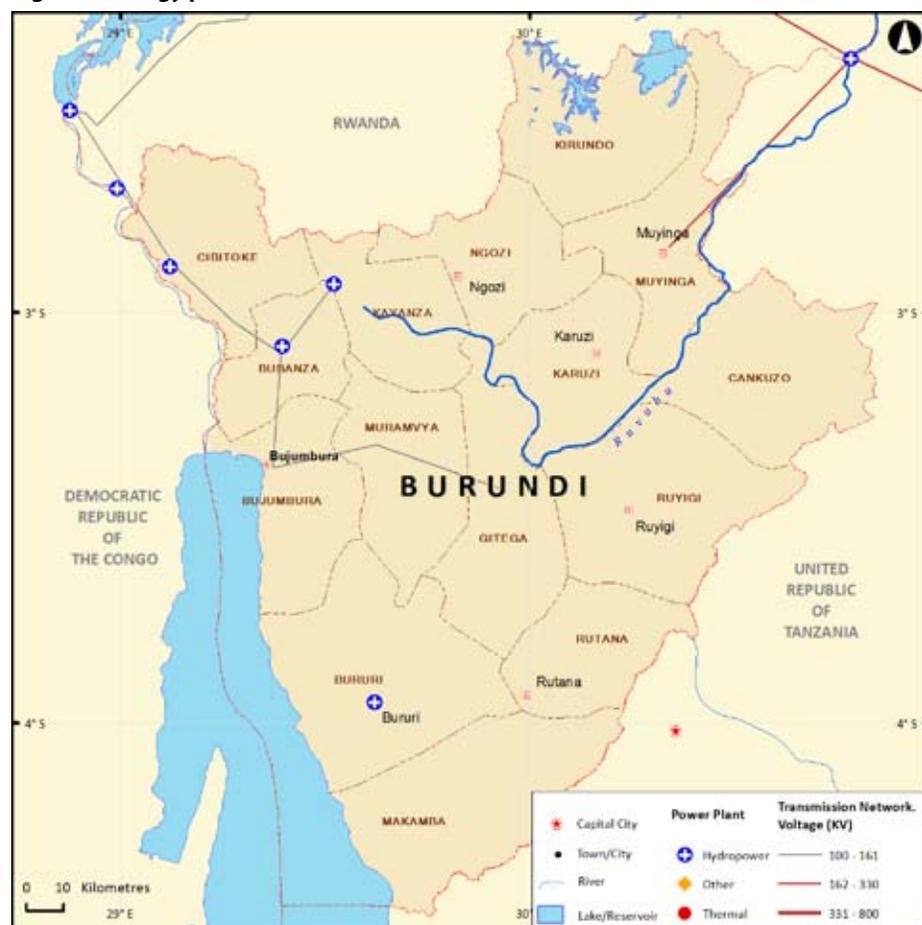


Figure 1: Energy profile of Burundi



Energy Consumption and Production

Burundi's population in 2013 was 10.4 million (Table 1). Total electricity produced in 2015 was 17 ktoe down from 21 ktoe in 2010 (Table 2). Key energy indicators are shown in Figures 2 and 3 (IEA, 2016).

Table 1: Burundi's key indicators

Key indicators	Amount
Population (million)	10.4
GDP (billion 2005 USD)	1.57
CO ₂ emission (Mt of CO ₂)	0.21

Source: (World Bank, 2015)

Energy Resources

Biomass

Most of the energy consumed in Burundi comes from biomass. Domestic clients are the main consumers and utilize about 96 per cent of this total energy. Based on current consumption patterns, the current forest coverage is 174,000 ha against forecast production needs of 180,000 ha. This presents a challenge in satisfying this unmet energy need. The total sustainable fuelwood supply in 2007 was assessed at 6.4 million m³ (REEEP, 2012).

Hydropower

Most of Burundi's energy supply (95 per cent) comes from hydropower. This high dependence on hydropower makes the country vulnerable to climate extremes such as drought. For instance, during the 2009 and 2011 droughts, electricity supply was reduced by as much as 40 per cent, drastically affecting the economy (REEEP, 2012).

Given the topography and abundant precipitation, there is considerable potential for developing small hydropower. The country's theoretical hydropower capacity is estimated at about 1,700 MW, but less than 20 per cent is commercially viable and to date only about 2 per cent has been harnessed (REEEP, 2012). Most (85 per cent) of the installed electric capacity is currently generated from the Rwegura and Mugera hydroelectric plants averaging 19 MW and 8 MW of electricity respectively. And there are an additional five plants in operation (REEEP, 2012).

Oil and natural gas

Burundi has no local sources of oil or natural gas and neither are there any facilities for oil refining. So all refined oil products are imported from neighbouring Kenya and Tanzania (REEEP, undated). Approximately 3,000 barrels of oil is imported daily. This is costly since they have to be transported overland. Petroleum products are mostly used in industry, power generation in thermal plants and for transportation.

Peat

Peat resources in Burundi amount to about 323 km² (WEC, 2013). Of the known peatland, the most extensive is located beneath the Akanyaru swamp complex in the north, an area of about 123 km² with an estimated 1.42 billion m³ of peat in situ (Joosten, 2010). Peat production in 2008 was 20,000 tonnes and all of this was consumed. This constituted the entire production and consumption total for Africa (WEC, 2013). As an

Figure 2: Total energy production, (ktoe)

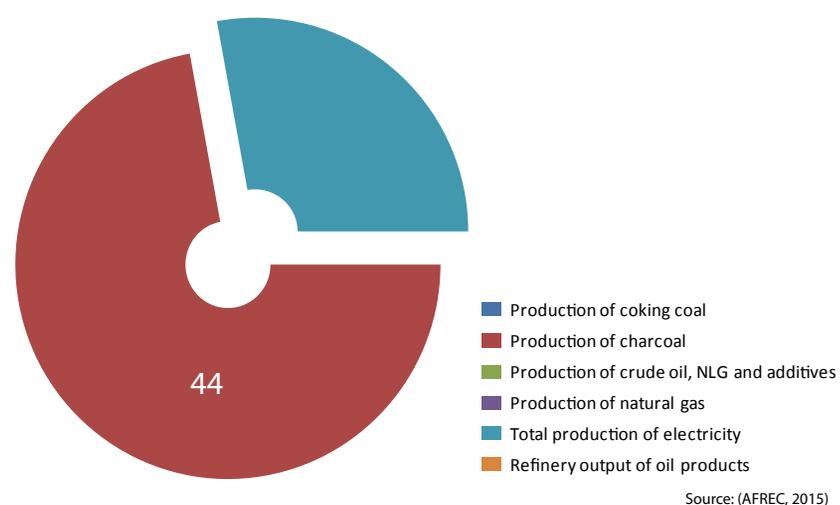


Figure 3: Total energy consumption, (ktoe)

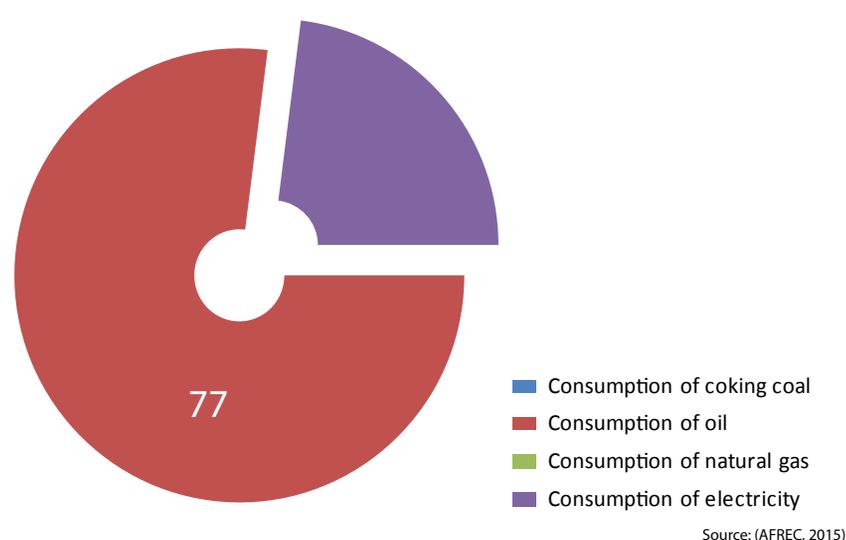


Table 2: Total energy statistics (ktoe)

Category	2000	2005	2010	2015 P
Production of coking coal	-	-	-	-
Production of charcoal	0	0	44	44
Production of crude oil, NLG and additives	-	-	-	-
Production of natural gas	-	-	-	-
Production of electricity from biofuels and waste	0	0	0	0
Production of electricity from fossil fuels	0	0	1	2
Production of nuclear electricity	-	-	-	-
Production of hydro electricity	8	8	20	15
Production of geothermal electricity	-	-	-	-
Production of electricity from solar, wind, Etc.	0	0	0	0
Total production of electricity	9	8	21	17
Refinery output of oil products	-	-	-	-
Final Consumption of coking coal	0	0	0	0
Final consumption of oil	132	132	73	77
Final consumption of natural gas	-	-	-	-
Final consumption of electricity	11	14	19	23
Consumption of oil in industry	0	0	0	0
Consumption of natural gas in industry	-	-	-	-
Consumption of electricity in industry	0	0	0	0
Consumption of coking coal in industry	-	-	-	-
Consumption of oil in transport	0	0	0	0
Consumption of electricity in transport	0	0	0	0
Net imports of coking coal	-	-	-	-
Net imports of crude oil, NGL, Etc.	-	-	-	-
Net imports of oil product	132	132	72	77
Net imports of natural gas	-	-	-	-
Net imports of electricity	3	6	7	8

- : Data not applicable

(AFREC, 2015)

0 : Data not available

(P): Projected

alternative to wood, the use of peat would help to reduce pressure on Burundi's forests. Commercialisation of this resource, for use in agriculture and industry is being driven by the National Peat Officer (ONATOUR). ONATOUR was established in 1977 and in Africa, is the only facility that produces turf or dried-out peat sods using mechanical means. So far, only 0.5 per cent of the 6 million tonnes peat reserves have been processed. Most of this (90 per cent) has been used by the military and prisons. With the rehabilitation of the processing facilities, peat production is expected to rise (WEC, 2013).

Coal

There are no indigenous sources of coal.

Wind

The Institute of Agronomic Sciences of Burundi (ISABU) gathers data on wind patterns, primarily for agricultural purposes, recording a mean wind speed between 4 and 6 m/s. More potential sites probably exist in higher elevations. A number of private-sector schemes are currently being

Table 3: Burundi's geographical wind power potential

Country	Total PCS ¹⁴ (km ²)	Grid restriction		No grid restriction	
		Total available area for wind farms (km ²)	Percentage of area availability	Total available area for wind farms (km ²)	Percentage of area availability
Burundi	27 235	10 047	36.89%	11 941	43.84%

Source: (Mentis, 2013)

Table 4: Burundi's technical wind power potential

Country	Energy (TWh/year) - no grid restriction	Energy (TWh/year) - grid restriction	Energy (TWh/year) - CF > 20%	Electricity TFC (TWh)
Burundi	15.2	12.1	0.0	0.3

Source: (Mentis, 2013)

piloted (REEEP, 2012). Studies have been ongoing on the geographical and technical wind power potential. It is estimated that the total area available for the installation of wind turbines is 10,047 km² as shown in Table 3. Table 4 highlights the technical wind potential in Burundi.

Geothermal

The Western Rift Valley region on the border of DR Congo has the potential for geothermal resources. Studies to assess commercial viability are necessary (REEEP, undated).

Solar

The potential for solar is great, especially in rural areas, as most regions are not connected to the grid. Some private institutions, such as Solar Electric Light Fund have invested in solar systems for public buildings such as health and education centres (REEEP, 2012). Average solar insolation is 4-5 kWh/m²/day.

Tracking progress towards sustainable energy for all (SE4All)

Burundi has a very low electrification rate — in 2012 it was only 6.5 per cent (see Table 5 and Figure 4). Only 1.2 per cent of people in rural areas have access to electricity, increasing to 58.5 per cent in urban areas (World Bank, 2016). Almost all (95 per cent) of the electricity consumed is used in Bujumbura. Gitega and Bujumbura are the only two cities that have a municipal electricity service. The national average electricity consumption per capita is only 20 kWh per year (REEEP, undated); thus, alternative fuels to supply the required energy are important. The proportion of people with access to non-solid fuels remained constant at 2 per cent between 1990 and 2012 (World Bank, 2015). Power cuts are a daily occurrence, especially during the dry season. In addition to its low generating capacity, Burundi's energy sector is fraught with a scarcity of technical and management skills impacting the sector's strategic development, effective policy-making and planning and operations of all stakeholders in the energy institutions.

The energy intensity (the ratio of the quantity of energy consumption per unit of economic output) of the Burundi economy has been increasing over time from 10.8 MJ per US dollar (2005 dollars at PPP) in 1990 to 13.06 MJ per US dollar in 2012. The compound annual growth rate (CAGR) between 2010 and 2012 was -2.05 (World Bank, 2015).

Table 5: Burundi's progress towards achieving SDG7 – Ensure access to affordable, reliable, sustainable and modern energy for all

Target	Indicators	Year					
		1990	2000	2010	2012	2000-2010	2011-2015
7.1 By 2030, ensure universal access to affordable, reliable and modern energy services	7.1.1 Per cent of population with access to electricity	0	4	5	6.5		
	7.1.2 Per cent of population with primary reliance on non-solid fuels	2	2	2	2		
7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	7.2.1 Renewable energy share in the total final energy consumption	82.6	93.2	96.8	96.6		
7.3 By 2030, Double the rate of improvement of energy efficiency	7.3.1 GDP per unit of energy use (constant 2011 PPP \$ per kg of oil equivalent)	-	-	-	-		
	Level of primary energy intensity(MJ/\$2005 PPP)	10.8		13.5	13.0	13.29	13.0

Sources: (World Bank, 2015); (World Bank, 2016)

Figure 4: SDG indicators

Percentage of population with access to electricity	Access to non-solid fuel (% of population)	GDP per unit of energy use (PPP \$ per kg of oil equivalent) 2013	Renewable energy consumption (% of total final energy consumption), 2006-2011, 2012
6.5%	2.0%	NA	96.65%



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Bags of tightly packed charcoal

Table 6: Burundi's institutional and legal framework

Basic Elements	Response
Presence of an Enabling Institutional Framework for sustainable energy development and services (Max 5 institutions) most critical ones	<ul style="list-style-type: none"> • Ministry of Energy and Mines • Burundian Agency for Rural Electrification (ABER) • Rural Electrification Agency
Presence of a Functional Energy Regulator	Ministry of Energy and Mines
Ownership of sectoral resources and markets (Electricity/ power market; liquid fuels and gas market)	
Level of participation in regional energy infrastructure (Power Pools) and institutional arrangements	
Environment for Private Sector Participation	
Whether the Power Utility(ies) is/are vertically integrated or there is unbundling (list the Companies)	Régie de Production et Distribution d'Eau et d'Electricité (REGIDESO), which operates and controls all of Burundi's thermal power stations.
Where oil and gas production exists, whether upstream services and operations are privatized or state-owned, or a mixture (extent) e.g., licensed private exploration and development companies)	
Extent to which Downstream services and operations are privatized or state-owned, or a mixture (extent)	
Presence of Functional (Feed in Tariffs) FIT systems	
Presence Functional IPPs and their contribution	
Legal, Policy and Strategy Frameworks	
Current enabling policies (including: RE; EE; private sector participation; & PPPs facilitation) (list 5 max) most critical ones	National Energy Supply Strategy
Current enabling laws/pieces of legislation (including: RE; EE; private sector participation; & PPPs facilitation) – including electricity/grid codes & oil codes (5 max or yes/no) most critical ones	<ul style="list-style-type: none"> • Law No. 1/014 of 2000 liberalizes and provides for the regulation of the public services of water and electricity. • A law on PPP (Public Private Partnership) • Law No. 1/24 of 2008 created an investment code encouraging foreign investment. • Law No. 1/23 of 2008 has defined all the tax benefits underway for investors • Decree No. 100/318 of 2011 created the Rural Electrification Agency.

This table was prepared with material from (REEEP, 2012); (ROB, 2015)

The share of renewable energy in the total final energy consumption increased from 82.6 per cent in 1990 to 96.6 per cent in 2012. Traditional solid biofuels form the biggest share of renewable sources at 94.9 per cent of Total Final Energy Consumption (TFEC) in 2012, while modern solid biofuels contributed 0.6 per cent and hydro 1.1 per cent only. Renewable sources contributed 98.2 per cent of electricity capacity in 2012 (World Bank, 2015).

Intended Nationally Determined Contributions (INDC) within the framework of the Paris climate Agreement

In recognition that climate change has the potential to affect almost every sector of the economy, Burundi defined its Intended Nationally

Determined Contributions (INDC) targets in September 2015 (Table 6). The country aims to reduce greenhouse gas emissions by 3 per cent compared to the business-as-usual (BAU) scenario for 2030 through implementing a National Reforestation Programme of 4,000 hectares of annual reforestation over the course of 15 years, starting in 2016.

Specifically, for energy, the aim is to increase the national electrification rate to 35 per cent by building an additional three hydroelectric power plants (ROB, 2015).

Institutional and Legal Framework

The Ministry of Energy and Mines is in charge of policy making and regulating the energy sector (Table 6). The Régie de Production et Distribution

d'Eau et d'Electricité (REGIDESO) operates and controls all of Burundi's thermal power stations. On a regional level, the country is a member of Eastern Africa Power Pool. The legal framework is provided by the Law No. 1/014 of 2000, which liberalizes and provides for the regulation of the public services of water and electricity. Conflict has greatly affected the country's infrastructure as well as energy generation, transmission and distribution systems.

The Energy Strategy and Action Plan guides the sector policy. It contains key objectives to aid the recovery and expansion of the energy sector.