Lighting Source for Urban Households 2012

<sup>227</sup> (National Bureau of Statistics Tanzania, 2014)

<sup>228</sup> (International Energy Agency, 2015)

<sup>229</sup> (National Bureau of Statistics Tanzania, 2014)

<sup>230</sup> (National Bureau of Statistics Tanzania, 2014)

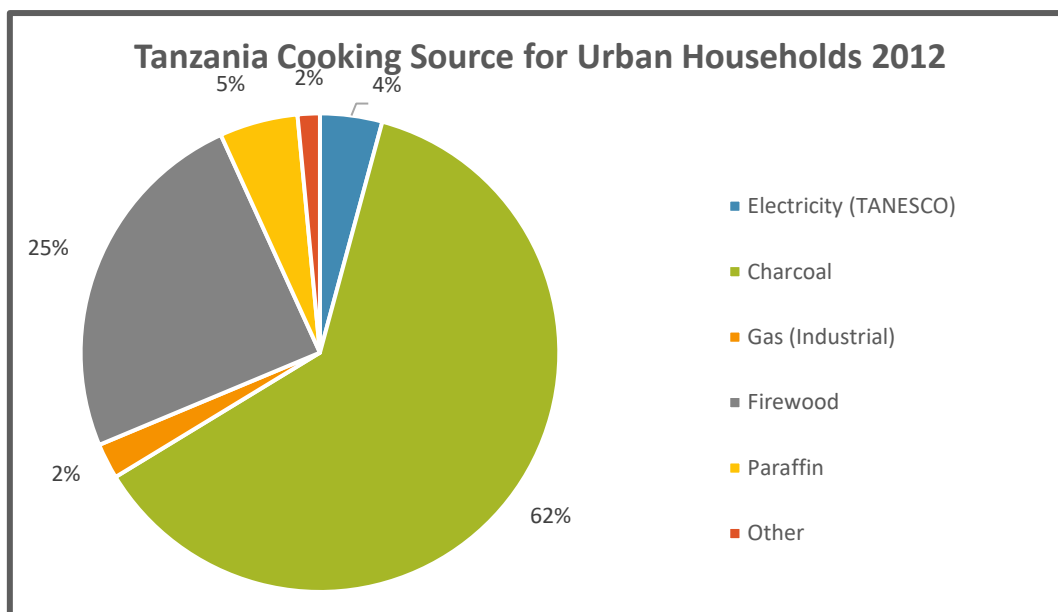


Figure 49: Tanzania Cooking Fuel for Urban Households 2012

### National Energy/Electricity

Total final energy consumption in Tanzania increased 25.9% from 17,833 ktoe in 2010 to 22,465 ktoe in 2015. The residential sector accounts for the majority of the total final energy consumption in Tanzania (72% in 2010 and 67% in 2015), but total final energy consumption in the industrial and transportation sectors grew rapidly from 12.6% and 6.3%, respectively in 2010 to 14.9% and 10.3%, respectively in 2015 (Figure 50). By fuel type, biomass and waste fuels supplied 97% of the total final energy consumption in 2015 with electricity supplying about 1.3% and oil products about 0.7%.

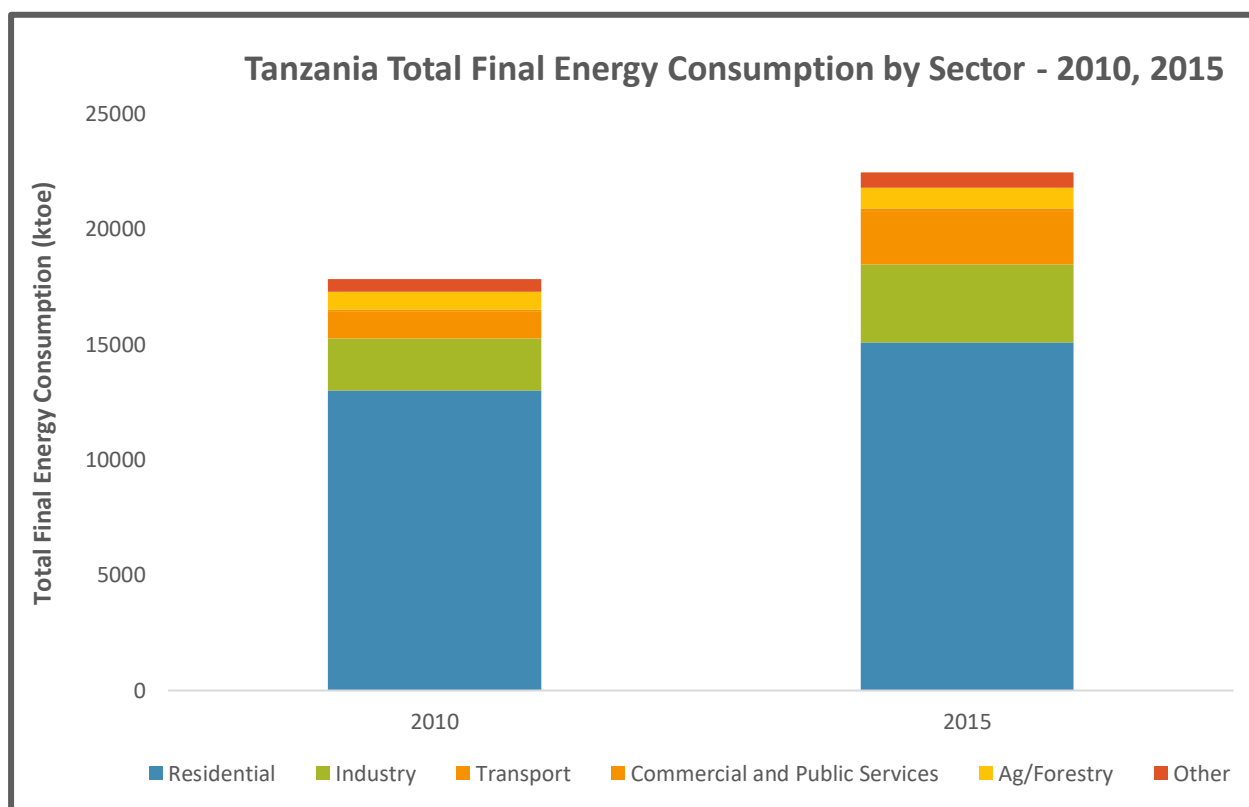
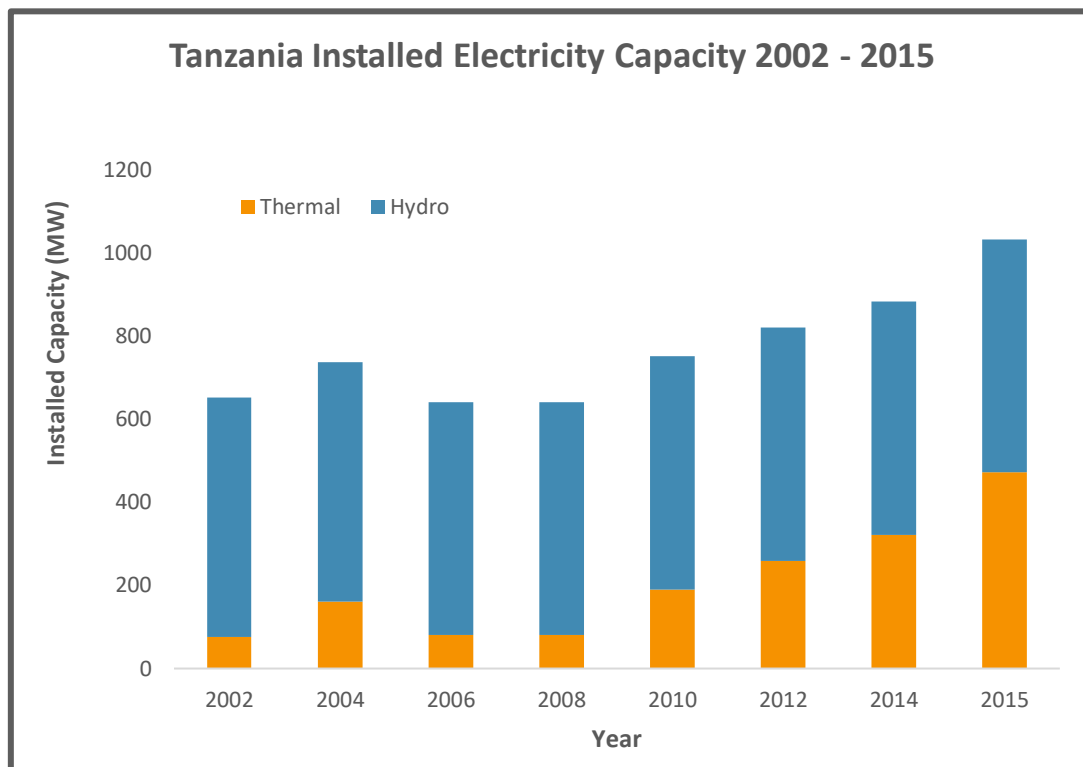


Figure 50: Tanzania Total Final Energy Consumption by Sector 2010, 2015

On the Tanzania mainland installed on-grid electricity capacity in 2015 totaled 1,034.2 MW with 561.8 MW from hydro and 472 MW from thermal resources. This is a 381.3 MW increase over 2002 levels with all of that increase from the expansion of Tanzania's thermal portfolio (**Figure 51**).



*Figure 51: Tanzania Installed Electricity Capacity 2002 – 2015*

From this capacity, 6,547 GWh of electricity were generated in 2015 of which 4,952 GWh (76.9%) were sold.<sup>231</sup> Electric power transmission and distribution losses in Tanzania were estimated at 17.6% of total output in 2015.<sup>232</sup> The sales in 2015 were split fairly evenly between commercial/industrial (54.9%) and domestic (45%) customers.<sup>233</sup> Electricity tariffs in Tanzania have stayed relatively constant for commercial and industrial customers at about 9 cents/kWh and 7 cents/kWh, respectively, but residential tariffs have grown from about 10 cents/kWh in 2008 to 18 cents/kWh in 2015 (**Figure 52**).<sup>234</sup>

<sup>231</sup> (National Bureau of Statistics Tanzania, 2015)

<sup>232</sup> (World Bank, 2017)

<sup>233</sup> (National Bureau of Statistics Tanzania, 2015)

<sup>234</sup> (East African Community, 2016)

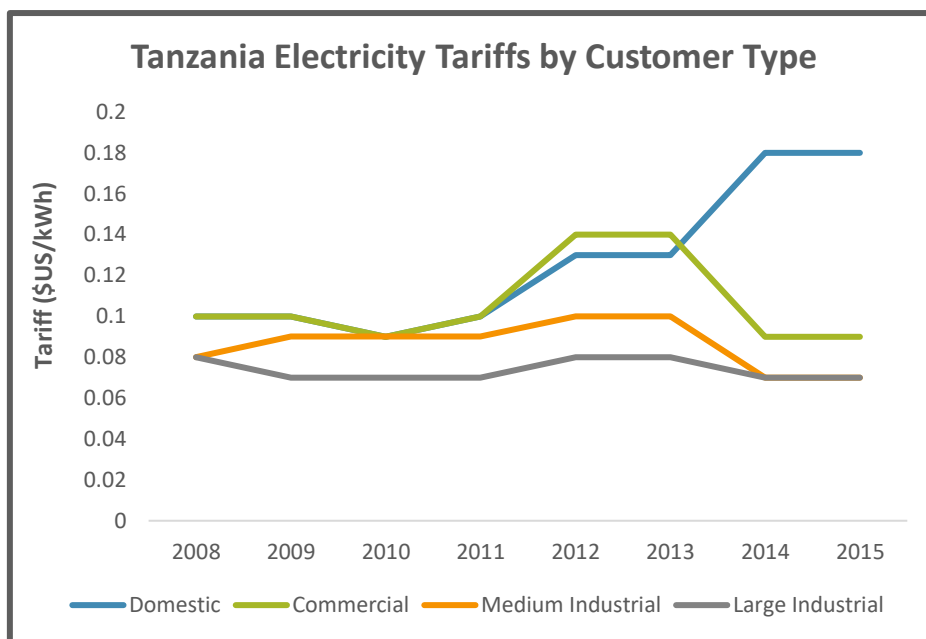


Figure 52: Tanzania Electricity Tariffs by Customer Type

Reliability of electricity supply is still an issue however as those commercial/industrial customers in 2013, for example, experienced an estimated 8.9 power outages per month losing value equivalent to 15.1% of total sales.<sup>235</sup> In total, electricity consumption in Tanzania totaled 5250 GWh in 2015 (45.2% residential, 25.9% industry, 22.4% commercial) nearly double consumption levels in 2006 (2669 GWh) (Figure 53).<sup>236</sup> From 2000 to 2014, the GHG emissions from the energy sector in Tanzania doubled to a total of 22.2563 MMTCO<sub>2</sub>e.<sup>237</sup>

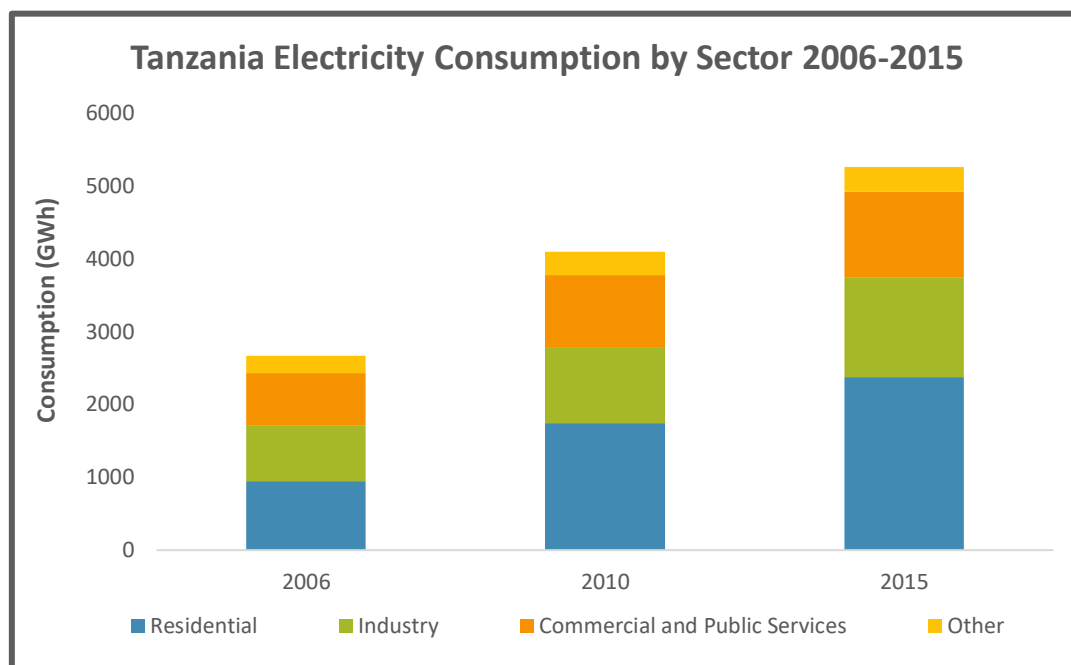


Figure 53: Tanzania Electricity Consumption by Sector 2006 - 2015

<sup>235</sup> (World Bank, 2017)

<sup>236</sup> (International Energy Agency, 2015)

<sup>237</sup> (World Resources Institute, 2017)

### Water/Sanitation

In 2015, it was estimated that 79.4% of the urban population in Tanzania had access to at least basic service level<sup>238</sup> for drinking water with 33.5% having access to safely managed drinking water.<sup>239</sup> Significant advancement has been seen in this sector, particularly for safely managed drinking water which stood at 8.3% coverage for urban populations in 2000 and 27% in 2010 (**Figure 54**).<sup>240</sup>

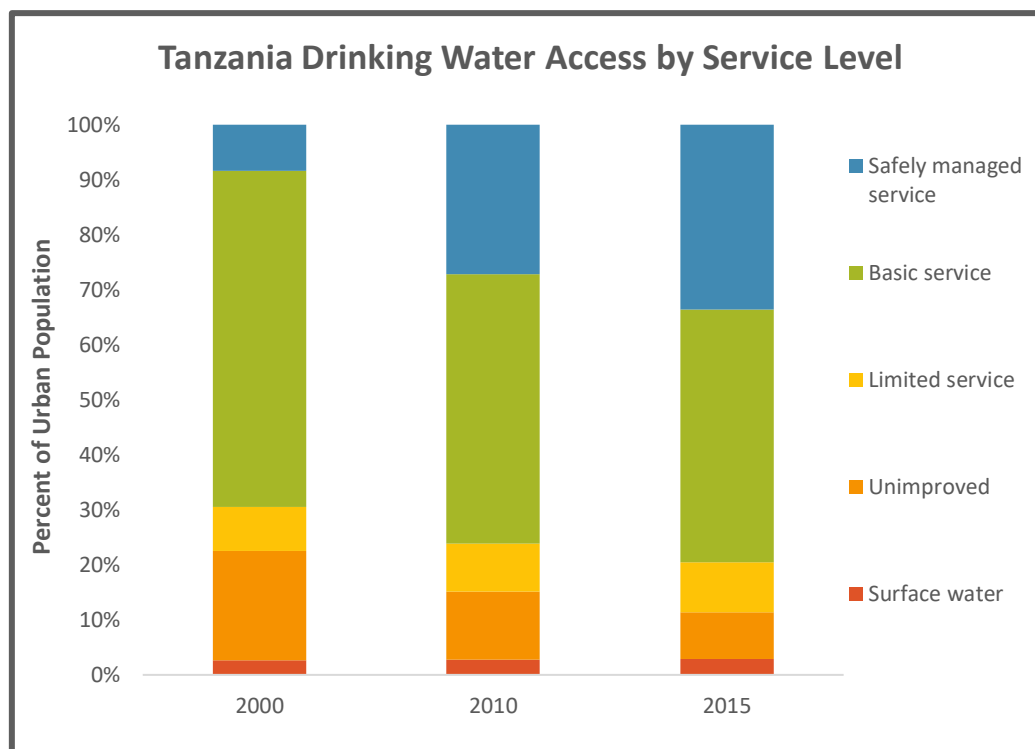


Figure 54: Tanzania Drinking Water Access by Service Level

Despite this, only 58.9% had access to a piped in improved source in 2015.<sup>241</sup> A 2012 survey in Tanzania suggested that only 8.3% of households in the dry season (25.6% in the rainy season) had a water source at their home, while 58.2% of households in the dry season (53.2% rainy) walked less than 500 km, and 11.7% (5.3%) had to travel more than 1 km.<sup>242</sup> The same survey highlighted the diversity of water sources for urban households in Tanzania in 2012. The most common source was piped in water to dwellings and plots (total of 39.1% of urban households), followed by public taps (18.8%), and dug wells (16.1%) (**Figure 55**).<sup>243</sup>

<sup>238</sup> Basic level is defined by the JMP as drinking water from an improved source, provided collection time is not more than 30 minutes for a roundtrip including queuing

<sup>239</sup> Safely managed is defined by the JMP as drinking water from an improved water source which is located on premises, available when needed and free from fecal and priority chemical contamination

<sup>240</sup> (WHO/UNICEF, 2017)

<sup>241</sup> (WHO/UNICEF, 2017)

<sup>242</sup> (National Bureau of Statistics Tanzania, 2014)

<sup>243</sup> (National Bureau of Statistics Tanzania, 2014)



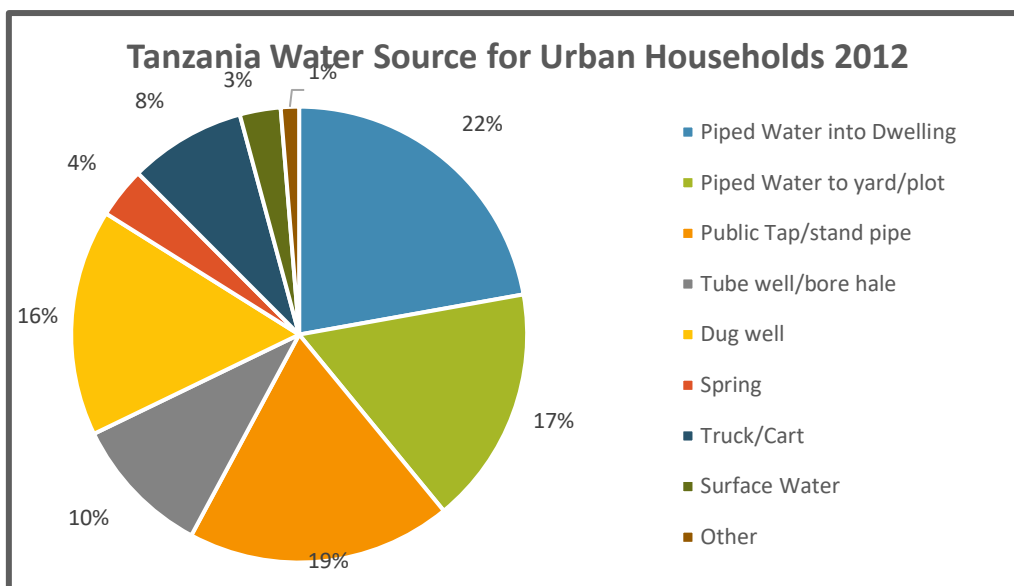


Figure 55: Tanzania Water Source for Urban Households 2012

In the sanitation sector, an estimated 37.2% of the urban population in Tanzania had access to at least basic service level<sup>244</sup> in 2015 which is substantially higher than the 11% and 28% coverage seen in 2000 and 2010, respectively. Still, only 1.2% of the urban population in Tanzania were covered by a sewer system and only 4% were covered by a septic tank in 2015 (Figure 56).<sup>245</sup>

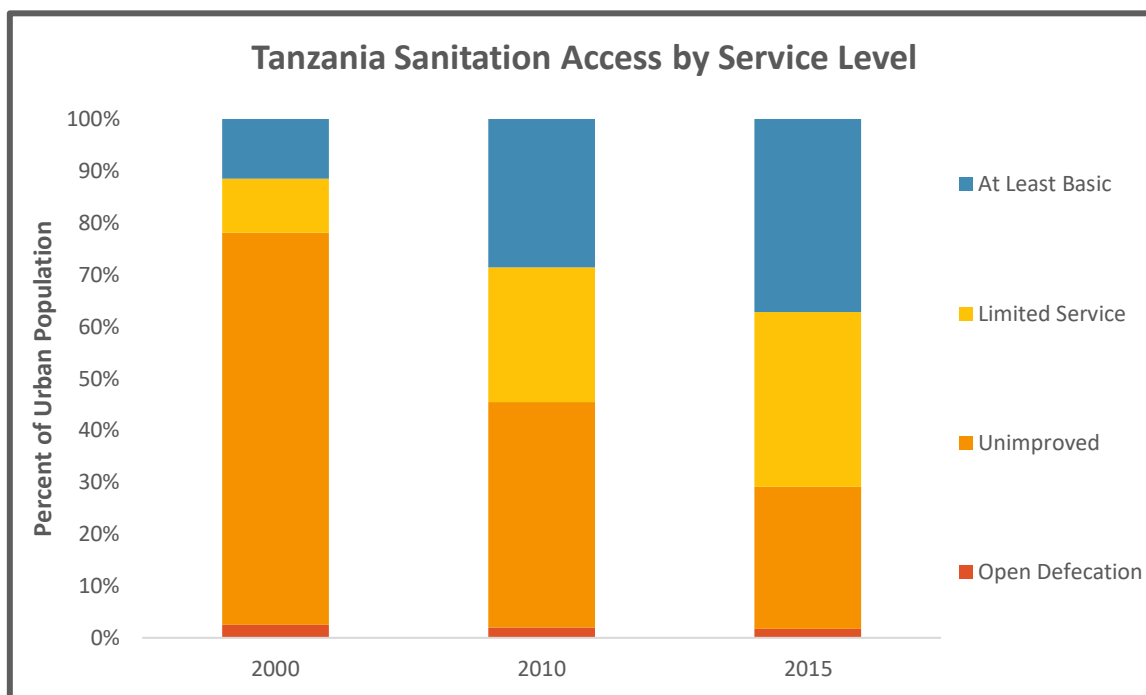


Figure 56: Tanzania Sanitation Access by Service Level

<sup>244</sup> Basic level is defined by the JMP as the use of improved facilities which are not shared with other households

<sup>245</sup> (WHO/UNICEF, 2017)

For hygiene, 63% of the urban population in Tanzania had access to basic hygiene services<sup>246</sup> in 2015 and only 12% of the urban population lacked access to a handwashing facility.<sup>247</sup>

### Capital City Spotlight

The UN's World Urbanization Prospects estimates that the population of Dar es Salaam was just over 5.1 million people in 2015 (more than double the population of 2000) and by 2030 the population will grow to over 10.7 million people (**Figure 57**).<sup>248</sup>

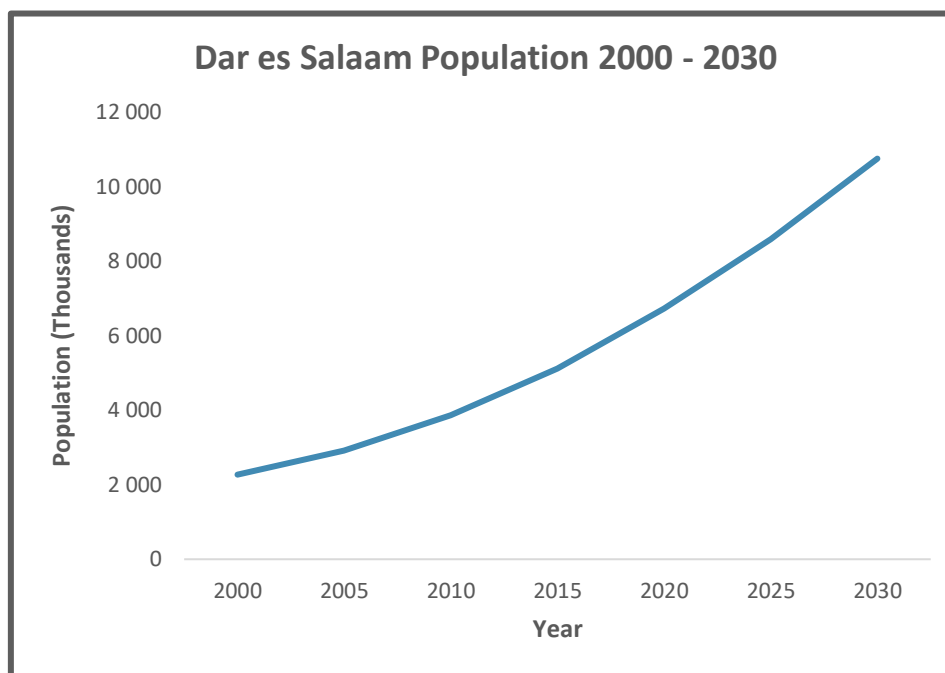


Figure 57: Dar es Salaam Population 2000 – 2030

In 2012, an estimated 94.5% of the population in Dar es Salaam had access to at least basic service for drinking water. It was estimated that 15.8% of households had access to water at home during the rainy season (6.3% during the dry season), 72.8% of households (80% in the dry season) had access less than 500 meters away, 9.8% (11.4% in the dry season) had access 500m – 1 km away, and 1.5% (2.3% dry season) had to travel over 1 km in 2012.<sup>249</sup> For sanitation, 37% of the population had at least basic sanitation with 38.3% having limited service, 24% unimproved, and less than half a percent relying on open defecation.<sup>250</sup> In 2014, Dar es Salaam had an estimated 188 km of sewerage systems covering roughly 7% of its population.<sup>251</sup>

A 2012 survey suggests that in Dar es Salaam electricity was the most common source of energy used for lighting at roughly 68.1% of households, followed by kerosene (23.3%), candles (4.2%), and distributed solar systems (1%). For cooking, 76.5% of households used charcoal, 9.4% used kerosene, 4.8% used industrial gas, 2.5% used firewood, and used 1.2% electricity.<sup>252</sup> Overall, electricity sales in the city increased from 1,574 kWh in 2007 to 2,229 kWh in 2015.<sup>253</sup>

<sup>246</sup> Basic service level is defined by the JMP as the availability of a handwashing facility on premises with soap and water

<sup>247</sup> (WHO/UNICEF, 2017)

<sup>248</sup> (United Nations Department of Economic and Social Affairs, Population Division, 2014)

<sup>249</sup> (National Bureau of Statistics Tanzania, 2014)

<sup>250</sup> (WHO/UNICEF, 2017)

<sup>251</sup> (National Bureau of Statistics Tanzania, 2014)

<sup>252</sup> (National Bureau of Statistics Tanzania, 2014)

<sup>253</sup> (National Bureau of Statistics Tanzania, 2015)

In the solid waste sector, 32% of the population in Dar es Salaam were served by municipal waste collection. The city’s solid waste stream is largely made up of organic material (31.5%) and plastic waste (22%), followed by paper (12%), glass (9%), and textiles (5%) with the manufacturing and household sectors account for the majority of the waste (**Figure 58, Figure 59**). For waste management in Dar es Salaam, annual inputs into landfills were over 8.2 million tonnes, with an additional 3.9 million tonnes of capacity from incineration plants and 35 million tonnes of capacity in the form of composting plants.<sup>254</sup>

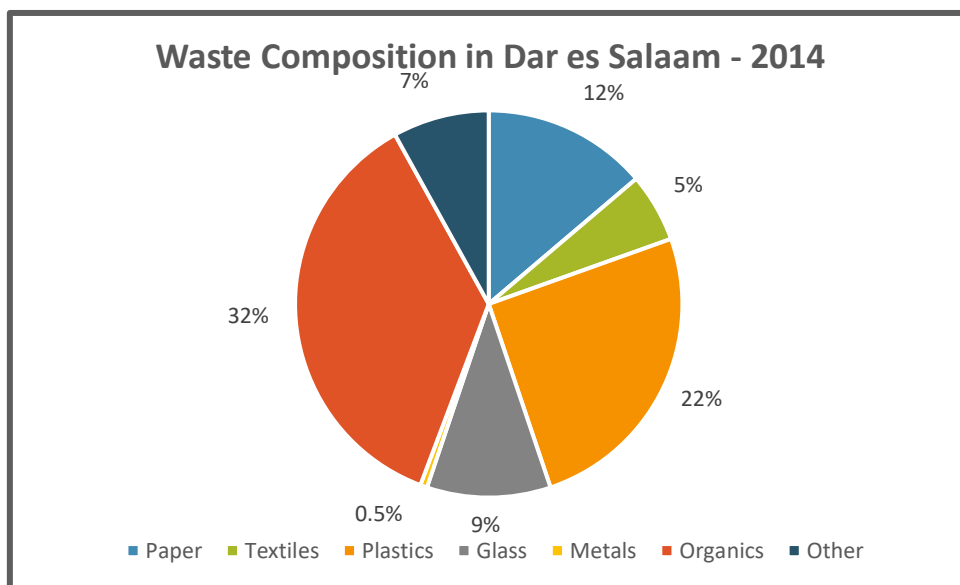


Figure 58: Waste Composition in Dar es Salaam - 2014

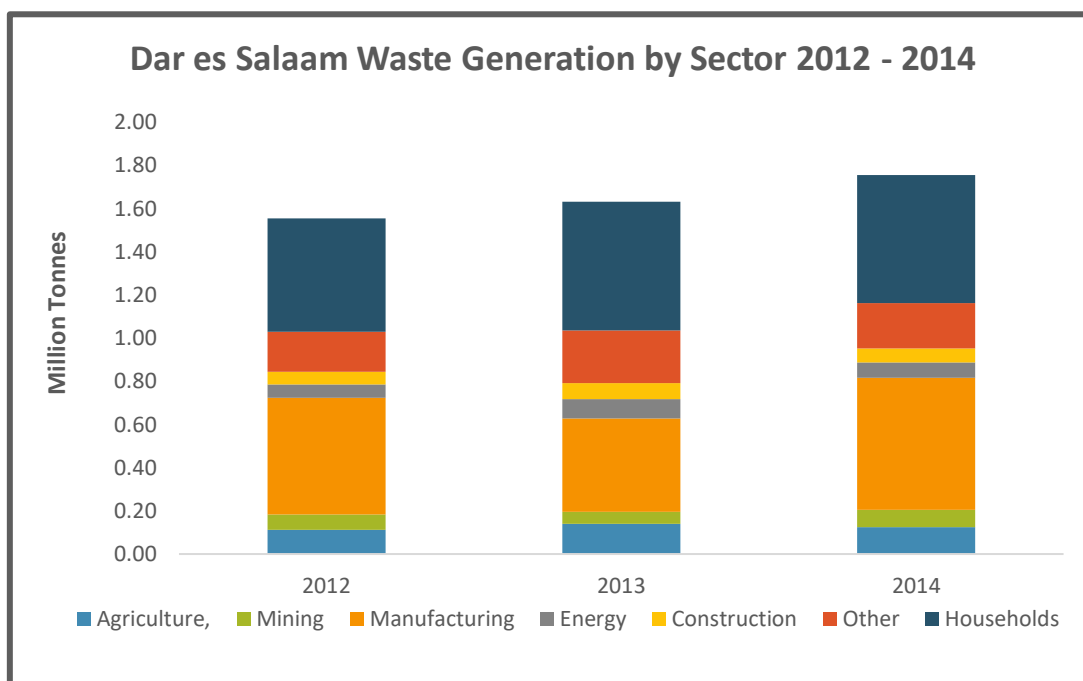


Figure 59: Dar es Salaam Waste Generation by Sector 2012 - 2014

Key challenges for Dar es Salaam stem from the fact that the city is fundamentally constrained by the lack of resources to finance trunk infrastructure. City-scale projects such as the BRT system are

<sup>254</sup> (National Bureau of Statistics Tanzania, 2014)

essential for promoting compact and connected urban form, but require significant capital investment. Dar es Salaam has limited financial resources, already constrained to meet existing infrastructure deficits in housing, water, waste management, sanitation, transport, energy, and health clinics, let alone projected demand with rapid population growth. The district municipalities, regional secretariats, and local government authorities have overlapping mandates, which undermines regional coordination. This makes it difficult to coordinate effective planning and delivery of major services, such as transportation, land use planning, water, and waste management, and to achieve economies of scale.<sup>255</sup>

### *Planned and Ongoing Initiatives in Urban Sustainability*

There are many initiatives related to urban sustainability both planned and ongoing in Tanzania. For a more complete look at planned and ongoing initiatives, stakeholders, and policy frameworks in Tanzania please refer to the accompanying excel document (**EAC Initiatives, Stakeholders, and Policies in Urban Sustainability**), but a few select projects are highlighted in **Table 12** below:

*Table 12: Selected Urban Development Projects - Tanzania*

Location	Project	Description	Sponsor	Timeline
<b>National</b>	Tanzania Strategic Cities Project <sup>256</sup>	The Strategic Cities Project for Tanzania development objectives will be to: (i) expand access (for firms and households) to urban infrastructure and services in selected urban Local Government Authorities (LGAs); and (ii) strengthen the management and fiscal performance of those urban LGAs. The Additional Financing (AF) will fund the cost of scaling up through: (i) new infrastructure investments in urban roads, bus stands, terminals and lorry stations, street lights, drainage and new cells in existing landfills; and (ii) strategic capacity building activities for project Local Government Authorities (LGAs).	World Bank; PRIME MINISTER'S OFFICE REGIONAL ADMINISTRATION AND LOCAL GO	Ongoing
<b>National</b>	Supporting Water Sector Development <sup>257</sup>	The programme supports national structure-building measures, promotes selected water utilities in the regions and advises the authorities responsible for water resources management in the Lake Rukwa and Lake Nyasa water basins. The programme also promotes the human right to water supply and sanitation through its interventions and helps improve living conditions for the poor urban population.	GIZ; Ministry of Water and Irrigation	2016 - 2019
<b>Dar es Salaam</b>	Dar es Salaam Bus Rapid Transit Infrastructure Project <sup>258</sup>	The project development objective is to provide enhanced transport facilities that are reliable and cost effective, with a view to improve urban mobility and accessibility to businesses and thereby supporting economic and social development of the city and the Country as a whole. The specific objective is to provide 19.3 km BRT infrastructure along the Kilwa road corridor to address congestion,	AfDB; TANROADS	Ongoing

<sup>255</sup> Local Consultant – Shadrack Stephene

<sup>256</sup> (World Bank, 2017)

<sup>257</sup> (GIZ, 2016)

<sup>258</sup> (Africa Development Bank, 2016)

public transport problem and provision of reliable and accessible transport for women, disabled (handicapped) and elderly citizens with standard and customized large articulated buses and feeder buses.

## Uganda

### *Key Challenges for Urban Sustainability*

In strategically planning for the country's future, the Ugandan government developed Uganda Vision 2040 as an overall framework for growth and development. The document, among other things, identifies key urban sustainability challenges the country seeks to address:

- **Low Competitiveness:** Uganda was ranked 121 out of 142 countries in terms of overall economic competitiveness of goods and services and, as such, needs and plans to invest in institutions, infrastructure, policies, and other factors to develop a strong private sector, drive innovation, and attract foreign direct investment
- **Weak public sector management and administration:** Administration and management of the public sector in Uganda has been characterized by weak policy and inadequate legal and regulatory frameworks; weak institutional structures and systems; oversized public administration; weak civil society and civic participation; inadequate data and information; inadequate standards and weak quality infrastructure; overlapping mandates; limited social protection and support systems; and weak management of environment and climate change.
- **Low industrialization and limited government investment in emerging industries:** Over time, government investment in strategic and emerging industries that stimulate the establishment of secondary and tertiary industries has been limited. Consequently, Uganda's GDP is still largely dominated by primary products, which has led to unfavorable balance of payment, skills transfer, low levels of employment, and high poverty levels
- **Slow improvement and development of infrastructure:** Uganda's infrastructure base (roads, railway, energy, and water) has not kept pace with the needs of urbanization and growth, which has hindered Uganda's economy in lowering the cost of doing business and competing for investments.<sup>259</sup>

The 2015 World Bank's Economic Update for Uganda also identified the following challenges confronting the country: underemployment, particularly for people migrating to urban areas; congestion to the extent of undermining the functionality of the existing infrastructure; sub-optimal living conditions and housing shortages driving people to informal developments; and increased pressure on access to public services (e.g., education and health) and infrastructure (e.g., electricity and piped water).<sup>260</sup>

On industrialization, the Private Sector Foundation Uganda's Business Agenda 2017/2018 identified several barriers to running a sustainable business in Uganda, particularly in Kampala: <sup>261</sup>

- a) The high cost of borrowing
- b) Market imperfections

<sup>259</sup> (Government of Uganda, 2013)

<sup>260</sup> (World Bank, 2015)

<sup>261</sup> (Private Sector Foundation Uganda, 2017)

- c) Increasing risk and nonperforming Loans
- d) Kenya's interest capping
- e) Structural saving challenges
- f) Limited long-term credit in the economy

### Baseline for Urban Sectors

#### Urbanization

Over the past decade and a half Uganda's population has been growing at an average rate of 3.4% per year. In 2016, Uganda's total population was estimated at 41.4 million people (about 72% higher than the population was in 2000). The urban population in Uganda has also risen rapidly (average of 5.4% per year) from about 2.9 million people (12.1% of the total population) in 2000 to over 6.8 million people (16.4% of the population) in 2016 (**Figure 60**).<sup>262,263</sup>

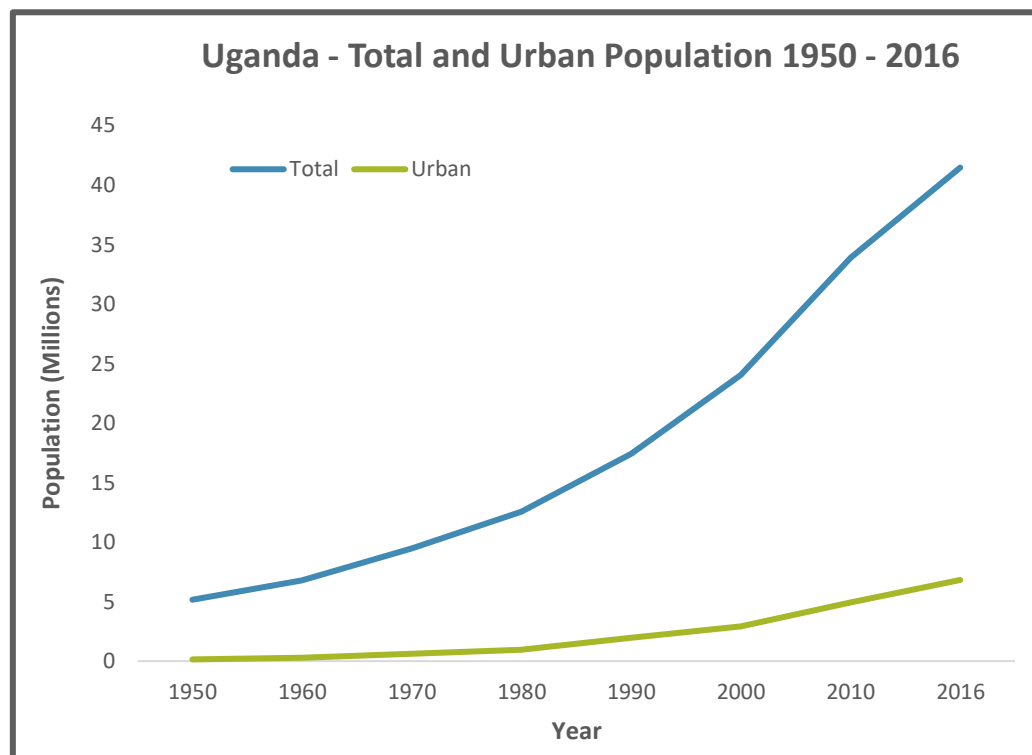


Figure 60: Uganda Total and Urban Population 1950 - 2016

Uganda's urban population is relatively distributed compared to other countries in the region as only about 29% of the total urban population (~2 million people) was located in the largest city of Kampala in 2016. Additionally, while the proportion of the urban population living in slums in Uganda has declined significantly from the 75% level in 2000, it was estimated that over 53% of the urban population in Uganda still lived in slums in 2014.<sup>264</sup>

#### Industrialization

In Uganda, manufacturing and industrial value added to GDP increased by over \$1.1 billion and \$2.2 billion (\$US-2010), respectively from 2000 to 2016. Combined the sectors saw an increase of over

<sup>262</sup> (United Nations Department of Economic and Social Affairs, Population Division, 2017)

<sup>263</sup> (United Nations Department of Economic and Social Affairs, Population Division, 2014)

<sup>264</sup> (World Bank, 2017)

215% or about \$3.46 billion (\$US-2010), but in 2016 they accounted for a total of just 18% of total GDP and 7% of all employment in Uganda. Overall GDP in Uganda increased by 177% to over \$27.4 billion (\$US-2010) from 2000 to 2016 (**Figure 61**).<sup>265</sup> Industrial processes in Uganda were estimated to account for 1.0833 MMTCO<sub>2</sub>e in 2014 which is about 5.8 times higher than their GHG contribution in 2000.<sup>266</sup>

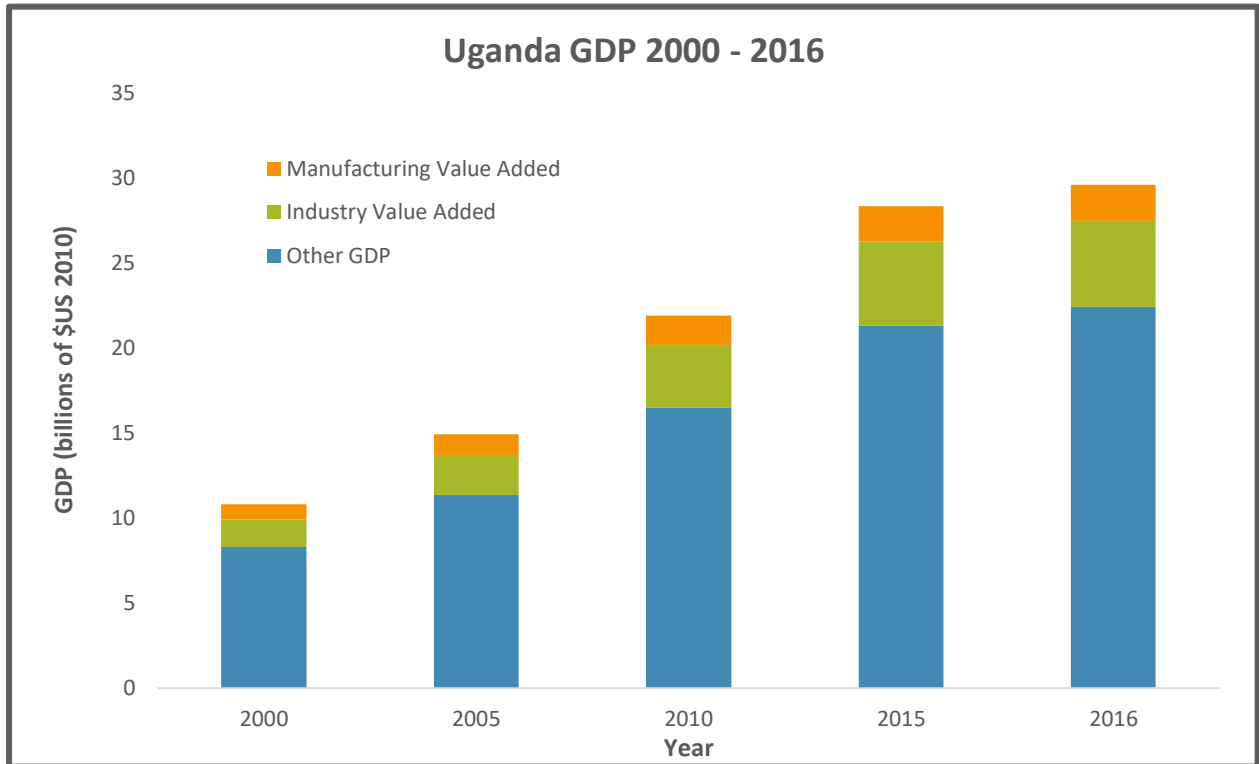


Figure 61: Uganda GDP 2000 – 2016

<sup>265</sup> (World Bank, 2017)

<sup>266</sup> (World Resources Institute, 2017)

### Transportation

Newly registered private vehicles in Uganda decreased from 125,518 vehicles in 2011 to just 56,772 vehicles in 2015. Government registered vehicles followed a similar pattern decreasing from 2,855 vehicles in 2011 to 1,014 vehicles in 2015.<sup>267</sup> In Uganda, the kilometers of paved roads in the national road network increased from 3119 km (29% of the total road network) in 2009/2010 to 3919 km (19% of the total road network) in 2014/2015.<sup>268</sup> The average retail price for diesel and gasoline has decreased from 3196 Ug. Shs/liter and 3613 Ug. Shs/liter, respectively in 2011 to 2891 Ug. Shs/liter and 3592 Ug. Shs/liter in 2015.<sup>269</sup>

### Solid Waste

A 2012 World Bank Study estimated that Uganda currently generates 0.34 kg of waste/capita/day (1,179 tonnes/day) and by 2025 Uganda could be generating 0.65 kg/capita/day (6313 tonnes/day). The study further estimated that solid waste streams in Uganda were dominated by organic waste (78%) and that solid waste collection rates in were around 39%.<sup>270</sup> CAIT estimated the GHG emissions from the waste sector in Uganda were about 0.4907 MMTCO<sub>2</sub>e in 2014 (.2923 MMTCO<sub>2</sub>e in 2000).<sup>271</sup>

### Household Energy/Electricity

The proportion of urban households with access to electricity fluctuated from about 50% in 2000 to a high point of 59.7% in 2012 and back down to 51.4% in 2014.<sup>272</sup> Access to clean cooking fuels in households stood at about 2% in 2014. The price of kerosene, however, declined from 2795 Ug. Shs/liter in 2011 to 2684 Ug. Shs/liter in 2015.<sup>273</sup>

For lighting, about 57% of urban households in Uganda rely on grid electricity. The remaining 43% is relatively evenly split between other technologies and fuels including tadooba (11%), batteries

**Project Spotlight:** Creating Opportunities for Sustainable Spending on Roads

**Sponsor:** DFID

**Timeline:** 2009 - 2018

**Description:** The Creating Opportunities for Sustainable Spending on Roads (CROSSRoads) programme is supporting the development of an efficient road sector in Uganda. The overall programme objective is to improve the quality and accessibility of the road network in Uganda and in so doing supporting the implementation of the National Development Plan and promote economic growth. The expected outcome of this project is an improvement in the effectiveness of the Government of Uganda's expenditure on national roads, greater participation of the private sector in road construction and more efficient road maintenance. This will be demonstrated by a 10% reduction in the unit cost of road works, a 25% reduction in the time taken by Uganda National Roads Authority (UNRA) to procure road works, and a reduction in the average delay in completion of road construction works from 8.8 months to 4.0 months (all targets to be met by 31 March 2015).

**Source:** <https://devtracker.dfid.gov.uk/projects/GB-1-200221>

<sup>267</sup> (Uganda Bureau of Statistics, 2016)

<sup>268</sup> (Uganda Bureau of Statistics, 2016)

<sup>269</sup> (Uganda Bureau of Statistics, 2016)

<sup>270</sup> (World Bank Group, 2012)

<sup>271</sup> (World Resources Institute, 2017)

<sup>272</sup> (World Bank, 2017)

<sup>273</sup> (Uganda Bureau of Statistics, 2016)



(10%), solar (9%), and lanterns and candles each at 6% (**Figure 62**). For cooking, two thirds of urban households utilize charcoal, 22% utilize firewood, and 11% rely on other fuels (**Figure 63**).<sup>274</sup>

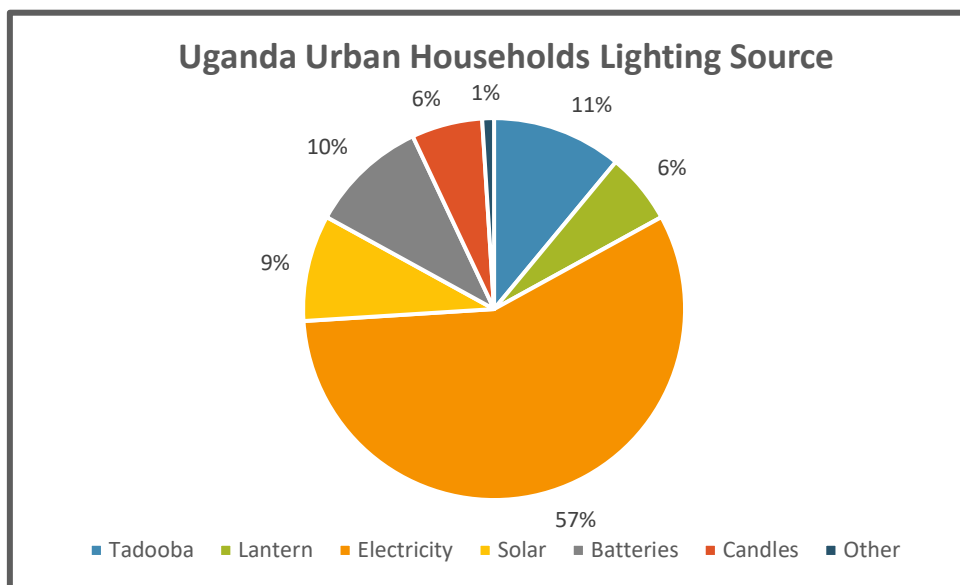


Figure 62: Uganda Urban Households Lighting Source

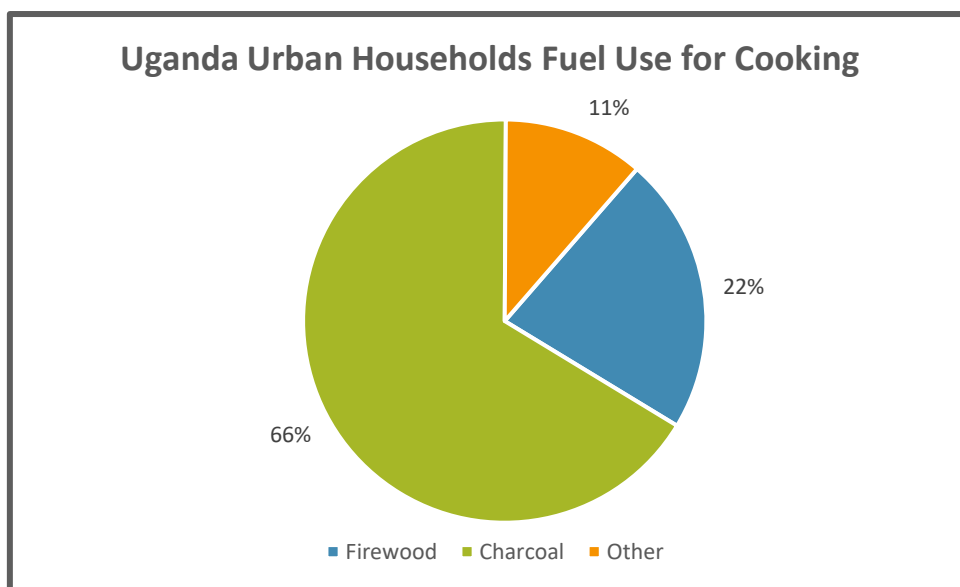


Figure 63: Uganda Urban Households Fuel Use for Cooking

### National Energy/Electricity

In 2015, total installed electricity capacity in Uganda stood at about 895.5 MW with 695 MW of hydroelectric capacity, 136 MW of thermal capacity, and 64.5 MW of bagasse capacity. Since 2011, installed thermal capacity has declined 34 MW and bagasse capacity has increased by 48.5 MW, but new hydroelectric capacity has accounted for 262.6 MW of the total 277.1 MW of the new capacity added to the Ugandan grid from 2011 to 2015 (**Figure 64**).<sup>275</sup> Electric generation in Uganda

<sup>274</sup> (Uganda Bureau of Statistics, 2017)

<sup>275</sup> (Uganda Bureau of Statistics, 2016)

increased 61% from 2147 GWh in 2011 to 3462.7 GWh in 2015. As with capacity, hydroelectric generation accounted for the vast majority (93% in 2015) of total electricity generation in Uganda.<sup>276</sup>

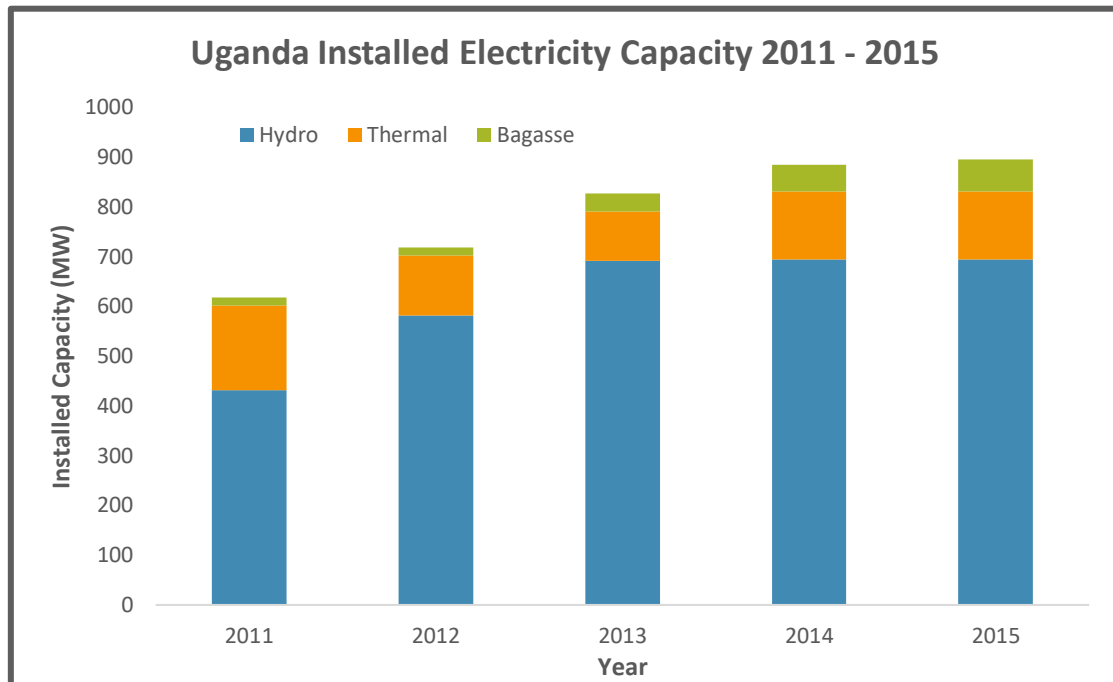


Figure 64: Uganda Installed Electricity Capacity 2011 - 2015

Total electricity customers in Uganda have increased by 85% from 470,542 in 2011 to 872,836 in 2015. Domestic and commercial customer classes have seen similar increases (85% and 88% respectively) growing to a 2015 total of 797,205 and 72,266 customers, respectively. Industrial customers increased to 3,054 customers in 2015 up 51% from their 2011 level of 2,020.<sup>277</sup>

As for rates, domestic customers pay the highest tariffs followed by commercial and then industrial customers. Domestic rates averaged 538 UG shs/kWh in 2015 compared to 484.2 UG shs/kWh for commercial customers and 393.4 UG shs/kWh for industrial customers (Figure 65).<sup>278</sup> Energy sector GHG emissions in Uganda have nearly doubled from 4.6913 MMTCO<sub>2e</sub> in 2000 to 8.5403 MMTCO<sub>2e</sub> in 2015.<sup>279</sup>

<sup>276</sup> (Uganda Bureau of Statistics, 2016)

<sup>277</sup> (Uganda Bureau of Statistics, 2016)

<sup>278</sup> (Uganda Bureau of Statistics, 2016)

<sup>279</sup> (World Resources Institute, 2017)

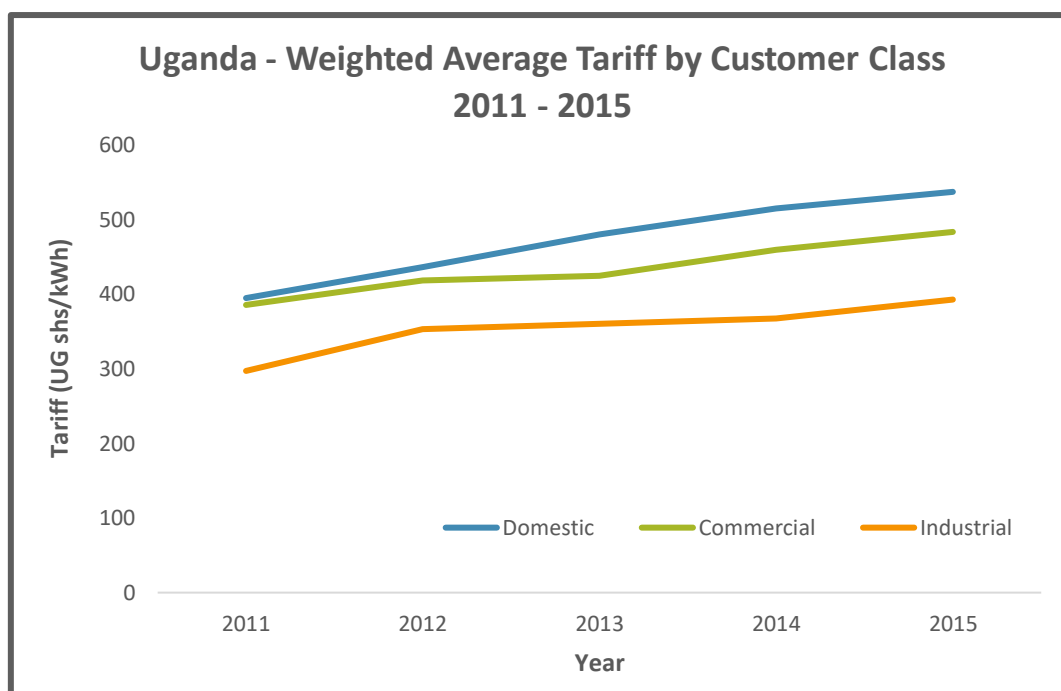


Figure 65: Uganda Weighted Average Tariff by Customer Class

### Water/Sanitation

In 2015, the JMP estimated that 72.5% of Uganda's urban population had access to at least basic service<sup>280</sup> for drinking water, with 17.5% having access to safely managed drinking water.<sup>281</sup> 56% of the urban population in Uganda had access to a piped-in improved drinking water source in 2015. However, both the proportion with access to safely managed drinking water and the proportion with access to piped-in improved sources decreased from their 2000 levels (Figure 66).<sup>283</sup>

Uganda's National Water and Sewerage Corporation is the main provider of metered water in urban areas and it produced over 99.6 million m<sup>3</sup> of water in 2014/2015 of which 96 million m<sup>3</sup> was actually supplied and 66.3 million m<sup>3</sup> (68.8%) was actually sold/billed compared to 2010/2011 where 77.7 million m<sup>3</sup> of water were produced, and 50.7 million m<sup>3</sup> actually sold/billed.<sup>284</sup>

<sup>280</sup> Basic level is defined by the JMP as drinking water from an improved source, provided collection time is not more than 30 minutes for a roundtrip including queuing

<sup>281</sup> Safely managed is defined by the JMP as drinking water from an improved water source which is located on premises, available when needed and free from fecal and priority chemical contamination

<sup>282</sup> (WHO/UNICEF, 2017)

<sup>283</sup> (WHO/UNICEF, 2017)

<sup>284</sup> (Uganda Bureau of Statistics, 2016)

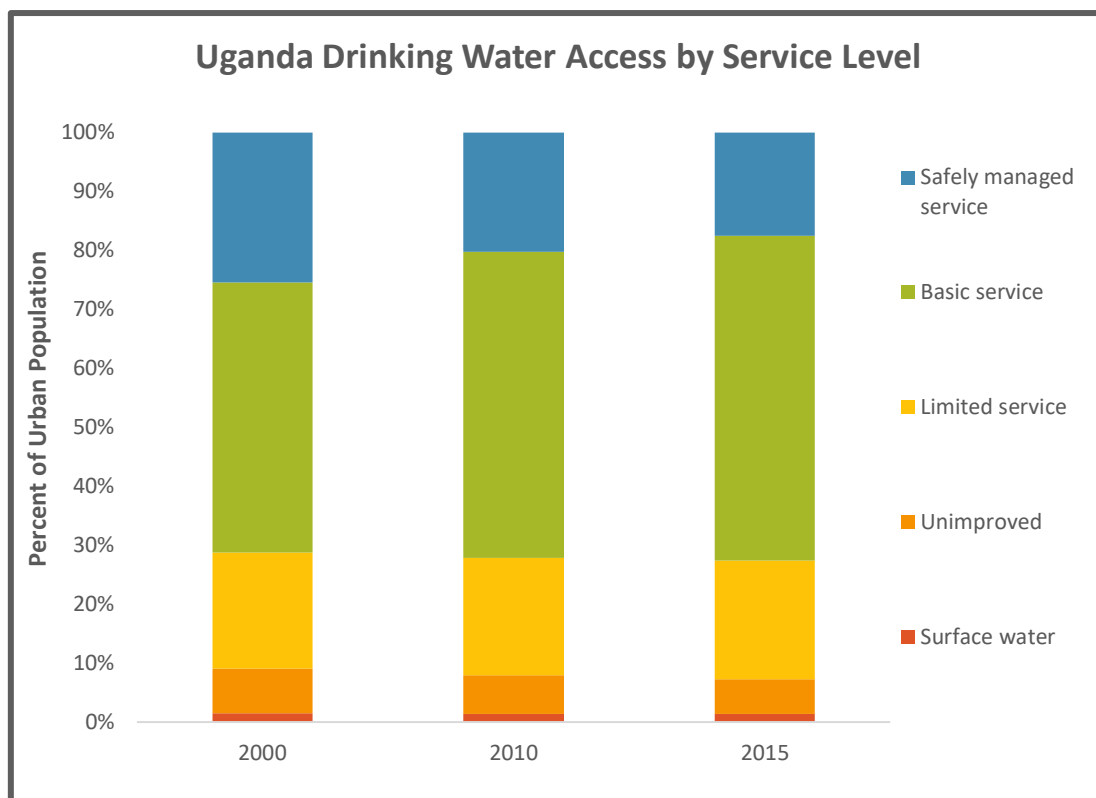


Figure 66: Uganda Drinking Water Access by Service Level

For sanitation, the proportion of the urban population in Uganda with access to at least basic level<sup>285</sup> sanitation service remained constant at about 28% from 2000 to 2015, but the proportion of the urban population practicing open defecation increased slightly from 1.9% in 2000 to 2.1% in 2015. The proportion of the urban population covered by sewerage or septic tank services for sanitation also remained constant from 2000 to 2015 (Figure 67).<sup>286</sup> Access to hygiene service also declined from 2000 to 2015 as 54% of the urban population had no access to a handwashing facility in 2000 and an estimated 64% of the urban population were lacking access in 2015.<sup>287</sup>

<sup>285</sup> Basic level is defined by the JMP as the use of improved facilities which are not shared with other households

<sup>286</sup> (WHO/UNICEF, 2017)

<sup>287</sup> JMP

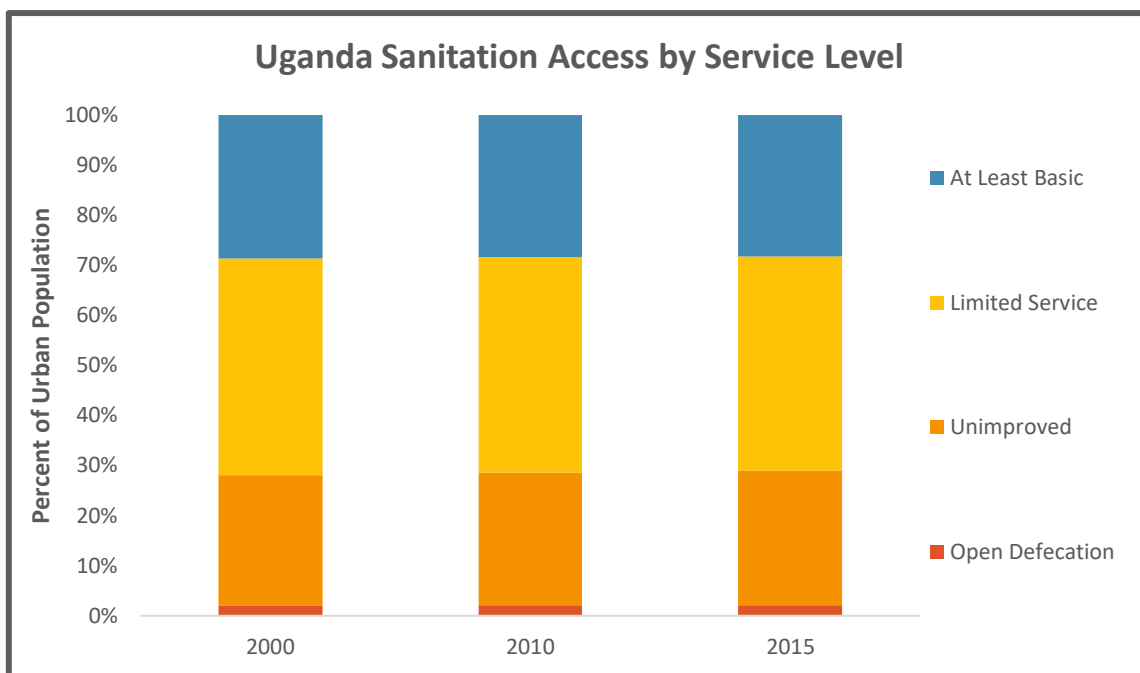


Figure 67: Uganda Sanitation Access by Service Level

### Capital City Spotlight

In 2000, Kampala’s population was estimated at just over 1.3 million people. By 2015, the city’s population had grown to over 1.9 million people and is projected to add an additional 2 million people by 2030 (Figure 68).<sup>288</sup>

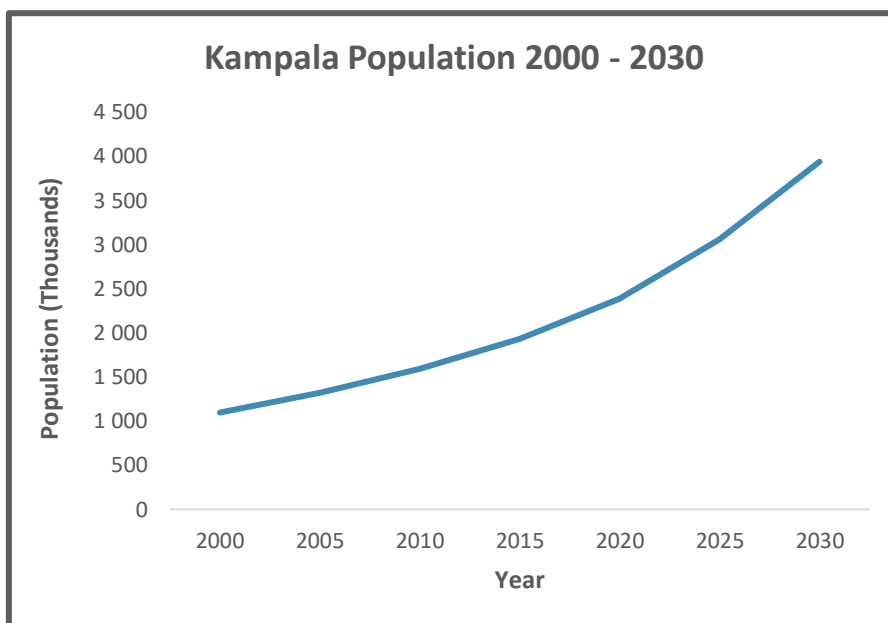


Figure 68: Kampala Population 2000 – 2030

In 2011, 30% of Kampala’s households were estimated to have basic level service for sanitation (51% limited, 17% unimproved, 0.5% open defecation) and 91% were estimated to have at least basic service for water (2.6% limited, 5.9% unimproved, <1% surface water).<sup>289</sup> For hygiene roughly 50%

<sup>288</sup> (United Nations Department of Economic and Social Affairs, Population Division, 2014)

<sup>289</sup> (WHO/UNICEF, 2017)

of Kampala lacked access to a handwashing facility.<sup>290</sup> In 2013, water production in Kampala was estimated at 171,134 m<sup>3</sup>/day (87.8% of capacity). By 2014/2015 over 63.8 million m<sup>3</sup> was produced, 63.7 million m<sup>3</sup> supplied, 42.5 million m<sup>3</sup> sold for a billing efficiency of 66.7%.<sup>291</sup>

Most areas in Kampala are supplied with water by the National Water and Sewerage Corporation (NWSC). The charges are as seen in **Table 13** below.<sup>292</sup>

*Table 13: Kampala Cost of Water FY 17/18*

Category	Tariff excl. VAT for FY 2017/18	Price per 20 Liter Jerrycan
<b>Public Standpipe</b>	1,060	25
<b>Domestic</b>	3,305	78
<b>Institution/Government</b>	3,344	79
<b>Commercial &lt;500m<sup>3</sup>/Month</b>	4,102	97
<b>Commercial &lt;500- 1500m<sup>3</sup>/Month</b>	4,102	97
<b>Commercial &gt;1500m<sup>3</sup>/Month</b>	3,278	77

Per capita solid waste generation in Kampala is about 1 kg/capita/day which works out to about 1500 tonnes.<sup>293</sup> In Kampala, collected solid waste is dumped at the Kiteezi landfill on the outskirts of city. The city is stratified into fully urban residential and peri-urban areas based on the earnings of the residents. Kampala Capital City Authority (KCCA) offers free solid waste collection services to people living in peri-urban areas of the city. Registered and licensed private solid waste collector companies also offer commercial services to subscribers in the urban residential, commercial and industrial areas of Kampala. According to key informants the charges are usually USH 15,000 to USH 50,000 per month.<sup>294</sup> Aside from Landfilling, the other technologies being used to manage waste in Kampala are incineration of hazardous and medical wastes at Luwero Industries and selected medical facilities.

Costs of common energy fuels can be seen in **Table 14** below:

*Table 14: Kampala Cost of Select Fuels<sup>295</sup>*

Item	Cost per unit (UGS - 2015)	Unit
<b>Kerosene</b>	2,633	Liter
<b>Charcoal</b>	721	Kg
<b>Petrol</b>	112.53	Liter
<b>Diesel</b>	103.21	Liter

### **Planned and Ongoing Initiatives in Urban Sustainability**

There are many initiatives related to urban sustainability both planned and ongoing in Uganda. A few select projects are highlighted in **Table 15** below, but for a more complete look at planned and ongoing initiatives, stakeholders, and policy frameworks in Burundi please refer to the accompanying excel document (**EAC Initiatives, Stakeholders, and Policies in Urban Sustainability**).

<sup>290</sup> (WHO/UNICEF, 2017)

<sup>291</sup> (Uganda Bureau of Statistics, 2016)

<sup>292</sup> (National Water and Sewerage Corporation, 2017)

<sup>293</sup> (Kampala Capital City Authority, 2017)

<sup>294</sup> Steven Nyanzi, Conversations with KCCA Officials

<sup>295</sup> (Uganda Bureau of Statistics, 2016)

Table 15: Selected Urban Development Projects - Uganda

Location	Project	Description	Sponsor	Timeline
National	Uganda Support to Municipal Infrastructure Development Program <sup>296</sup>	The objective of the Uganda Support to Municipal Infrastructure Development Program Project (USMID) is to enhance the institutional performance of program Local Governments (LGs) to improve urban service delivery. The core of the program will comprise two grant flows to Municipalities: (i) the Municipal Development Grant (MDG) which will provide substantial additional funds to the targeted Municipalities for investment in urban infrastructure; (ii) the Municipal Capacity Building Grant (MCBG), which will provide Municipalities with the resources to access the capacity building inputs that are required for them to achieve the performance that the MDG will incentivize.	World Bank; Ministry of Lands, Housing and Urban Development	2013 - 2018
National	On and Off-Grid Small Scale Renewable Energy in Uganda <sup>297</sup>	The project's objective is to improve the environment for private investment in Uganda's renewable energy sector by supporting the construction of at least 15 on-grid small scale power plants. This will increase Uganda's energy production by circa 20%, mobilise up to £240 million in private finance and stabilise Uganda's power sector finances by saving approximately \$260m to 2.7bn during the period 2013-35, and lead to greenhouse gas emission savings of between 1 and 10 MtCO <sub>2</sub> e.	DFID; Uganda Energy Regulatory Authority	2013 - 2024
National	Water Supply and Sanitation Programme Phase 2 <sup>298</sup>	WSSP II objectives are aligned to the overall sector objectives Its contributing towards achieving urban target of 100% coverage and rural coverage of 90% by 2035. The JWESSP is targeting providing access to safe water supply to at least 3.4 million Ugandans (rural: 2.5 million; small towns and rural growth centres: 0.9 million), and increasing access to improved sanitation for the same target population by 2018. "The Sector Programme Support (SPS) component will address both urban and rural facilities supporting Climate Change Resilience for protection of 90 water source catchments, training of 200 women and youth in different skills to support ecosystem restoration and improve their livelihood, Mainstreaming HIV/AIDS and awareness creation on lifestyle diseases, support sector coordination and programme monitoring; and support capacity development program for private sector, Local Government and Ministry staff in drilling and design of solar powered piped water systems.	AfDB; Ministry of Water & Environment	Ongoing

<sup>296</sup> (World Bank, 2017)

<sup>297</sup> (Department for International Development, 2013)

<sup>298</sup> (Africa Development Bank, 2016)

## Gaps to EAC Targets in Key Urban Sustainability Sectors

In 2016, the EAC developed the EAC Vision 2050 which laid out the community's overall development and strategic agenda out to 2050. As part of this 2030 and 2050 targets were set for a variety of indicators including, electricity access, sanitation/water access, transportation networks, energy, and industrialization. Below a gap analysis for achieving these goals is explored. It is important to recognize that these goals were initially developed for the five EAC countries (Burundi, Kenya, Rwanda, Tanzania, Uganda), but the discussion below has added in South Sudan which may skew some of the gaps and needed progress.<sup>299</sup>

### GDP per Capita

2030 and 2050 targets for GDP/capita and industry contribution to GDP were established by the EAC Vision 2050. Looking first at GDP per capita, the Vision establishes the target of \$3000 per capita by 2030 and \$10,000 per capita by 2050. In 2014, the Vision document calculated a baseline of \$1014 per capita for a total GDP of over \$147.5 billion. Using this starting point and the population growth projected by the Vision, 2030 GDP in the EAC would need to reach over \$552.9 billion in order to reach the target of \$3000 per capita. In order to meet the \$10000 per capita 2050 target, total GDP would need to increase to over \$2.78 trillion.

Using current business as usual (BAU) GDP estimates from the World Bank,<sup>300</sup> and projected average decadal BAU GDP growth rates from the AfDB's<sup>301</sup>, GDP in the EAC plus South Sudan is projected to grow from an estimated \$134.8 billion in 2014 to \$413.9 billion in 2030 and \$2.24 trillion in 2050. Applying these figures to the population projections from the EAC Vision document, the per capita GDP figures for 2030 and 2050 are \$2246 and \$8030, respectively. However, applied to the much more rapid population projections from the UN, the per capita figures in 2030 and 2050 are \$1589 and \$5486 falling well short of the EAC goals (**Table 16**).

Table 16: GDP per Capita Estimates and 2030 and 2050 Goals

Projection Source	EAC Vision 2050*			World Bank, UN, AfDB*		
	2014	2030	2050	2014	2030	2050
Year						
Total Pop (millions)	145.5	184.3	278.4	169.5	260.5	407.5
GDP Estimate (\$US billion)	147.54	552.9	2784	134.88	413.92	2235.67
GDP/Capita	1014	3000	10000	795	1589	5486

### Industrialization

The EAC Vision 2050 document also establishes goals for industrialization. By 2030, the EAC is looking to have industry contribute 27% of GDP and by 2050, 40%. In 2014, the Vision estimated a baseline GDP of \$147.54 billion with industry adding contributing 16% of that or about \$23.6 billion. With this baseline and GDP growth needed to reach the GDP/capita goals calculated above, the EAC needs industrial value added to reach approximately \$149 billion by 2030 and \$1.1 trillion by 2050 to meet its industrialization targets.

<sup>299</sup> (East African Community, 2016)

<sup>300</sup> (World Bank, 2017)

<sup>301</sup> (Africa Development Bank, 2011)



Using the GDP projections from the World Bank and AfDB calculated above, the gaps are smaller because overall GDP growth is less. Under these scenarios, an additional \$82.1 billion of industrial GDP would need to be developed before 2030 and an additional \$864.6 billion between 2030 and 2050 (**Table 17**).

*Table 17: Industrial Contribution to GDP and Gaps to Vision 2030 and 2050 Goals*

Projection Source	EAC Vision 2050*			World Bank and UN*		
	2014	2030	2050	2014	2030	2050
Year						
GDP Estimate (\$US billion)	147.54	552.9	2784	134.88	413.92	2235.67
Industry % of GDP	16	27	40	19.8	27	40
Value of Industry	23.6	149.3	1113.6	29.7	111.8	894.3
Gap 2014 – 2030 (\$US billion)	-	125.7	-	-	82.1	-
Gap 2030 – 2050 (\$US billion)	-	-	1090	-	-	864.6

### *Access to Electricity in Urban Populations*

EAC Vision 2050, established the targets of having 63% of the urban population in the EAC with access to electricity by 2030 and 94% by 2050.<sup>302</sup> The Vision estimated that about 15.8 million people (28% of the estimated 56.7 million people living in urban areas) had access to electricity in the five EAC countries in 2014. The World Bank estimates are slightly different as the urban populations for the EAC and South Sudan totaled approximately 40.3 million people in 2014 with an estimated 51.5% (20.8 million people) with access to electricity.

In 2030, the EAC Vision is targeting urban populations in just the five EAC countries to rise to 94 million people. If this goal is met, to meet the 2030 target of 63% of the urban population with access to electricity, an additional 43.3 million people will need to gain access to electricity by 2030. By 2050, the targeted urban population for the EAC is 194.8 million people which indicates to meet the 94% 2050 goal, an additional 123.9 million people in urban areas would need to gain access to electricity between 2030 and 2050.

However, if urban populations follow a slower growth pattern as projected by the UN, the estimates of additional access needed are lower. The UN projects that the EAC and South Sudan combined will have an urban population of about 83.2 million people in 2030 and 173.3 million people in 2050. Using these estimates and the World Bank starting points instead, a total of 52.5 million people would need access to electricity in urban areas by 2030 and 163 million people would need access by 2050. That is an additional 31.7 million people before 2030, and an additional 110.5 million people between 2030 and 2050.

Depending on the estimate, to meet the EAC Vision 2030 goals, the EAC and South Sudan will need to extend electricity access to an additional 31.7 – 43.4 million people; and to meet 2050 goals an additional 110.5 – 124 million people between 2030 and 2050 (**Table 18**).

<sup>302</sup> (East African Community, 2016)

Table 18: Electricity Access for Urban Populations to Meet EAC Vision Goals

Projection Source	EAC Vision 2050 <sup>303304</sup>			World Bank and UN <sup>305306307</sup>		
	2014	2030	2050	2014	2030	2050
Year						
Total Pop (millions)	145.5	184.3	278.4	169.5	260.5	407.5
Urban (%)	39	51	70	23	32.0	42.5
Urban Pop (millions)	56.7	94.0	194.9	40.3	83.2	173.3
Urban Electricity Access (%)	28	63	94	51.5	63	94
Urban Pop w/ Electricity (millions)	15.9	59.2	183.2	20.8	52.5	163.0
Gap 2014 – 2030 (millions of people)	-	43.3	-	-	31.7	-
Gap 2030 – 2050 (millions of people)	-	-	124.0	-	-	110.5

### Transportation Network

For transportation, the Vision document outlines the goals to expand the paved road network to 39,250 km by 2030 and 65,700 by 2050. The 2014 baseline established in the Vision document estimated that the current paved road network in the five EAC countries stood at 24,523 km. The 2016 EAC Facts and Figures Report suggests that there were 27,808 km of paved roads in just Tanzania, Uganda, and Kenya in 2015 and adding in an additional 1,331 km estimated from Rwanda<sup>308</sup> the total 2015 estimate for paved roads rises to 29,139 km of paved roads. This suggests that in the next decade or so the EAC needs to add an additional 10,000 km of paved roads to its network and between 2030 and 2050 the EAC will need to add an additional 26,500 km of paved roads.<sup>309</sup>

<sup>303</sup> (East African Community, 2016)

<sup>304</sup> Estimates are just for the five EAC countries (South Sudan is excluded)

<sup>305</sup> (World Bank, 2017)

<sup>306</sup> (United Nations Department of Economic and Social Affairs, Population Division, 2014)

<sup>307</sup> Estimates include the five EAC countries and South Sudan

<sup>308</sup> (National Institute of Statistics of Rwanda, 2016)

<sup>309</sup> (East African Community, 2016)

# Chapter 2: Pilot City Selection Criteria and Recommendations



**Arusha and Mt. Meru**

Source: [https://commons.wikimedia.org/wiki/File:Look\\_at\\_Mt.\\_Meru\\_Arusha\\_Tanzania.jpg](https://commons.wikimedia.org/wiki/File:Look_at_Mt._Meru_Arusha_Tanzania.jpg)

## Overview

This chapter first establishes an initial selection of potential pilot cities in the EAC countries based primarily on population data from national censuses and government priorities/resources from strategic plans. Following a brief discussion about programmatic criteria, the chapter then outlines more targeted impact criteria that can be employed in future pilot city selection. Finally, the chapter concludes by summarizing relevant initiatives and projects implemented within the shortlisted cities to help inform pilot project development.

For all EAC countries, national statistical agency sources were used to obtain basic demographic data from the most recent country censuses. Initial city selection was done by applying a minimum city size of 100,000, which resulted in 65 cities across the EAC. The programmatic criteria (see the second section in this chapter) were then applied, reducing the list to a set of 14 cities.

## Initial City Selection

The six EAC countries can be divided into two groups based on their total population. Burundi, South Sudan, and Rwanda are considered relatively small countries (populations of 8 to 10.5 million), while Uganda, Kenya and Tanzania are regarded as larger countries (populations of 34.5 to 45 million). Furthermore, there appears to be some correlation between the size of the country's population and its urban population, with Burundi, Rwanda, and South Sudan ranging from 10.1% to 17%, and Uganda, Tanzania, and Kenya ranging from 21.4% to 31.3%, as illustrated in **Table 19**.<sup>310</sup>

Table 19: EAC Country and Urban Populations by Census Year

Country	Urban Population	% of Total	Total Population	Year
Burundi	811,866	10.1	8,053,574	2008
Kenya	12,023,570	31.3	38,412,088	2009
Rwanda	1,732,175	16.5	10,482,641	2012
South Sudan	1,405,186	17.0	8,260,490	2008
Tanzania	13,305,004	29.6	44,928,923	2012
Uganda	7,425,864	21.4	34,634,650	2014

### Burundi

The Institut de Statistiques et d'Etudes Economiques du Burundi is official source of demographic data in Burundi<sup>311</sup> and provides the 2008 population census of different *communes* broken down by urban and rural, and in the absence of any identification of cities or their populations, this study therefore assumes that there is only one city (the capital, Bujumbura) in Burundi with a population greater than 100,000 as clarified in **Table 20**. In Burundi, there are a total of 129 *communes* out of which 53 had urban populations. Of these 53 *communes*, only 22 had a population over 10,000, of which 13 constitute the Municipality of Bujumbura (the largest *commune* of which – Kanyosha – had a population of 59,181 while the smallest – Rohero – had a population of 17,481). After Bujumbura, the three next largest urban settlements are included in **Table 20** in order to illustrate the huge gap in population sizes, even though they do not qualify as cities for the purpose of this study due to their small population size.

<sup>310</sup> The source for this table is the six national statistical agencies cited in the next footnotes for each country's analysis of its urban population sizes.

<sup>311</sup> (Institut de Statistiques et d'Etudes Economiques du Burundi, 2008)

Table 20: Burundi Cities and Communes

City/Commune	2008 Population	% of Urban Population	% of Total Population	Notes
Bujumbura	497,166	61.2	6.2	Municipality of Bujumbura
Gitega	41,944	5.2	0.5	Urban population of <i>commune</i>
Ngozi	39,884	4.9	0.5	Urban population of <i>commune</i>
Rumonge	35,931	4.4	0.4	Urban population of <i>commune</i>

## Kenya

In 2009, Kenya had 250 to 300 urban centres with a population of at least 2,000.<sup>312</sup> The official census lists 178 urban centres with a population greater than 5,000, of which 131 were less than 50,000. Another 24 urban centres had a population ranging from 50,000 to under 100,000, while the 23 urban centres with a population greater than 100,000 and are of interest for this study are listed in Table 21.

Table 21: Kenya Urban Centres (2009)

Urban centre	2009 Population	Core Urban Population	Peri-urban Population	% of Urban Population	% of Total Population
Nairobi	3,109,861	3,109,861	0	25.9	8.1
Mombasa	925,137	905,627	19,510	7.7	2.4
Kisumu	383,444	254,016	129,428	3.2	1.0
Nakuru	367,183	343,395	23,788	3.1	1.0
Eldoret	312,351	247,500	64,851	2.6	0.8
Kikuyu	264,714	200,285	64,429	2.2	0.7
Ruiru	240,226	238,329	1,897	2	0.6
Kangundo-Tala	218,722	13,119	205,603	1.8	0.6
Naivasha	170,551	91,898	78,653	1.4	0.4
Thika	151,225	136,386	14,839	1.3	0.4
Machakos	150,467	40,819	109,648	1.3	0.4
Kitale	148,261	98,071	50,190	1.2	0.4
Mavoko	135,571	108,924	26,647	1.1	0.4
Kericho	127,042	40,813	86,229	1.1	0.3
Vihiga	124,391	36,380	88,011	1.0	0.3
Nyeri	117,297	61,187	56,110	1.0	0.3
Malindi	115,882	82,747	33,135	1.0	0.3
Garissa	115,744	109,224	6,520	1.0	0.3
Karuri	115,731	107,754	7,977	1.0	0.3
Kitui	115,183	19,067	96,116	1.0	0.3
Awendo	108,742	17,909	90,833	0.9	0.3
Ngong	107,042	103,927	3,115	0.9	0.3
Mumias	102,208	38,623	63,585	0.9	0.3

<sup>312</sup> (Kenya National Bureau of Statistics, 2012)



## Rwanda

Rwanda's administrative structure divides the country into provinces, then districts (30) and in turn sectors (416).<sup>313</sup> No information on cities could be found through the national institute of statistics except one reference that lists total, urban and rural populations of all sectors based on the 2012 census.<sup>314</sup> Other than the capital Kigali, there were only two sectors that had an urban population greater than 50,000 as listed. After Kigali City, the two next largest urban settlements are included in **Table 22** in order to illustrate the huge gap in population sizes, even though they do not qualify as cities for the purpose of this study due to their small population size.

Table 22: Rwanda Cities

City	2012 Population	% of Urban Population	% of Total Population	Notes
Kigali City	1,132,686	65.4	10.8	Urban population is listed as 859,332.
Kimironko Sector	57,430	3.3	0.5	Urban population
Gisenyi Sector	53,603	3.1	0.5	Urban population

## South Sudan

The smallest administrative area for which population figures are reported in South Sudan is the *payam* (a group of *payams* constitute a county, while a set of counties constitute a state). Of South Sudan's 521 *payams*, 300 (56%) have a population between 10,000 and 50,000, 16 (3%) between 50,000 to 100,000, and only two greater than 100,000.<sup>315</sup> While there is no definition of cities in the previously cited source, various sources mention a number of cities, of which the only four exceeding 100,000 are shown in **Table 23**.

Table 23: South Sudan Cities

City	2008 Population	% of Urban Population	% of Total Population	Notes
Juba	230,195	16.4	2.8	Juba city is considered to consist of five <i>payams</i> (Juba, Kator, Munuki, Northern Bari and Rejaf). <sup>316</sup>
Wau	118,331	8.4	1.4	Based on two <i>payams</i> : Wau North, Wau South.
Malakal	114,528	8.2	1.4	Based on four <i>payams</i> : Central, Eastern, Northern and Southern.
Yambio Town	105,881	7.5	1.3	

## Tanzania

In Tanzania, there are either 169 or 172 urban localities depending on which official source is used. Of these, 25 urban localities have a population over 100,000 (around 15% of all localities), and

<sup>313</sup> (Rwanda Ministry of Local Governemnt, 2011)

<sup>314</sup> (National Institute of Statistics of Rwanda, 2014)

<sup>315</sup> (Southern Sudan Centre for Census Statistics and Evaluation, 2010)

<sup>316</sup> (Martin & Mosel, 2011)

another 31 localities have a population greater or equal to 50,000 and smaller than 100,000 (18%), with 116 localities (67%) having a population less than 50,000 (Table 24).<sup>317</sup>

Table 24: Tanzania Urban Localities

Urban locality	2012 Population	% of Urban Population	% of Total Population
Dar es Salaam region	4,364,541	32.8	9.7
Arusha City Council	416,442	3.1	0.9
Dodoma Municipal Council	410,956	3.1	0.9
Mbeya City Council	385,279	2.9	0.9
Nyamagana Municipal Council	363,452	2.7	0.8
Ilemela Municipal Council	343,001	2.6	0.8
Morogoro Municipal Council	315,866	2.4	0.7
Tanga City Council	273,332	2.1	0.6
Kahama Town Council	242,208	1.8	0.5
Tabora Municipal Council	226,999	1.7	0.5
Zanzibar Urban District	223,033	1.7	0.5
Kigoma Municipal Council	215,458	1.6	0.5
Sumbawanga Municipal Council	209,793	1.6	0.5
Kasulu Town Council	208,244	1.6	0.5
Songea Municipal Council	203,309	1.5	0.5
Moshi Municipal Council	184,292	1.4	0.4
Musoma Municipal Council	178,356	1.3	0.4
Shinyanga Municipal Council	161,391	1.2	0.4
Iringa Municipal Council	151,345	1.1	0.3
Singida Municipal Council	150,379	1.1	0.3
Njombe Town Council	130,223	1.0	0.3
Bukoba Municipal Council	128,796	1.0	0.3
Kibaha Town Council	128,488	1.0	0.3
Mtwara Municipal Council	108,299	0.8	0.2
Mpanda Town Council	102,900	0.8	0.2

## Uganda

In 2014 Uganda had 197 urban centres, of which 11 had a population greater than 100,000 as shown in Table 25, while the distribution of urban centres by size is illustrated in Table 26.<sup>318</sup>

Table 25: Uganda Urban Centres

Urban Centres	2014 Population	% of Urban Population	% of Total Population
Kampala Capital City	1,507,114	20.3	4.4
Nansana Municipality	365,857	4.9	1.1
Kira Municipality	317,428	4.3	0.9
Makindye Ssabagabo	282,664	3.8	0.8
Mbarara Municipality	195,160	2.6	0.6
Mukono Municipality	162,744	2.2	0.5
Gulu Municipality	149,802	2.0	0.4

<sup>317</sup> (Tanzania National Bureau of Statistics, 2015)

<sup>318</sup> (Uganda Bureau of Statistics, 2016)

<b>Lugazi Municipality</b>	114,163	1.5	0.3
<b>Masaka Municipality</b>	103,293	1.4	0.3
<b>Kasese Municipality</b>	101,557	1.4	0.3
<b>Hoima Municipality</b>	100,126	1.3	0.3

Table 26: Distribution of Uganda's Urban Centres by Size

Population	Number of Urban Centres	Total Population	% of Total Population
<b>More than 250,000</b>	4	2,473,006	33.3
<b>100,000 – 250,000</b>	7	926,831	12.5
<b>50,000 – 99,999</b>	16	1,164,443	15.7
<b>25,000 – 49,000</b>	24	851,015	11.5
<b>10,000 – 24,999</b>	91	1,382,409	18.6
<b>Less than 10,000</b>	117	628,160	8.5
<b>Total</b>	197	7,425,864	100

## Initial Pilot City Selection

Due to a combination of population, economic development, government resource and capacity constraints, lack of data, relatively new strategic planning for urbanization, and government priorities many of the EAC countries have primarily focused their urban development work and attention on capital cities and other primary cities with large population and economic bases. Therefore, to provide a starting point for future projects that is aligned with national priorities, pilot city selection in this baseline study was based on population and strategic status. With that in mind, the selection of initial cities in each EAC country was based on the three most populous cities over 100,000 people with an emphasis on capital cities.

**Table 27** provides a summary of the initial selection of 65 cities, the number of cities per country, the lower and upper population limits, the country population, the combined population of selected cities, and the proportion of their population compared to the country population. This is immediately followed by **Table 28**, which presents the first cut of cities, and then by **Table 29**, which presents the final list of shortlisted cities.

Table 27: Summary of Initial City Selection

Country	Number of cities	Lower population limit	Upper population limit	Country population	Population of selected cities	% of selected cities population to urban population	% of selected cities population to country population
<b>Burundi</b>	1	497,166	497,166	8,053,574	497,166	61.2	6.2
<b>Kenya</b>	23	102,208	3,109,861	38,412,088	7,726,975	64.3	20.1
<b>Rwanda</b>	1	1,132,686	1,132,686	10,482,641	1,132,686	65.4	10.8
<b>South Sudan</b>	4	105,881	230,195	8,260,490	568,935	40.5	6.9
<b>Tanzania</b>	25	102,900	4,364,541	44,928,923	9,826,382	73.9	21.9
<b>Uganda</b>	11	100,126	1,507,114	34,634,650	3,399,908	45.8	9.8
<b>Totals</b>	65	-	-	144,772,366	23,152,052	63.1	16.0



Table 28: List of Initial Cities Selected

City	Country	Population	Year
Bujumbura	Burundi	497,166	2008
Nairobi	Kenya	3,109,861	2009
Mombasa	Kenya	925,137	2009
Kisumu	Kenya	383,444	2009
Nakuru	Kenya	367,183	2009
Eldoret	Kenya	312,351	2009
Kikuyu	Kenya	264,714	2009
Ruiru	Kenya	240,226	2009
Kangundo-Tala	Kenya	218,722	2009
Naivasha	Kenya	170,551	2009
Thika	Kenya	151,225	2009
Machakos	Kenya	150,467	2009
Kitale	Kenya	148,261	2009
Mavoko	Kenya	135,571	2009
Kericho	Kenya	127,042	2009
Vihiga	Kenya	124,391	2009
Nyeri	Kenya	117,297	2009
Malindi	Kenya	115,882	2009
Garissa	Kenya	115,744	2009
Karuri	Kenya	115,731	2009
Kitui	Kenya	115,183	2009
Awendo	Kenya	108,742	2009
Ngong	Kenya	107,042	2009
Mumias	Kenya	102,208	2009
Kigali City	Rwanda	1,132,686	2012
Juba	South Sudan	230,195	2008
Wau	South Sudan	118,331	2008
Malakal	South Sudan	114,528	2008
Yambio	South Sudan	105,881	2008
Dar es Salaam	Tanzania	4,364,541	2012
Arusha	Tanzania	416,442	2012
Dodoma	Tanzania	410,956	2012
Mbeya	Tanzania	385,279	2012
Nyamagana	Tanzania	363,452	2012
Ilemela	Tanzania	343,001	2012
Morogoro	Tanzania	315,866	2012
Tanga	Tanzania	273,332	2012
Kahama	Tanzania	242,208	2012
Tabora	Tanzania	226,999	2012
Zanzibar	Tanzania	223,033	2012
Kigoma	Tanzania	215,458	2012
Sumbawanga	Tanzania	209,793	2012
Kasulu	Tanzania	208,244	2012
Songea	Tanzania	203,309	2012
Moshi	Tanzania	184,292	2012
Musoma	Tanzania	178,356	2012
Shinyanga	Tanzania	161,391	2012

Iringa	Tanzania	151,345	2012
Singida	Tanzania	150,379	2012
Njombe	Tanzania	130,223	2012
Bukoba	Tanzania	128,796	2012
Kibaha	Tanzania	128,488	2012
Mtwara	Tanzania	108,299	2012
Mpanda	Tanzania	102,900	2012
Kampala	Uganda	1,507,114	2014
Nansana	Uganda	365,857	2014
Kira	Uganda	317,428	2014
Makindye	Uganda	282,664	2014
Ssabagabo			
Mbarara	Uganda	195,160	2014
Mukono	Uganda	162,744	2014
Gulu	Uganda	149,802	2014
Lugazi	Uganda	114,163	2014
Masaka	Uganda	103,293	2014
Kasese	Uganda	101,557	2014
Hoima	Uganda	100,126	2014

Table 29: List of Shortlisted Cities

City	Country	Population
Bujumbura	Burundi	497,166
Nairobi	Kenya	3,109,861
Mombasa	Kenya	925,137
Kisumu	Kenya	383,444
Kigali	Rwanda	1,132,686
Juba	South Sudan	230,195
Wau	South Sudan	118,331
Malakal	South Sudan	114,528
Dar es Salaam	Tanzania	4,364,541
Arusha	Tanzania	416,442
Dodoma	Tanzania	410,956
Kampala	Uganda	1,507,114
Nansana	Uganda	365,857
Kira	Uganda	317,428

## Impact Criteria

To better select cities and projects in the future, more targeted criteria can be explored, provided that some of the constraints listed above, particularly the lack of data at the city level, are addressed. Some of these potential impact criteria are discussed below:

### Economic Diversification

Cities that have already embarked on or have a track record in approaches of economic diversification will be favoured, as these will have the potential to build out the private sector in secondary and tertiary sectors like manufacturing and processing. Economic diversification goes

hand-in-hand with reducing the cost of doing business, and focus should be on cities that have deep and sustained efforts to support businesses and innovation, such as through energy/electricity costs, transportation, laws/governance, raw materials, etc.

### **Transportation Capacity**

The degree to which transportation constraints for economic development and competitive industry are prevalent within a city is a concern. Pilot cities will preferably have initiatives that aim to enhance the level of connectivity to other parts of the country and international transport routes, in addition to paying significant attention to inter-modal transport needs of the city itself, both for residents and businesses.

### **Climate Change Mitigation**

Pilot projects in the selected cities should have a high potential to reduce climate change impacts, such as through the number and range of beneficiaries or stakeholders that will be impacted by climate adaptation policies or through the likelihood of reduction in carbon emissions.

### **Urban Water System Sustainability**

Urban water systems face significant pressures due to rapidly increasing urbanization, climate change impacts, poor management, and other factors. It will be critical that pilot projects have the potential to enhance the sustainability of urban water systems, through reductions in the frequency and magnitude of water-related disaster, increasing the quality of urban water system, and reducing wastewater discharges.

### **Industrial/commercial activity**

The level of industrial and commercial activity in cities should be considered, given the possible impacts of climate change, such as on the economic profitability of operations, the environmental sustainability of transport infrastructure, and the types of trade goods going through local or regional transport hubs. Mitigation measures can be at many levels, from forward planning and strategic governance, through the maintenance regimes of the physical infrastructure to human resources management.

### **Energy**

Growth rates of a number of cities in the EAC will present significant challenges in the face of climate change impacts, while also trying to meet any renewable energy goals that such countries have set or will set. As is the case with any utility, pilot projects should aim to enhance the resilience of transmission and distribution networks in the face of climate change impacts, while enhancing the service quality and increasing the proportion of renewable energy and adoption of green technologies.

### **Waste management**

There is a need to incorporate improved waste management practices in the pilot projects, especially in ensuring that waste, particularly plastic waste, is reduced and whatever is generated does not end up as marine debris.

### **Institutional**

Pilot projects ought to leverage cities that have shown an ability to offer solutions to institutional challenges, including conflicts or gaps in the mandates of those institutions that play key roles in

such projects. This may include the establishment of new entities, while not simply creating parallel (and potentially redundant) structures. Furthermore, cities in which NGOs/civil society/women associations are active participants – especially in public-private partnerships – should be favoured.

### **Financial**

Cities that have demonstrated a track record in using or promoting a variety of financial instruments to fund projects (whether through banks, investment companies, or public finance) will be favoured. Selection and project design should also take into account the willingness of stakeholders to consider cost offsetting, as well as the incorporation of income generating components.

### **Legislation**

It will be critical that the legislation should be open to the establishment of initiatives, especially PPPs. The legal framework should also be conducive to the establishment of NGOs/civil society/women associations, with the regulatory and political environments making it relatively easy for those actors to operate, organise, fundraise, etc. once they are established. Pilot projects are more likely to be successful in cities that can benefit from a flexible, mature, and efficient legal system. While legal frameworks might be in place, notoriously slow courts or excessively expensive costs of going to court will create barriers to entry. Local courts should be seen as being business-friendly and willing to push the envelope in terms of allowing the establishment of PPPs when court challenges have been lodged.

### **Partnership Approaches**

Public private partnerships have already figured in the institutional and legislative criteria above, but they also merit a standalone focus. One of the main outcomes of this project is for investments in pilot cities to generate local and global environmental benefits, and from the point of view of the likely levels of necessary investments or that pilot projects are almost always going to involve multiple stakeholders including the private sector and/or semi-public administrations (e.g. transport infrastructure), it is expected that PPPs will form a key and recurring theme to successful pilot projects. Thus, cities with proven track records of PPPs should be promoted.

### **Planning and Management Capacities**

The capacity of various administrations within cities, especially local governments, to plan and manage their development and other aspects that directly impact urbanization is an important criterion, and one that is directly associated to the issue of governance. Pilot projects should be undertaken in cities that have exhibited high capacity levels for planning and management, as evidenced through more advanced initiatives such as through the development of capital or regional planning commissions or authorities.

## **Ongoing Initiatives in Shortlisted Cities**

Future selection should also be based to some extent on what initiatives, projects, and programs are ongoing, planned, and completed in specific cities. This logic works two ways. First you can select cities that have a strong presence of these ongoing/planned/completed initiatives already as these cities likely have the capacity, resources, and interest in undertaking new initiatives that build on existing progress or help fill current gaps. Further down the line after a certain level of urban development and capacity building in country, you could use the project criteria to identify cities/areas that have been underinvested in and target those areas for pilots instead.

Even though the selection in this current study was primarily accomplished through population criteria as described above, there is still a need to identify and explore, in coordination with local and national governments, initiatives in the shortlisted cities to more effectively target and design pilot projects in urban sustainability. To that end, ongoing and planned initiatives related to the urban sectors presented in Chapter 1 (urbanization, industrialization, transport, solid waste, energy, and water/sanitation) for the shortlisted cities are presented below. Additional projects and initiatives can be seen in the accompanying excel document (**EAC Initiatives, Stakeholders, and Policies in Urban Sustainability**).

### *Burundi*

Examples of initiatives for the shortlisted cities in Burundi (Bujumbura) can be seen in **Table 30** below:

*Table 30: Initiatives in Selected Cities - Burundi*

Location	Project	Sector/s	Description	Sponsor	Timeline
<b>Bujumbura</b>	Burundi Infrastructure Resilience Emergency Project <sup>319</sup>	Transportation	The project development objective for the Infrastructure Resilience Emergency Project for the Burundi is to enhance the climate resilience of key transport and drainage infrastructure in Greater Bujumbura while strengthening the country's capacity to manage and prevent natural disasters.	World Bank; National Road Agency	2015 - 2019
<b>Bujumbura</b>	Innovative approach to hygiene and sanitation and the promotion of the right to water and to sanitation in the municipality of Mutimbuzi <sup>320</sup>	Sanitation, Water	Its objective is to improve the coverage of sanitation, taking into account the entire chain: collection (latrines), evacuation (emptying of pits or recovery of excreta for agricultural valuation) and treatment (compost and agricultural valuation). It also aims to improve hygiene practices.	AFD	Ongoing
<b>Bujumbura, Mubuga</b>	Gigawatt Global Mini-grid Pilots <sup>321</sup>	Energy	The aim of this pilot project is to test two different mini-grid concepts. Each pilot project is an independent power producer powered by solar PV. Pilot 1 is focused on street lights to make a mixed commercial/residential neighborhood safer and more economically productive and Pilot 2 focuses on rural communities and businesses currently using diesel generated electricity.	Energy and Environment Partnership; Gigawatt Global Cooperatief	Ongoing

<sup>319</sup> (World Bank, 2015)

<sup>320</sup> (Agence Francaise de Developpement)

<sup>321</sup> (Gigawatt Global, 2017)

<b>Bujumbura</b>	Establishing Solar Lights Assembly, Repair, and Sales in Burundi <sup>322</sup>	Energy, Industry, Manufacturing	This project aims to introduce a new business model for the production and sales of solar lamps in Burundi. The lamps to be introduced, developed by the German partner Solux, will be assembled locally, thereby decreasing the cost while maintaining the high quality. The project will not only contribute to the solution of the lighting problem in Burundi but will also create new jobs in 'green' economy, bringing new knowledge and technology to the country.	Energy and Environment Partnership; Solidarite pour un Development Integre Sprl (SDI)	Ongoing
<b>Bujumbura</b>	Improved Cookstoves Manufacturing and Affordable Dissemination in Burundi <sup>323</sup>	Energy, Industry, Manufacturing	Overall project objective is the local manufacturing and mass-retailing of improved cookstoves (ICS) in Burundi. These biomass-fueled ICS, essentially made of ceramic liners and metallic bodies, allow quicker heating-up, longer cooking and heat retaining with less fuel and lower combustion fumes than prevailing traditional cookstoves.	Energy and Environment Partnership; Ecosur Afrique	Ongoing
<b>Bujumbura</b>	Solar Bakery Demonstration Project <sup>324</sup>	Energy, Industry	Solar Bakery demonstration project in Burundi. The aim of the project is to install a solar thermal oven to a local bakery near Bujurumba to provide cleaner, more cost-efficient method of baking bread and selling it to the local community. The bakery has not been running due to lack of charcoal and firewood, so through this project the village will open a new business and create jobs for women.	Energy and Environment Partnership; The R20 – Regions of Climate Action	Ongoing
<b>Bujumbura</b>	Hands on Training on Energy Efficiency and Renewable Energy for Youth Empowerment <sup>325</sup>	Energy	Objective is to involve the youth in the green economy that is contributing to climate change mitigation. Modules covered include: Conducting energy audits, Green building and passive building designs, Tubular biogas	UNHabitat	Ongoing

<sup>322</sup> (Energy and Environment Partnership, 2017)

<sup>323</sup> (Energy and Environment Partnership, 2017)

<sup>324</sup> (Energy and Environment Partnership, 2017)

<sup>325</sup> (UN Habitat, 2014)

			digester systems, Improved cook stoves and gasifier stoves, Sustainable charcoal briquette production to substitute charcoal and firewood, Assembling and installation of solar bulb lights		
<b>Bujumbura</b>	Bujumbura 2045 <sup>326</sup>	Urban Development	Masterplan for Bujumbura by 2045: The Masterplan intends to have a consistent zoning and transport system that can accommodate the growing population.	UNDP; Ministry of Water, Environment, Land Management and Urbanism / Singapore Cooperation Enterprise/ Surbana Jurong	Ongoing
<b>Bujumbura</b>	Reduction of Non-Revenue Water and Billing System Modernisation <sup>327</sup>	Water	Project looks to reduce the non-revenue water tracking, renew non-functioning water meters, and modernize the billing system	Government of Burundi; REGIDESO (National Water and Electricity Company)	Ongoing

## Kenya

Examples of initiatives for the shortlisted cities in Kenya (Nairobi, Mombasa, Kisumu) can be seen in

**Table 31** below:

<sup>326</sup> (Singapore Cooperation Enterprise, 2017)

<sup>327</sup> (REGIDESO - Burundi, 2016)

Table 31: Initiatives in Selected Cities - Kenya

Location	Project	Sector/s	Description	Sponsor	Timeline
Mombasa	Water Security and Climate Resilience <sup>328</sup>	Climate Adaptation, Water, Infrastructure	The development objectives of the Water Security and Climate Resilience Project for Kenya are to: (i) increase availability and productivity of irrigation water for project beneficiaries; and (ii) enhance the institutional framework and strengthen capacity for water security and climate resilience for the country. The Additional Financing (AF) will support improved and new flood control infrastructure on the Lower Nzoia River, providing enhanced flood protection for 66,700 people as well as new watershed management activities in the Nzoia Watershed. The additional grant from the KWPF will support an improved flood early warning system	World Bank, Ministry of Environment, Water, and Natural Resources	2013 - 2022

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<sup>328</sup> (World Bank, 2013)



<b>Mombasa</b>	Coastal Region Water Security and Climate Resilience Project <sup>329</sup>	Water, Infrastructure	The objective of the Coastal Region Water Security and Climate Resilience Project for Kenya is to sustainably increase bulk water supply to Mombasa County and Kwale County, and increase access to water and sanitation in Kwale County. The project has three components. (1) dam and transportation related infrastructure (2) Investments in water supply and sanitation in rural communities and small towns; a demonstration irrigation scheme to inform, design, and establish the viability of a large-scale irrigation program in Kwale in the future; and livelihoods investments support. (3) Financing of the required office space, goods, equipment, staff, consultant services, travel, training, and operating costs that will allow for the successful implementation of project activities.	World Bank, Ministry of Environment, Water, and Natural Resources	2014 - 2021
<b>Mombasa</b>	Kuza Project <sup>330</sup>	Waste Management	This is a project that attempts to address the root causes of youth unemployment in Kenya	DFID, Adam Smith International, Mombasa County Government	Ongoing
<b>Mombasa, Kisumu</b>	Kenya Informal Settlements Improvement Project <sup>331</sup>	Urban Development, Housing	The objective of the Informal Settlements Improvement Project is to improve living conditions in informal settlements in selected municipalities in Kenya. The additional financing will scale up the project's impact and development effectiveness by upgrading an additional four informal settlements in the urban centers participating in the project.	World Bank, Ministry of Lands, Housing, and Urban Development	2011 - 2018

<sup>329</sup> (World Bank, 2017)

<sup>330</sup> (DFID; Adam Smith International, 2017)

<sup>331</sup> (World Bank, 2011)

<b>Nairobi</b>	Sustainable conversion of waste into clean energy to reduce GHG emissions <sup>332</sup>	Energy, Climate Change, Waste management	The proposed project activities promote the use of Waste to Energy (WTE) technologies. This area was selected due to their rapid scaling up and greenhouse gas (GHG) emissions reduction potential. More specifically the project aims at promotion of bio-waste to energy technologies, with a focus on biogas generation & utilization and landfill methane recovery & utilization. GEF funds will support the implementation of the project activities resulting in a transition towards a low carbon development path. The proposed project covers one of the strategic focal area objectives that focuses on technologies at the stage of market demonstration and commercialization.	UNIDO/GEF	2015 - 2019
<b>Nairobi</b>	Transport Infrastructure Development <sup>333</sup>	Transportation	Nairobi, the capital city of Kenya, rapid traffic increases due to population growth and inefficient traffic system caused by unconnected ring road networks have not been sufficiently addressed, resulting in serious traffic congestion, accidents and pollution. It is urgently necessary to develop proper road networks and maintenance system to respond to rapid urbanization of Nairobi with an estimated population growth from 3.0 to 4.3 million by 2025.	JICA	2015 - 2025
<b>Nairobi</b>	Program on Improvement of Infrastructure for Transportation in Nairobi Metropolitan Area <sup>334</sup>	Transportation	The program is to develop and improve roads in Nairobi and strengthen road maintenance and management in order to mitigate traffic congestion, reduce accidents and solve the bottleneck of regional transportation. JICA Projects-strengthening of Capacity for Supervision and Operation on Road Maintenance; Works through Contracting; The Project for Dualling of Nairobi-Dagoreti Corner Road C60/C6; Construction of Nairobi Missing Links No. 3, 6 & 7	JICA	Ongoing

<sup>332</sup> (Global Environment Facility, 2014)

<sup>333</sup> (JICA)

<sup>334</sup> (JICA)

<b>Nairobi</b>	Nairobi Metro 2030 Vision - Projects <sup>335</sup>	Urban Development, Infrastructure, Transportation	Nairobi City County-JICA Integrated Urban Development Master Plan; Nairobi Transport and Urban Decongestion Committee; Thika Highway Upgrade; Sustran Bus Rapid Transit Corridor; Kenya Railroad Expansion; Tatu City Development; Konza City Technology Park; Nairobi Metropolitan Services Improvement Project (NaMSIP); Kenya Slum Upgrading Programme (KENSUP); Nairobi Metropolitan Region (NMR) Traffic Decongestion Program	Republic of Kenya, Ministry of Nairobi Metropolitan Development (MoNMED)	2008 - 2030
<b>Nairobi</b>	Education for Sustainable Development in Africa - Sustainable Urban Development (ESDA - SUD) <sup>336</sup>	Urban Development, Economic Development	The ESDA-SUD represents a paradigm shift from traditional training for white collar jobs to training for self-employment, employment creation and wealth creation in urban Africa. Given the focus of this programme, the mission of the KENYA ESDA- SUD course is to enhance skills development for sustainable development in Africa by training innovation and action-oriented professionals ready to make a contribution to sustainable livelihoods of vulnerable urban communities' cooperation with the University of Nairobi and Kenyatta University.	AfDB	Pipeline
<b>Nairobi</b>	Assembly and Sales of SHS in Kenya <sup>337</sup>	Energy	The Brighterlite Kenya Project (BKP) aims within 5 years to provide 1M Kenyans with a tailor-made financing-lighting solution based on size (cost) of Solar Home Systems and length of credit period, matching the monthly family savings made on paraffin.	Energy and Environment Partnership, Basecamp Foundation Kenya	Ongoing
<b>Nairobi</b>	Promoting Sustainable Transport Solutions for East African Cities	Urban Development, Infrastructure, Climate Change	The project aims to reduce growth in private motorized vehicles, thus reducing traffic congestion and GHG emissions in the three capital cities of Ethiopia, Uganda, and Kenya. The envisaged strategic response is to upgrade their transit systems, implement improved non-motorized transport infrastructure and apply travel demand management as well as other supporting policies.	UN-HABITAT, UNEP/GEF	Ongoing

<sup>335</sup> (Nairobi Planning Innovations, n.d.)

<sup>336</sup> (AfDB, 2009)

<sup>337</sup> (Energy and Environment Partnership, 2017)

<b>Nairobi, Kisumu</b>	Scaling-up the market infrastructure to increase access and affordability of solar solutions in Kenya <sup>338</sup>	Energy	The project foresees the scale-up and further roll-out of its business model of offering solar solutions to the doorstep of low- and medium income households in selected areas in Kenya. The company will set-up a wide distribution network of own branch locations, staffed and equipped for sales and after sales services to its target group. The project aims to expand its network with additional 15 branches, enabling it to target an estimated 11,000 households within the project period.	Energy and Environment Partnership, Orb Energy Private Limited	Ongoing
<b>Nairobi, Mombasa, Kisumu</b>	Scaling-up Briquette Commercialization in Kenya <sup>339</sup>	Energy, Waste Management	The aim of the project is to increase accessibility to briquettes as alternative affordable cooking fuel to at least 40,000 consumers in Mombasa, Nairobi, Nakuru and Kisumu counties leading to re-use of waste biomass.	Energy and Environment Partnership, Practical Action Eastern Africa Regional Office	Ongoing
<b>Nairobi, Mombasa</b>	Strengthening Regional Economic Integration <sup>340</sup>	Economic Development, Transportation	To improve the pace of infrastructure development and enhance regional trade competitiveness, by delivering improvement to the managerial capacity and physical layout for cargo handling at the Port of Mombasa, and improved regulatory framework for trade. This will contribute to increased exports and regional trade in East Africa benefitting the regional population.	DFID, Trademark East Africa	2013 – 2018

## Rwanda

Examples of initiatives for the shortlisted cities in Rwanda (Kigali) can be seen in **Table 32** below:

*Table 32: Initiatives in Selected Cities – Rwanda*

Location	Project	Sector/s	Description	Sponsor	Timeline
<b>Kigali</b>	Advanced Recycling and Energy Recovery Project for the City of Kigali <sup>341</sup>	Energy, Solid Waste	The project aims to bring the plan for a commercial scale plant in the city of Kigali to a financial close. The plant would generate green electricity from Municipal Solid Waste (MSW) and supply it to the grid to alleviate the shortage of electricity in Rwanda.	Energy and Environment Partnership, Green Waste Energy Development	Ongoing

<sup>338</sup> (Energy and Environment Partnership, 2017)

<sup>339</sup> (Energy and Environment Partnership, 2017)

<sup>340</sup> (DFID, 2013)

<sup>341</sup> (Energy and Environment Partnership, 2017)

				Africa (GWEDA)	
<b>Kigali</b>	MobiliseYourCity: 100 Cities Engaged in Sustainable Urban Mobility Planning to Reduce Greenhouse Gas Emissions <sup>342</sup>	Transportation	Support developing and transition cities and countries in better urban mobility planning to design more livable and prosperous cities for all, reduce congestions, road fatalities, noise and air pollution, and CO <sub>2</sub> emissions through the elaboration or revision of Sustainable Urban Mobility Plans between 2016 and 2020	Cooperation for Urban Mobility in the Developing World (CODATU), European Commission;	2015 - 2020
<b>Kigali</b>	Manufacturing and Sales of Solar Home Systems in Rwanda <sup>343</sup>	Energy, Industry, Manufacturing	The project's objective is to establish the first local manufacturing plant of affordable solar home systems in Rwanda. The project aims to lower the cost price of solar home systems by introducing manufacturing and assembly of solar panels locally. With the right financial incentive for the customer it hopes to boost the sales of solar kits up to the level of commercial viability. Rural households will achieve cost savings by spending less on lighting and phone charging, and will also see significant economic, health, education, and social benefits.	Energy and Environment Partnership, Uages LLC	Ongoing
<b>Kigali</b>	Support for Development and Implementation of a Green Economy Approach <sup>344</sup>	Economic Development	Support for the Development and implementation of a Green Economy Approach to Rwanda's Economic Transformation	UNDP, KOICA	2014 - 2018
<b>Kigali</b>	Rwanda CFL Energy Efficiency Project <sup>345</sup>	Energy	Electrogaz, the national electricity utility, will distribute up to 800,000 energy efficient CFLs to be installed in the residential and commercial sectors. This energy efficiency program, intends to address Rwandan acute electricity supply shortage, by reducing the electricity consumption and the peak loads with efficiency gains of up to 60-80 percent, and restraint carbon dioxide emissions. Mininfra, the Ministry of Environment, bears also this national program, which is a real incentive to widen the use of energy efficiency lighting technology in Rwanda.	World Bank, Electrogaz	2009 - 2019

<sup>342</sup> (Codatu, 2017)

<sup>343</sup> (Energy and Environment Partnership, 2017)

<sup>344</sup> (UNDP, 2014)

<sup>345</sup> (World Bank, 2009)

<b>Kigali</b>	Rwanda Electricity Sector Strengthening Project <sup>346</sup>	Energy	The objective of the Electricity Sector Strengthening Project for Rwanda is to enhance the operational efficiency of the utility and increase electricity access. The project has three components: component A, electricity sector capacity strengthening; component B, increased access to electricity services; and component C, technical assistance and project implementation support.	World Bank, Ministry of Infrastructure	2015 - 2021
<b>Kigali and Secondary Cities</b>	Rwanda Urban Development Project <sup>347</sup>	Urban Development, Infrastructure	The objective of the Urban Development Project for Rwanda is to provide access to basic infrastructure and enhance urban management in selected urban centers of the participating districts. There are multiple components to the project, the first component being provision of basic infrastructure in secondary cities. This component will support provision of basic infrastructure in the six secondary cities to enhance living conditions for residents and support LED. Eligible investments are those that are directly under the mandate of the district governments such as roads, drainage, solid waste management, and sanitation. The second component is the upgrading of unplanned settlements in the City of Kigali.	World Bank, Ministry of Infrastructure	2016 - 2021
<b>Kigali</b>	Energy Efficiency through Reduction of Losses in Kigali Grid Network Project <sup>348</sup>	Energy	In order to address inadequate infrastructure in Rwanda's transmission and distribution network that were estimated contribute to total losses of about 23%, the European Commission embarked on the Energy Efficiency through Reduction of Losses in Kigali Grid Network project. Outputs include the construction of a 110-kV line, upgrade of three existing substation and construction of a new one, and the installation of smart meters.	European Commission, Ministry of Infrastructure, Rwanda Energy Group, Rwanda Environmental Management Authority	Ongoing
<b>Kigali</b>	Kigali Bulk Water Project <sup>349</sup>	Water	The project is expected to have strong development outcomes by: 1) providing clean potable water to the population therefore contributing to improving public health, 2) addressing Rwanda's growing demand in industry sector for reliable water, 3) economic growth due to improved	AfDB	Pipeline

<sup>346</sup> (World Bank, 2015)

<sup>347</sup> (World Bank, 2017)

<sup>348</sup> (European Commission, 2015)

<sup>349</sup> (Africa Development Bank, 2015)

			productivity particularly for women and redeployment of Government budgetary savings to the Health sector and other economic sectors. and 4) strong demonstration effect given this is the country's first Independent Water Producer ("IWP") project on a large scale in the continent therefore contributing to private sector development.		
<b>Kigali</b>	Green City Pilot <sup>350</sup>	Urban Development	The aim of the Implementation Framework is to lay the ground for the implementation of a bankable green urban mixed-use development project (Green City Pilot –GCP) on a designated site (approx. 620 ha) in Kigali	KfW, FONERWA	Pipeline

### South Sudan

Examples of initiatives for the shortlisted cities in South Sudan (Juba, Wau, Malakal) can be seen in **Table 33** below:

*Table 33: Initiatives in Selected Cities - South Sudan*

Location	Project	Sector/s	Description	Sponsor	Timeline
<b>Juba</b>	Juba Distribution System Rehabilitation and Expansion Project <sup>351</sup>	Energy	The main development objective of the Project is to strengthen the distribution networks in Juba in order to provide reliable electricity and increase access in the city which is currently at a very low level. The supply of electricity will improve the quality of life of the residents; improve the performances of the public and private service providers; and promote businesses, thus contributing to economic growth and poverty reduction in South Sudan.	AfDB, South Sudan Electricity Corporation	Ongoing

<sup>350</sup> (German Ministry of Economic Cooperation & Development)

<sup>351</sup> (Africa Development Bank, 2017)

<b>Juba</b>	Resilience Water Project for Improved Livelihoods in Juba <sup>352</sup>	Water, Sanitation	The project main outcomes are: improved equitable access to sustainable water supply in the project area and improved water system functionality. When completed the project will benefit approximately 230 ,000 resident and transient population of Juba city. The anticipated project impacts are; reduced incidences of water borne diseases in the project area, reduced under five mortality rate and increased primary school enrollment, especially for the girl child. This project will not have sanitation infrastructure, as this will be addressed through a project to be financed by another development partner (DP).	AfDB	Ongoing
<b>Juba</b>	Project for Improvement of Water Supply Systems of Juba in South Sudan <sup>353</sup>	Water, Sanitation	The Project aims to improve the capacity of the water supply system of Juba by constructing water intake facilities, a purification facility, a distribution reservoir, transmission pipelines, 120 public tap stands and eight water tanker filling stations. Due to the rapid increase of population in the capital city and the lack of adequate water supply facilities, people of Juba have limited access to safe and clean water which is causing water-borne diseases and economic burden. Upon completion of the Project, SSUWC will be able to provide clean and safe drinking water to over 400,000 people in Juba. JICA has also implemented technical cooperation projects to enhance the management capacity of SSUWC since 2010.	JICA, Ministry of Water Resources and Irrigation, South Sudan Urban Water Corporation (SSUWC)	Ongoing

## Tanzania

Examples of initiatives for the shortlisted cities in Tanzania (Dar es Salaam, Arusha, Dodoma) can be seen in **Table 34** below:

*Table 34: Initiatives in Selected Cities - Tanzania*

Location	Project	Sector/s	Description	Sponsor	Timeline
<b>Arusha</b>	Arusha Sustainable Water and	Water, Sanitation	This project includes the rehabilitation of existing facilities and constructing of new ones to increase the percentage of the population with access to water and sanitation facilities.	AfDB, Arusha Urban Water Supply and Sanitation Authority	Ongoing

<sup>352</sup> (African Development Bank, 2016)

<sup>353</sup> (Japan International Cooperation Agency, 2013)



Sanitation Delivery Project<sup>354</sup>

<b>Dar es Salaam</b>	Dar es Salaam Urban Transport Improvement Project <sup>355</sup>	Transportation	The development objective of Dar Es Salaam Urban Transport Improvement Project for Tanzania is to improve transport mobility, accessibility, safety, and quality of transport service delivery along the selected corridors in Dar es Salaam. This project has three components. 1) The first component is Establishment of the Third and Fourth Phases of the Dar es Salaam Bus Rapid Transit (BRT) System. The second component, Improvement of the Ubungo Intersection and Complementary Road Safety Infrastructure for the BRT Phase 1 System. The third component, Institutional Strengthening and Reform, Information and Communication Technology (ICT) Innovation, Safety Net, and Transport Studies	World Bank, TANROADS	Ongoing
<b>Dar es Salaam</b>	Dar es Salaam Metropolitan Development Project <sup>356</sup>	Infrastructure, Urban Development	The development objective of the Dar es Salaam Metropolitan Development Project for Tanzania is to improve urban services and institutional capacity in the Dar es Salaam metropolitan area, and to facilitate potential emergency response.	World Bank, DAR ES SALAAM LOCAL AUTHORITIES	2015 - 2020

<sup>354</sup> (African Development Bank, 2015)

<sup>355</sup> (World Bank, 2017)

<sup>356</sup> (World Bank, 2017)

<b>Dar es Salaam</b>	Dar es Salaam Bus Rapid Transit Infrastructure Project <sup>357</sup>	Transportation	The project development objective is to provide enhanced transport facilities that are reliable and cost effective, with a view to improve urban mobility and accessibility to businesses and thereby supporting economic and social development of the city and the Country as a whole. The specific objective is to provide 19.3 km BRT infrastructure along the Kilwa road corridor to address congestion, public transport problem and provision of reliable and accessible transport for women, disabled (handicapped) and elderly citizens with standard and customized large articulated buses and feeder buses.	AfDB, TANROADS	Ongoing
<b>Dar es Salaam</b>	Women Economic Empowerment Through Business Incubation and Entrepreneurship <sup>358</sup>	Energy	The project aims at increasing access to sustainable energy and energy services by women in urban Tanzania. The project will select and test a mobile biogas digested capable of utilizing food waste produced by food vendors in the streets of Dar es Salaam who depend solely on charcoal which result into forest depletion. During the project life at least 20 entrepreneurial women groups in urban and suburban areas of Car es Salaam will be formally established with sustainable businesses based on renewable energy.	Energy and Environment Partnership, The Royal Norwegian Society for Development	Ongoing

<sup>357</sup> (Africa Development Bank, 2016)

<sup>358</sup> (Energy and Environment Partnership, 2017)

<b>Dar es Salaam</b>	Kigamboni New City <sup>359</sup>	Urban Development	Due to the expansion of economic activities, Dar Es Salaam is expanding faster. The big picture of the Kigamboni new city master plan is to provide sufficient infrastructure in order that the residents have a better quality of life and to build a core for developing new land demands of Dar Es Salaam, such as residential, commercial, trade and business, industrial, educational, and tourism facilities.	Ministry of Lands, Housing and Human Settlements Development	Ongoing
<b>Dar es Salaam, Arusha, Dodoma</b>	Tanzania Strategic Cities Project <sup>360</sup>	Transportation; Waste Management; Water; Sanitation	The projects seeks to improve the quality of and access to basic urban services in participating Local Government Authorities (LGAs) through: (a) investment in core urban infrastructure and services subprojects prioritized by the project LGAs; (b) construction supervision support and technical assistance (c) enhanced management and cost recovery of key urban services; (d) improved revenue collection from all sources within the Participating LGA's jurisdiction; (e) improved strategic urban planning; and (f) strengthened capacity of PO-RALG to provide sustained support and guidance to participating LGAs	Worldbank/IDA, Prime Minister's Office Regional Administration and Local Government (PMO-RALG)	Ongoing

## Uganda

Examples of initiatives for the shortlisted cities in Uganda (Kampala) can be seen in **Table 35** below:

*Table 35: Initiatives in Selected Cities - Uganda*

Location	Project	Sector/s	Description	Sponsor	Timeline
<b>Kampala</b>	Second Kampala Institutional and Infrastructure Development Project <sup>361</sup>	Infrastructure, Transportation	The Second Kampala Institutional and Infrastructure Development Project (KIIDP-2) for Uganda seeks to enhance infrastructure and institutional capacity of Kampala Capital City	World Bank, KAMPALA CAPITAL CITY AUTHORITY	Ongoing

<sup>359</sup> (Ministry of Lands, Housing and Human Settlements Development)

<sup>360</sup> (World Bank, 2017)

<sup>361</sup> (World Bank, 2014)

			Authority (KCCA) to improve urban mobility for inclusive economic growth. The first component is city wide road infrastructure and associated investments. This component will enhance the quality of roads infrastructure and associated investments in Kampala City for improved city mobility.		
<b>Kampala</b>	Kampala Sanitation Program <sup>362</sup>	Water, Sanitation	The objectives of the project are i. To improve the health and living standards of the urban poor residents in the Nakivubo catchment. ii. To improve environmental sustainability of the Lake Victoria basin through reduction of pollution entering the lake through the Nakivubo channel. and iii. To improve the quality of lives of the residents in informal settlements in Kampala, who largely live below the poverty line, through improved management of sludge from domestic sanitation facilities and provision of hygiene education.	AfDB, NATIONAL WATER AND SEWERAGE CORPORATION NWSC	Ongoing
<b>Kampala</b>	Briketi Energy Savings Solutions <sup>363</sup>	Energy, Industry, Manufacturing	Green Bio Energy (GBE) is a social enterprise based in Kampala, Uganda that offers low-income Ugandan families access to cost-saving, safe and eco-friendly energy solutions such as energy efficient cook stoves and environmentally friendly charcoal briquettes. GBE also provides individuals and organizations with trainings on topics such as micro-enterprise management, briquettes and stoves production, for which it sells equipment and machinery.	Energy and Environment Partnership, Green Bio Energy Ltd	Ongoing
<b>Kampala</b>	Kampala Water and Sanitation Forum <sup>364</sup>	Water and Sanitation	To streamline coordination of stakeholders in developing an integrated WASH sector through collaborative exploration of prevailing challenges,	GIZ, Kampala Capital City Authority	Ongoing

<sup>362</sup> (AfDB)

<sup>363</sup> (Energy and Environment Partnership, 2017)

<sup>364</sup> (Kampala Capital City Authority)

identification and efficient allocation of available resources, enhancing opportunities for synergy and learning networks, and building on existing and emerging innovations to enhance sustainable interventions to achieve the total sanitation and universal access to clean and safe water targets in Kampala City.

<b>Kampala</b>	Kampala Faecal Sludge Management (KFSM) Project <sup>365</sup>	Water and Sanitation	To improve fecal sludge management (FSM) services for on-site sanitation in Kampala City. The project specifically; 1) Develop and maintain a sanitation GIS Based database for Kampala for planning resource allocation and monitoring of service provision, 2) Implement binding Service Level Agreements (SLAs) for Faecal Sludge Collection and Transportation (FS C&T) to ensure regulated, efficient and affordable services, 3) Conduct social and sanitation marketing measures throughout the city to improve peoples' willingness to adopt and pay for improved sanitation solutions, 4) Build Capacity of service providers and KCCA for effective service provision and regulation respectively, 5) Upgrade the existing client care services to include a call centre to bridge the gap between users and service providers and improve efficiency (e.g. reduction in the response time for receiving services).	Bill and Melinda Gates Foundation, Kampala Capital City Authority	Ongoing
<b>Kampala</b>	Kampala South Water and Sanitation Project <sup>366</sup>	Water	The project is to improve the quality of life, health and economy of people in the south and west of greater Kampala. The project covers feasibility studies for the development of the new WTP, abstraction	Royal Danish Embassy, Government of Uganda, National Water and Sewerage Corporation	Ongoing

<sup>365</sup> (Kampala Capital City Authority, 2013)

<sup>366</sup> (NWSC)

system, primary bulk storage reservoir, associated pumping main, distribution system a Faecal Sludge Treatment Plant and Supply of Water in Informal Settlements in this area.

<b>Kampala</b>	Support of Further Development of the Northern Corridor Road Axis in Uganda - Kampala-Jinja Expressway <sup>367</sup>	Transportation	Project is expected to improve inter-urban connectivity as part of the corridor while improving also intra-urban transport within the Kampala Metropolitan. One of the key underpinnings of this project was the introduction of the 2015 PPP Act as well as ongoing efforts to operationalise the law to provide a framework to attract private sector contributions, along with the 2015 Public Finance Management Act that provides for public debt management and accounting and auditing of public funds. A pending Roads bill and tolling regulation will provide the necessary legal and policy framework for the collection of toll revenue.	European Commission	Ongoing
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<sup>367</sup> (European Commission, 2016)



# Chapter 3: Sustainable City Development in 2050



**Nairobi City Centre**

Source: [https://commons.wikimedia.org/wiki/File:Nairobi\\_City\\_centre\\_including\\_Basilica.jpg](https://commons.wikimedia.org/wiki/File:Nairobi_City_centre_including_Basilica.jpg)

## Why Sustainable Cities?

Why look toward sustainable city development as a model for cities in the EAC region? A sustainable city model can combine the benefits of social, economic, and environmental factors and facilitate the efficient use of environmental resources through sharing land, goods and services, and other natural resources. For example, cities with efficient mass transportation systems reduce per capita pollution more substantially than less densely populated places that rely on individual motorized transportation.<sup>368</sup> Sustainable cities also show potential for shifting to greener methods of production, because they bring larger economies of scale: “urban green growth is fostering economic growth and development through urban activities that reduce environmental impact, for example low air pollution and CO<sub>2</sub> emissions; low consumption of natural resources including water, energy and undeveloped land; and the protection of ecological services.”<sup>369</sup>

Tackling urban environmental challenges is a strategic priority for the EAC’s sustainable development for a number of reasons:

- The region is still urbanizing and has the potential to reap extraordinary benefits by leap-frogging to a green economy. For instance, two-thirds of urban investments are expected to occur between now and 2050 and, therefore, investments in “no regret” urban infrastructure and planning urban development are necessary. Today’s technologies provide additional momentum for a new ecological model of service delivery, thus shaping more sustainable cities.<sup>370</sup>
- The costs of environmental degradation are considerable, and ignoring these costs – in terms of both public health and economic cost – will act as a binding constraint on sustainable development. The region is also highly vulnerable to climate change, more so than other world regions.

Urbanization provides an opportunity to address climate change more efficiently by developing more sustainable cities through an integrated, resilient, low impact, low carbon, and environmentally friendly approach to urban planning and management.

The following sections provides an outlook for developing sustainable city models in the EAC. Building on Chapter 1, which outlined the urban challenges facing EAC cities and identified current gaps toward achieving the Vision 2050 goals, the current chapter presents the EAC regional vision, details key steps for creating an enabling environment, and presents criteria that can be used to facilitate transparent data collection, comparability, and tracking of progress for sustainable city development.

## EAC Vision 2050 and Sustainable City Framework

In 2016, the heads of state of the EAC agreed to the EAC Vision 2050, which laid out the community’s overall development and strategic agenda to 2050. The Vision identifies key development concerns, including: persistent poverty, unbalanced distribution of economic and social infrastructure, inadequate social cohesion, lack of human capital, sub-optimal utilization of natural resources, inadequate exploitation of mineral resources, poor infrastructure that hampers development, increasing unemployment especially among the youth, unplanned urban setting, low

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<sup>368</sup> (Glaser, 2012)

<sup>369</sup> (African Development Bank, 2016)

<sup>370</sup> (African Development Bank, 2016)



investment in research and development, low levels of industrialization and lack of competitiveness, insufficient energy supplies, and weak accountability.<sup>371</sup>

Included in the Vision is a framework that summarizes logic and linkages needed to achieve six aspirational goals, which are derived from each of the focus areas identified for the EAC. The achievement of Vision 2050 also depends on the existence of an enabling environment. **Figure 69** below presents the Vision 2050 framework outlining the enabling environment needed, the priority focus areas or pillars, and the six aspirational goals.<sup>372</sup>

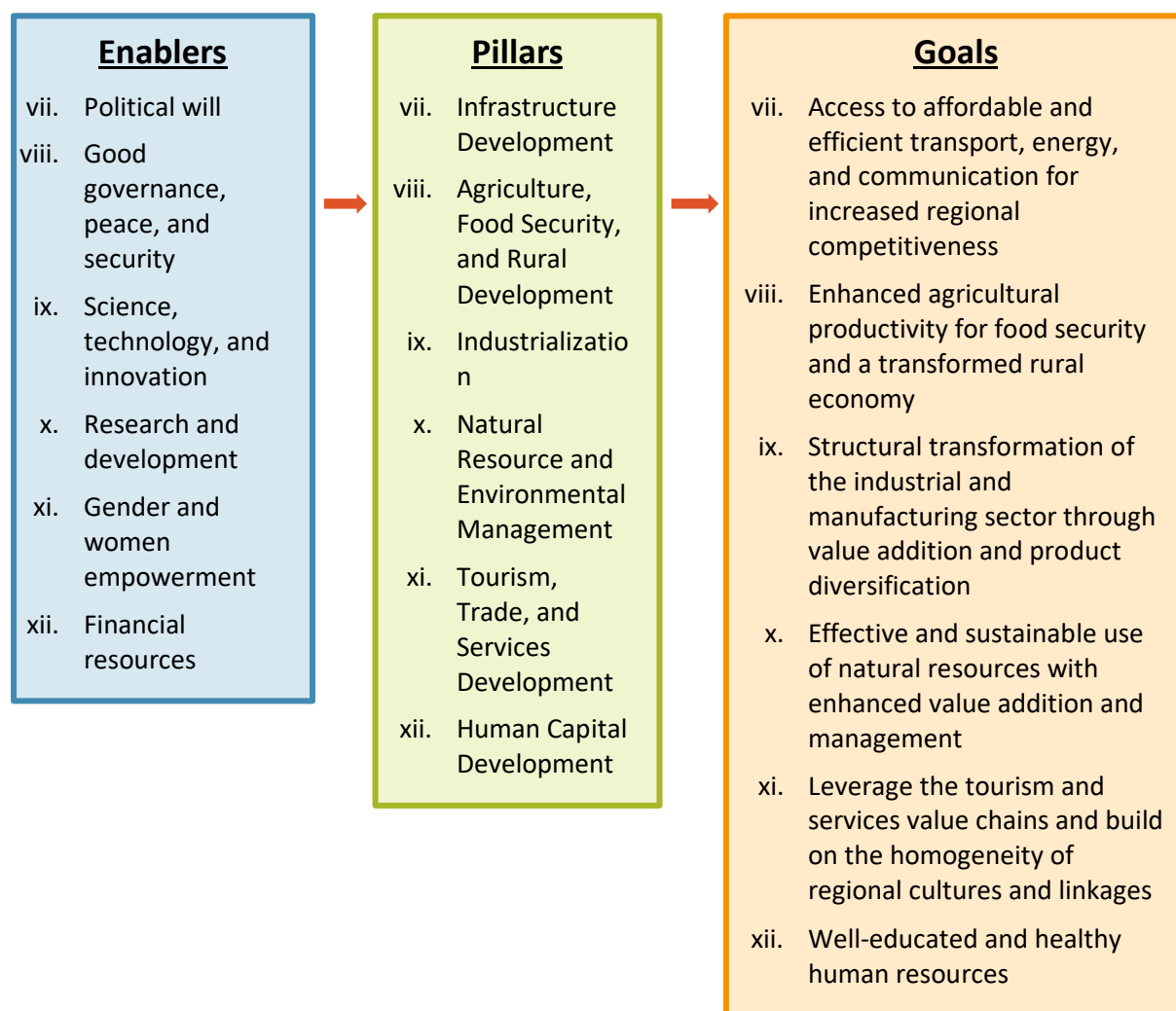


Figure 69: EAC Vision 2050 Enablers, Pillars, and Goals

The EAC Vision 2050 lays out a strategy and goals for the entire region, however, many of the underlying enablers, pillars, and goals can be applied at the city-scale. The Vision also addresses the four key challenges for urban sustainability identified in Chapter 1:

1. Diversification of the Economy
2. Underdeveloped Transportation Infrastructure
3. High Cost of Doing Business

<sup>371</sup> (East African Community, 2016)

<sup>372</sup> (East African Community, 2016)

#### 4. Infrastructure for Basic Services

At the city-level, to develop a model for urban sustainability the challenges identified for the six EAC countries can be combined with the goals and aspirations laid out for the region to encompass four main areas for achieving urban sustainability: (i) social development; (ii) economic development; (iii) environmental management; and (iv) effective governance (**Figure 70**).



*Figure 70: Framework for Sustainable Cities in the EAC*

The four areas will have significant overlap. For example, environmental management would include the production and distribution of renewable energy sources, green energy access, adaptation to and mitigation of climate change, and ensuring access to basic services.

The road towards building sustainable cities in EAC will necessitate investment in a strong enabling environment as well as financial and human capital. Specifically, investment in:

1. Infrastructure to ensure access to: (i) good-quality public transportation, (ii) water and sanitation, (iii) health, (iv) education, (v) housing, and (vi) energy services
2. Urban resilience, including structural and industrial transformation towards the use of renewable energy sources, creation of employment in green productive activities, and adoption of adaptation and mitigation strategies.<sup>373</sup>

<sup>373</sup> (United Nations, 2013)

These two investment areas provide a pathway toward sustainability, fit within an overall sustainable city model, address specific challenges faced by cities in the region, and align directly to the EAC Vision 2050. The next section provides specific steps cities can take to develop an enabling environment that promotes urban sustainability.

## Key Steps for Creation of an Enabling Environment

The *African Economic Outlook*, 2016 (AEO), developed in partnership with the African Development Bank (AfDB), OECD, and UNDP includes the theme “Sustainable Cities and Structural Transformation,” which identifies the main channels through which urbanization can accelerate economic, social and environmental development, as well as the policy options to seize those opportunities for structural transformation. The following section, utilizes many of the findings detailed in the AEO report to delineate key steps to be taken for creating a strong enabling environment for urban sustainability.

The following paragraphs outline a number of the key steps. Although each step is assigned a number, they do not need to be completed sequentially but rather can be undertaken in parallel or at different times. The steps are also not exhaustive, and depending on the city, may or may not be applicable. They are, however, aligned with the goal of enabling investment in both infrastructure and urban resilience.

### 1) Step 1: Sustainable city strategy integrated into long-term national development strategy

Only 16 countries out of 51 in Africa have adopted national urbanization strategies.<sup>374</sup> Two of those 16 countries are in the EAC region, Rwanda and Uganda. However, having an urban strategy is not enough. Any strategy will need to be integrated into the long-term national development plan of a country and decided on and implemented coherently with the participation of local actors.

#### a. Step 1a) Reliable data for strategy development

The data collection and analytical component of any sustainable city strategy must include a country’s demographic shifts and economic geography in its sub-regional and global contexts. It should identify the binding constraints, such as infrastructure, energy reliability and access, etc. Policy makers can then better understand the contribution of specific places to job creation and economic output by sectors, and how different categories of the urban system relate to rural areas and other cities. Optimizing the connections between sectors or regions ultimately enhances the aggregate productivity and performance of the national economy.<sup>375</sup>

As an example, Nairobi is an export node of freshly cut flowers to the European market. The capital city itself, however, depends on growing regions well beyond its borders, and on the connective infrastructure to quickly ship the flowers from the point of production to processing sites close to the airport. Understanding how this value chain operates spatially is important for effective cross-municipal border management to optimize the prospects of the sector to grow.<sup>376</sup>

#### b. Step 1 b) Open data and engaging local actors

Analysis and strategy development should include input from local actors, including

<sup>374</sup> (African Development Bank, 2016)

<sup>375</sup> (African Development Bank, 2016)

<sup>376</sup> (African Development Bank, 2016)

registered civil society organizations, businesses, and the informal sector. Turning data into a widely available resource can generate socio-economic innovations, pave the way for new entrepreneurial ambitions, or be the source of new jobs. Access to national data alone is not enough to enable civic participation: citizens need to believe in the quality of the information and government responsiveness.

## **2) Step 2: Clarify Land Rights (Land Reform)**

Urban land is the primary building block of cities. In the case of cities, the current mismatch between land and fiscal systems prevents governments, especially local governments, from undertaking the large-scale investments needed to shift urban development trajectories. The lack of transparency over urban land markets impedes effective and sustainable personal and corporate investment, creates opportunities for political power bases to flourish outside of democratic structures, and makes land-based climate mitigation and adaptation measures difficult to enforce. In most countries, urban land reform should thus be a priority in the context of national urban strategies.

The nature and modalities of land reforms should be context-specific, as there is no blueprint to achieve sustainable authority over urban land. More secure land rights should, however, be a key objective because they are a prerequisite for long-term urban investment anywhere. Furthermore, systems of urban land regulation are most effective for preserving the environment. The scope of land reform extends beyond urban administrative boundaries to rural-urban periphery, so as to mitigate potential conflicts on land use change.<sup>377</sup>

## **3) Step 3: National Infrastructure Investment Strategies (NITS)**

While an infrastructure investment strategy can be embedded within a larger sustainability strategy, investment in infrastructure is such a key factor in moving EAC cities toward sustainability and in shaping the nature of urbanization that it does merit separate consideration.

Access to affordable energy, sanitation, solid waste, transport and health care services provide the means by which urban citizens become more productive. Where infrastructure is insufficient, expensive, and poorly maintained, it underpins the high cost of urban services and reduces the potential of cities.

The strategic agenda of National Infrastructure Investment Strategies (NITS) is to address the needs for physical infrastructure together with the provision of services and the crafting of adequate institutional frameworks. In particular, NITS recognize the importance of soft infrastructure, including governance institutions, legislation, public engagement capacity and fiscal accounting mechanisms, for the efficacy of hard infrastructure.<sup>378</sup> NITS are multi-sectoral and sequenced with other urban policies. They specify, locate and address the financing of the infrastructure to deliver a wide range of services.<sup>379</sup>

## **4) Step 4: Build public-sector capacity**

Effective multi-level governance requires new sets of skills, managerial approaches, and institutional culture across all levels and dimensions of the public sector that implement or contribute to urban policies. Many governments lack building professionals, such as engineers, planners, urban finance experts, project managers, local economic development practitioners,

<sup>377</sup> (African Development Bank, 2016)

<sup>378</sup> (African Development Bank, 2016)

<sup>379</sup> (African Development Bank, 2016)

environmental and building regulation inspectors, transport planners, engineers, and land-use lawyers. Filling this gap requires systematic capacity-building programs.

#### 5) Step 5: Structural transformation

Policy makers can integrate structural transformation across a number of urban activities that can eventually reduce a city's environmental impact. Examples include:

- *Land-use planning*: zoning that allows for a mix of land uses to reduce travel distances between home, work and other activities.
- *Tax reform*: to encourage development of underused lands in urban cores and discourage urbanization of underdeveloped land on the urban fringe
- *Transport*: expansion and/or improvements to public transport; physical improvements to encourage walking and cycling; fees for personal vehicle travel.
- *Energy*: installation of distributed renewable energy generation; district heating and cooling systems; fees that discourage peak energy use.
- *Waste*: recycling of household and industrial waste; waste-to-energy and landfill methane-to-energy systems; fees that discourage waste generation.
- *Water*: fees that encourage water conservation; governance mechanisms to improve efficiency of water delivery.<sup>380</sup>

#### 6) Step 6: Mobilizing Finance

Mobilizing new finance is necessary to support national urban strategies and to finance structural transformation. The financing gap is large, and bridging it requires context-specific solutions that tap the opportunities available in different countries, by:

- Empowering local authorities and decentralizing finance (national transfers, local taxes, and complementary instruments such as land value capture mechanisms and private finance)
- Raising new financial resources through innovative finance mechanisms (co-production of infrastructure, green funds and climate finance, valuing ecological capital)
- Harnessing the international community's financial resources and opportunities for knowledge exchange.

Taken together the six steps/areas outlined above form the basis of creating a strong enabling environment. The four main elements needed are:

- (1) Strong planning (steps 1 & 3);
- (2) Proactive policy, regulatory frameworks (steps 2 & 5);
- (3) Capacity development (step 4); and
- (4) Adequate financing to implement the plans, policies, and regulations (step 6).

To track progress of sustainable city initiatives it is important to have a mechanism to measure progress. The next section discusses potential indicators that can be used for cities in the EAC.

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<sup>380</sup> (African Development Bank, 2016)

## Criteria for Measuring Sustainable Cities

Urban sustainability indicators are tools that allow city planners, city managers, and policymakers to gauge the socio-economic and environmental impact of infrastructure investments, waste management systems, access to energy, and other basic services provided to citizens. They allow for the diagnosis of problems and pressures, and thus the identification of areas that would profit from being addressed through sound governance and science-based responses. They also allow cities to monitor the success and impact of sustainability interventions.<sup>381</sup>

Challenges to developing appropriate indicators include:

- Identifying relevant data to measure success for the various indicators
- Selecting indicators that are good measures of sustainability
- Limited staff, time, and resources, particularly in smaller communities
- Availability of data from city departments or other government institutions.

A useful set of indicators should be able indicate (1) whether urban quality and performance in cities is improving or deteriorating in relation to certain sustainability criteria or describe targets; and (2) how these trends in urban quality and performance are linked to trends in spatial structures, urban organization, and lifestyles.<sup>382</sup>

The set of indicators should also:

- 1) Align with the EAC Vision 2050 to become “an upper-middle income region within a secure and politically united East Africa based on principles of inclusiveness and accountability” and its mission to “widen and deepen economic, political, social and cultural integration in order to improve that quality of life of the people of East Africa”
- 2) Capture the dimensions of the model for sustainability outlined above: (i) social development; (ii) economic development; (iii) environmental management; and (iv) effective governance
- 3) Be appropriate for cities in the EAC

To develop a set of criteria for measuring sustainable cities in the EAC, key indicators developed by a number of organizations were examined including the United Nations Center for Human Settlements (UNCHS), World Bank, OECD, EEA, and WHO. The indicator list developed also borrows from the EIU/Siemens project, African Green City Index, which carried out an extensive survey in 2011 of 15 major African cities, two in the East African Region (Nairobi and Dar es Salaam). **Table 36** below presents the results area category for measuring sustainability with potential indicators to measure and track across selected cities in the EAC.

*Table 36: Results Category and Indicators for Tracking Sustainable City Progress*

Results Category	Potential Indicators
Climate Change	<ul style="list-style-type: none"> <li>• GHG emissions (MTCO<sub>2</sub>eq)</li> </ul>
Energy	<ul style="list-style-type: none"> <li>• Access to electricity</li> <li>• Reliability of electric service</li> <li>• Cost of electric service</li> <li>• Electricity consumption per capita</li> </ul>

<sup>381</sup> (European Commission, 2015)

<sup>382</sup> (Alberti, 1996)

	<ul style="list-style-type: none"> <li>• Energy-use per capita</li> <li>• Clean energy/renewable energy policy/investment</li> <li>• Clean and affordable alternative fuels and technologies</li> </ul>
<b>Land Use</b>	<ul style="list-style-type: none"> <li>• Population density</li> <li>• Rate of growth of urban population</li> <li>• Population living in informal settlements</li> <li>• Green spaces per capita</li> <li>• Land use policy</li> </ul>
<b>Transport</b>	<ul style="list-style-type: none"> <li>• Modal split (# and average length of trips)</li> <li>• Automobile ownership</li> <li>• Traffic volumes</li> <li>• Public transportation network</li> <li>• Expenditures on road infrastructure</li> </ul>
<b>Waste</b>	<ul style="list-style-type: none"> <li>• Waste generated per capita</li> <li>• Composition of waste</li> <li>• Waste collection and disposal policy</li> </ul>
<b>Water</b>	<ul style="list-style-type: none"> <li>• Access to potable water</li> <li>• Water consumption per capita</li> <li>• Collection time</li> <li>• Water management policy</li> </ul>
<b>Sanitation</b>	<ul style="list-style-type: none"> <li>• Population with access to improved sanitation</li> <li>• Population practicing open defecation</li> <li>• Sanitation policy</li> </ul>
<b>Industry</b>	<ul style="list-style-type: none"> <li>• Investment in electricity grid</li> <li>• Investment in water/sanitation</li> <li>• Investment in transportation</li> <li>• Investment in communication (telecoms, internet, etc.)</li> </ul>
<b>Environmental Quality</b>	<ul style="list-style-type: none"> <li>• Air quality</li> <li>• Environmental hazard exposure</li> </ul>

New methods and processes of data collection are also in place to allow city governments to monitor their progress towards SDG 11 (make cities inclusive, safe, resilient and sustainable). UN-Habitat has adapted the City Prosperity Initiative (CPI) to the global monitoring framework of the SDGs, including SDG 11, and the future New Urban Agenda. By adopting the CPI, a municipal government can monitor progress by using a single platform for decision-making between different levels of government. **Figure 71** below presents the CPI for three cities in the EAC: Kampala, Nairobi, and Dar es Salam. While providing interesting data, many indicators proposed to monitor progress in the SDG 11 prove challenging for cities to measure. Issues of data availability, ease of access or collection, and perceived relevance pose difficulties for the African, European, and Asian cities.<sup>383</sup> UN

<sup>383</sup> (Simon, et al., 2015)

Habitat has made the data available publicly through a Global CPI database. However, there are only 10 African cities included to date.<sup>384</sup>

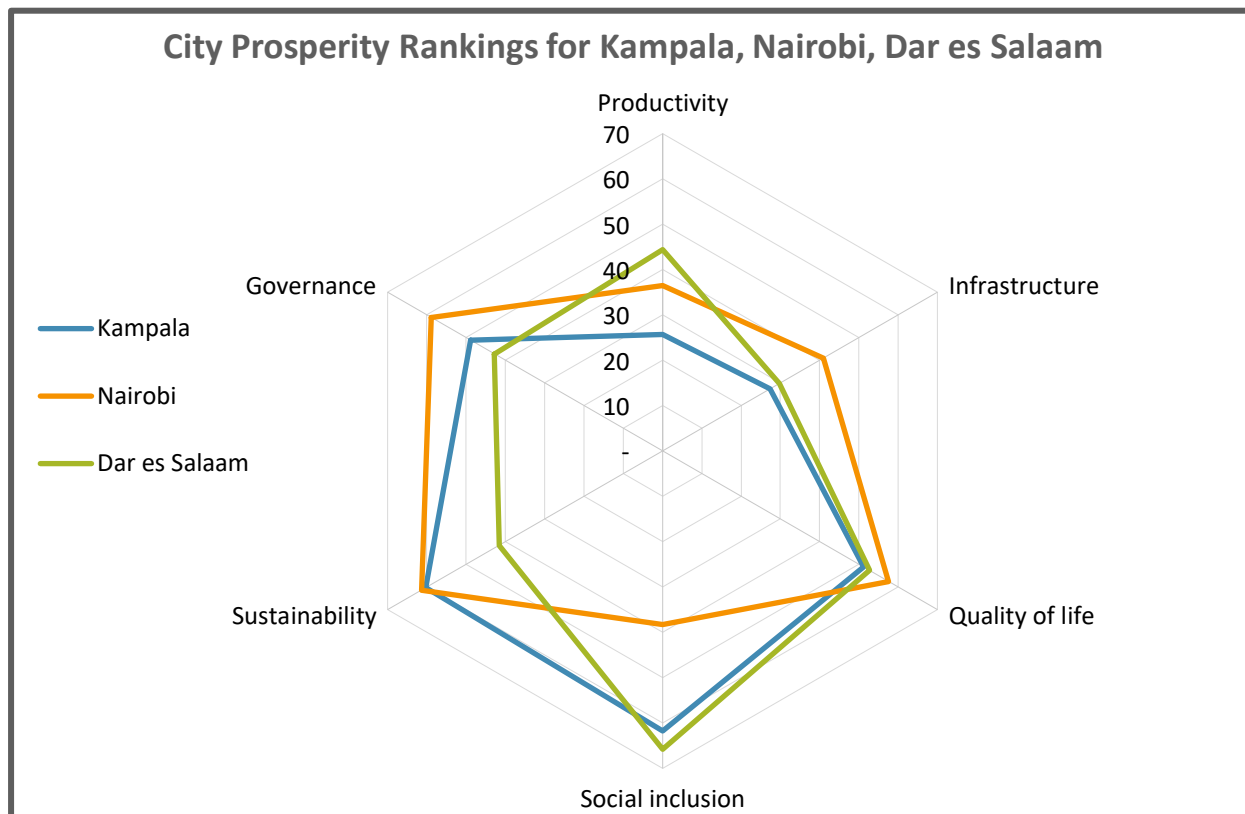


Figure 71: UN Habitat City Prosperity Initiative Rankings for Kampala, Nairobi, and Dar es Salaam<sup>385</sup>

While there are movements to harmonize and collect data worldwide to measure progress, the challenge remains to provide a framework that can also help local communities select context-specific sustainability measures. Any indicators or measurement system utilized needs to ensure: (i) key issues for specific cities are captured within selected indicators; (ii) data needs are identified and mechanisms for systematic collection are put in place; and (iii) mechanisms are established to evaluate the indicators and recalibrate them periodically.

<sup>384</sup> (UN Habitat, 2017)

<sup>385</sup> Each dimension has a scale of 0 to 100, with a higher score representing a better outcome in the respective dimension



# Annexes



**Juba City, South Sudan**

Source: [https://commons.wikimedia.org/wiki/File:Juba\\_City.jpg](https://commons.wikimedia.org/wiki/File:Juba_City.jpg)

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