

Conclusions

Achieving universal access to modern energy is a key development challenge for African countries. While the continent somehow shares a common fate, the problem in the poorest regions is particularly pressing. After discussing some of the details of the problem, this book illustrated the variety of resources available and focused on the potential to value them for the ultimate goal of achieving universal electrification and clean cooking in the continent.

Reserves of hydrocarbons are plentiful, and even more so are renewable energy sources such as solar, wind, hydropower, and geothermal. Each country has some sort of “energy portfolio” to exploit. Achieving access to modern energy for all will certainly require considerable investments, but also a further effort in terms of policy formulation and implementation. The energy sector of most African countries lags behind when it comes to defining clear pathways to renewable energy development (e.g. legal frameworks, incentives and support to private sector development) and fossil fuel investments largely focus on production for export.

Renewable energies, which are becoming more and more competitive, will play a key role the electrification of the continent, through a mix of centralised and decentralised production. In fact, in SSA photovoltaic technology is already leading new investments in power generation including in remote areas—where it is booming as a means to provide cheap electricity far from the grid.

The consideration of a diversified power mix for the future is not only justified by economic considerations, which vary from country to country, but also by the fact that the most widespread renewable sources—solar and wind—are variable. This makes future power storage developments particularly relevant for Africa’s electrification on the one hand, and underlines the strategic importance of dispatchable renewable and fossil resources on the other.

The changing role of fossil fuels in the global energy landscape forces all countries, including SSA, to consider their potential and impact in the long term. This means not only taking action in terms of air quality and the environmental

impact of upstream investments, but also prioritizing investments that accelerate access to modern energy, like domestic power consumption and the provision of alternative cooking solutions to solid biomass.

Increasing access to power requires a joint action of SSA countries and the international community. On their side, SSA countries should reform the governance of their energy sectors—without this, international private investments will never materialize. At the same time, international financial assistance to Africa's electrification could be more impactful if better coordinated. This need for coordination is particularly urgent at European level, where initiatives are not only fragmented between EU Member States, but also between various EU institutions themselves.

The challenge of clean cooking is also particularly pressing and generally does not seem to receive the attention it deserves considering the costly burden of indoor air pollution, gender inequality, and environmental damage that come from the widespread reliance on solid biomass. Much more needs to be done to catalyse the necessary resources (also in terms of infrastructural investments) and political will to solve the problem.

Particularly when it comes to the development of innovative, inclusive solutions, the role of private entrepreneurs should not be underestimated. Notably, the unexpected boom of off-grid solar appliances has stemmed from the pragmatic idea of linking a pay-as-you-go business model to mobile-based payments, which allowed to make the most of the resources and instruments available. Many more successful initiatives exist, although they may not always receive much visibility, particularly when it comes to clean cooking. In this sense, improving access to credit for small businesses, investing in developing local skills, and working with women could prove particularly fruitful.

Annex: Map of African Countries and Key Socio-economic and Energy Indicators

See Fig. A.1 and Tables A.1, A.2, A.3, A.4 and A.5.



Figure A.1 Map of African countries. *Source* Author's elaboration on a map from www.africaguide.com

Table A.1 Key socioeconomic Indicators

	Population, millions	Population growth, annual %	Rural population, % of total	GDP (constant 2010 US\$), billions	GDP, annual growth %	GDP per capita, PPP (current international \$)	Human Development Index (scale 0–1)
	2016	2016	2016	2016	2012–2016 average	2016	2015
Algeria	40.6	1.8	29	196.0	3.4	15,013	0.745
Angola	28.8	3.4	55	103.2	3.8	6,454	0.533
Benin	10.9	2.8	56	9.1	4.9	2,168	0.485
Botswana	2.3	1.8	42	16.8	4.5	16,957	0.698
Burkina Faso	18.6	2.9	69	12.4	5.3	1,771	0.402
Burundi	10.5	3.1	88	2.3	1.8	778	0.404
Cabo Verde	0.5	1.2	34	1.9	1.5	6,551	0.648
Cameroon	23.4	2.6	45	35.1	5.2	3,609	0.518
Central African Republic	4.6	1.1	60	1.5	-4.4	699	0.352
Chad	14.5	3.1	77	12.4	3.3	1,991	0.396
Comoros	0.8	2.3	72	0.6	2.4	1,522	0.498
Congo, Dem. Rep.	78.7	3.3	57	30.5	6.9	802	0.435
Congo, Rep.	5.1	2.6	34	14.3	3.0	5,717	0.592
Cote d'Ivoire	23.7	2.5	45	36.8	9.1	3,693	0.474
Djibouti	0.9	1.6	23	1.5 ^a	5.6 ^a	3,343 ^a	0.473
Egypt, Arab Rep.	95.7	2.0	57	260.7	3.2	11,129	0.691
Equatorial Guinea	1.2	3.8	60	15.0	-2.7	26,058	0.592
Eritrea	4.5	1.9	79	2.3 ^b	0.9 ^b	1,510 ^b	0.420
Ethiopia	102.4	2.5	80	52.3	9.5	1,734	0.448
Gabon	2.0	2.5	13	18.9	4.3	18,103	0.697

(continued)

Table A.1 (continued)

	Population, millions	Population growth, annual %	Rural population, % of total	GDP (constant 2010 US\$), billions	GDP, annual growth %	GDP per capita, PPP (current international \$)	Human Development Index (scale 0–1)
	2016	2016	2016	2016	2012–2016 average	2016	2015
Gambia, The	2.0	3.0	40	1.1	3.6	1,677	0.452
Ghana	28.2	2.2	45	48.2	5.6	4,292	0.579
Guinea	12.4	2.5	62	9.1	4.7	1,966	0.414
Guinea-Bissau	1.8	2.5	50	1.1	2.9	1,609	0.424
Kenya	48.5	2.6	74	55.4	5.5	3,155	0.555
Lesotho	2.2	1.3	72	3.0	3.2	2,951	0.497
Liberia	4.6	2.5	50	1.6	3.2	813	0.427
Libya	6.3	0.9	21	28.3 ^b	-7.1 ^b	11,193 ^b	0.716
Madagascar	24.9	2.7	64	10.4	3.2	1,506	0.512
Malawi	18.1	2.9	84	8.7	3.6	1,169	0.476
Mali	18.0	3.0	59	13.4	4.1	2,126	0.442
Mauritania	4.3	2.8	40	5.6	4.2	3,853	0.513
Mauritius	1.3	0.1	60	12.4	3.6	21,103	0.781
Morocco	35.3	1.4	39	114.8	3.2	7,857	0.647
Mozambique	28.8	2.9	67	14.9	6.4	1,217	0.418
Namibia	2.5	2.2	52	15.0	4.8	10,625	0.640
Niger	20.7	3.8	81	8.1	6.7	986	0.353
Nigeria	186.0	2.6	51	456.8	3.4	5,861	0.527
Rwanda	11.9	2.4	70	8.8	7.2	1,913	0.498
Sao Tome and Principe	0.2	2.2	34	0.3	4.5	3,237	0.574

(continued)

Table A.1 (continued)

	Population, millions	Population growth, annual %	Rural population, % of total	GDP (constant 2010 US\$), billions	GDP, annual growth %	GDP per capita, PPP (current international \$)	Human Development Index (scale 0–1)
	2016	2016	2016	2016	2012–2016 average	2016	2015
Senegal	15.4	2.9	56	16.8	5.0	2,566	0.494
Seychelles	0.1	1.3	46	1.3	4.8	28,384	0.782
Sierra Leone	7.4	2.2	60	3.4	5.3	1,476	0.420
Somalia	14.3	2.9	60	17.06 ^c	2.4 ^d	–	–
South Africa	56.0	1.3	35	419.5	1.6	13,197	0.666
South Sudan	12.2	2.9	81	8.9 ^a	-9.0 ^a	1,925 ^a	0.418
Sudan	39.6	2.4	66	76.1	3.4	4,730	0.490
Swaziland	1.3	1.8	79	5.2	3.0	8,330	0.541
Tanzania	55.6	3.1	68	46.8	6.7	2,786	0.531
Togo	7.6	2.5	60	4.2	5.0	1,491	0.487
Tunisia	11.4	1.1	33	48.6	2.4	11,596	0.725
Uganda	41.5	3.3	84	27.5	4.5	1,819	0.493
Zambia	16.6	3.0	59	27.0	4.8	3,933	0.579
Zimbabwe	16.2	2.3	68	14.8	4.9	2,027	0.516

^aMost recent data from 2015

^bMost recent data from 2011 (in Libya, the civil war led to a massive reduction in oil and gas production reflected in the data)

^cData not available from World Bank. Estimate of GDP Purchasing Power Parity from The World Factbook.

^dData not available from World Bank. Estimate for 2017 from The World Factbook.

Source HDI from UN Development Programme; all others from World Bank Development Indicators apart from the estimates of GDP of Somalia, which are taken from Central Intelligence Service “the World Factbook”. All databases accessed in April 2018

Table A.2 Primary energy supply and energy use

	Primary energy supply (kilotonne of oil equivalent)										Total	Energy use (kg of oil equivalent per capita)
	Bioenergy		Hydro	Coal and peat	Other renewables	Oil	Natural gas	Nuclear	Total			
	2015	2015	2015	2015	2015	2015	2015	2015	2015	2015		
Algeria	6	12	141	7	19,440	34,410	0	54,014	1,321			2014
Angola	7,289	447	0	0	6,587	629	0	14,951	545			
Benin	2,713	1	25	0	1,723	0	0	4,555	417			
Botswana	553	0	1,035	0	1,001	0	0	2,715	1,253			
Burkina Faso	-	-	-	-	-	-	-	-	-			
Burundi	-	-	-	-	-	-	-	-	-			
Cabo Verde	-	-	-	-	-	-	-	-	212 ^a			
Cameroon	5,020	436	0	0	1,921	295	0	7,794	342			
Central African Republic	-	-	-	-	-	-	-	-	-			
Chad	-	-	-	-	-	-	-	-	-			
Comoros	-	-	-	-	-	-	-	-	64 ^a			
Congo, Dem. Rep.	27,252	767	0	0	902	1	0	28,887	390			
Congo, Rep.	1,521	80	0	0	854	202	0	2,656	539			
Cote d'Ivoire	9,395	116	0	0	1,860	1,686	0	12,984	616			
Djibouti	-	-	-	-	-	-	-	-	177 ^a			
Egypt, Arab Rep.	1,749	1,155	355	137	39,332	36,762	0	79,395	815			
Equatorial Guinea	-	-	-	-	-	-	-	-	2,121 ^a			
Eritrea	654	0	0	0	196	0	0	850	170 ^b			

(continued)

Table A.2 (continued)

	Primary energy supply (kilotonne of oil equivalent)										Total	Energy use (kg of oil equivalent per capita)
	Bioenergy		Hydro	Coal and peat	Other renewables	Oil	Natural gas	Nuclear	Total			
	2015	2015	2015	2015	2015	2015	2015	2015	2015	2015		
Ethiopia	45,813	832	253	65	3,041	0	848	307	0	49,990	497	
Gabon	3,811	79	0	0	848	307	0	0	5,073	2,706	86 ^a	
Gambia, The	–	–	–	–	–	–	–	–	–	–	–	
Ghana	3,617	503	0	0	4,540	1,064	0	0	9,696	335	–	
Guinea	–	–	–	–	–	–	–	–	–	–	–	
Guinea-Bissau	–	–	–	–	–	–	–	–	–	–	66 ^a	
Kenya	16,208	326	349	5	4,360	0	0	0	25,100	513	10 ^a	
Lesotho	–	–	–	–	–	–	–	–	–	–	–	
Liberia	–	–	–	–	–	–	–	–	–	–	–	
Libya	152	0	0	0	11,909	5,178	0	0	17,246	2,880	–	
Madagascar	–	–	–	–	–	–	–	–	–	–	–	
Malawi	–	–	–	–	–	–	–	–	–	–	–	
Mali	–	–	–	–	–	–	–	–	–	–	–	
Mauritania	–	–	–	–	–	–	–	–	–	–	–	
Mauritius	242	10	444	2	752	0	0	0	1,451	1,111	–	
Morocco	1,367	162	4,444	217	11,760	1015	0	0	19,394	553	–	
Mozambique	9,249	1,480	498	0	1,163	761	0	0	12,950	428	–	
Namibia	237	129	2	2	1,284	0	0	0	1,873	762	–	
Niger	2,213	0	65	0	618	0	0	0	2,964	151	–	
Nigeria	111,566	492	29	0	12,385	14,901	0	0	139,373	763	–	
Rwanda	–	–	–	–	–	–	–	–	–	–	–	

(continued)

Table A.2 (continued)

	Primary energy supply (kilotonne of oil equivalent)										Energy use (kg of oil equivalent per capita)	
	Bioenergy		Hydro	Coal and peat	Other renewables	Oil	Natural gas	Nuclear	Total			
	2015	2015	2015	2015	2015	2015	2015	2015	2015	2014	2014	
Sao Tome and Principe	-	-	-	-	-	-	-	-	-	-	-	270 ^a
Senegal	1,842	29	241	0	1,921	36	0	4,089	272	2411 ^a	-	-
Seychelles	-	-	-	-	-	-	-	-	-	-	-	-
Sierra Leone	-	-	-	-	-	-	-	-	-	-	-	-
Somalia	-	-	-	-	-	-	-	-	-	-	-	-
South Africa	15,782	69	96,339	496	22,032	4,253	3,189	142,026	2,696	61	-	-
South Sudan	201	0	0	0	356	0	0	557	381	372 ^a	-	-
Sudan	9,683	724	0	0	5,263	0	0	15,670	475	457	-	-
Swaziland	-	-	-	-	-	-	-	-	-	-	-	-
Tanzania	21,801	181	158	2	3,089	731	0	25,968	381	372 ^a	-	-
Togo	2,702	5	0	0	618	0	0	3,431	457	457	-	-
Tunisia	1,076	6	0	89	4,637	5,055	0	10,928	944	944	-	-
Uganda	-	-	-	-	-	-	-	-	-	-	-	-
Zambia	7,991	1121	94	0	1,072	0	0	10,243	635 ^c	635 ^c	-	-
Zimbabwe	7,498	429	2,090	0	1,252	0	0	11,261	750 ^c	750 ^c	-	-

^aMost recent data from 2007^bMost recent data from 2011^cMost recent data from 2013

Source: OECD database and World Bank Development Indicators, accessed in April 2018

Table A.3 Electricity production by source

	Electricity production		Sources of electricity production						Nuclear power % of total 2014
	kilowatt hours billions 2014	% of total 2014	Coal	Natural gas	Oil	Hydropower	Renewable sources		
			% of total 2014	% of total 2014	% of total 2014	% of total 2014	% of total 2014		
Algeria	64.2	0	97.8	1.8	0	0.4	0	0	
Angola	9.5	0	0	46.8	0	53.2	0	0	
Benin	0.2	0	0	99.5	0	0	0.5	0	
Botswana	2.4	95.8	0	4.2	0	0	0	0	
Burkina Faso	-	-	-	-	-	-	-	-	
Burundi	-	-	-	-	-	-	-	-	
Cameroon	6.9	0	12.9	12.8	73.2	1	0	0	
Cabo Verde	-	-	-	-	-	-	-	-	
Central African Republic	-	-	-	-	-	-	-	-	
Chad	-	-	-	-	-	-	-	-	
Comoros	-	-	-	-	-	-	-	-	
Congo. Dem. Rep.	8.8	0	0.1	0	99.9	0	0	0	
Congo. Rep.	1.7	0	45.3	0	54.7	0	0	0	
Cote d'Ivoire	8.3	0	69.9	6.1	23.1	0.8	0	0	
Djibouti	-	-	-	-	-	-	-	-	
Egypt. Arab Rep.	171.7	0	78.7	12.2	8.1	0.9	0	0	
Equatorial Guinea	-	-	-	-	-	-	-	-	
Eritrea	0.4	0	0	99.5	0	0.5	0	0	
Ethiopia	9.6	0	0	0.1	95.6	4.3	0	0	
Gabon	2.4	0	38.9	27	33.6	0.5	0	0	

(continued)

Table A.3 (continued)

	Electricity production		Sources of electricity production															
	kilowatt hours billions 2014		Coal	Natural gas	Oil	Hydropower	Renewable sources	Nuclear power										
			% of total 2014	% of total 2014	% of total 2014	% of total 2014	% of total 2014	% of total 2014	% of total 2014									
Gambia, The	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ghana	13		0	18.2	17.1	64.7	0	0	0	0	0	0	0	0	0	0	0	0
Guinea	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Guinea-Bissau	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kenya	9.3		0	0	18.5	35.8	0	45.7	0	0	0	0	0	0	0	0	0	0
Lesotho	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Liberia	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Libya	37.7		0	53.7	46.3	0	0	0	0	0	0	0	0	0	0	0	0	0
Madagascar	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Malawi	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mali	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mauritania	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mauritius	2.9		42.9	0	36.7	3.1	17.2	0	0	0	0	0	0	0	0	0	0	0
Morocco	28.7		55	19.5	13.1	5.7	6.7	0	0	0	0	0	0	0	0	0	0	0
Mozambique	17.7		0	8.8	0	91.2	0	0	0	0	0	0	0	0	0	0	0	0
Myanmar	14.2		2	35.2	0.5	62.4	0	0.6	0	0	0	0	0	0	0	0	0	0
Niger	0.7		71.6	0	27.8	0	17.6	0	0	0	0	0	0	0	0	0	0	0
Nigeria	30.4		0	82.4	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Rwanda	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sao Tome and Principe	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

(continued)

Table A.3 (continued)

	Electricity production		Sources of electricity production							
	kilowatt hours billions 2014	% of total 2014	Coal	Natural gas	Oil	Hydropower	Renewable sources	Nuclear power		
			% of total 2014	% of total 2014	% of total 2014	% of total 2014	% of total 2014	% of total 2014		
Senegal	3.7	0	4.2	83.6	8.7	1.8	0			
Seychelles	–	–	–	–	–	–	–	–		
Sierra Leone	–	–	–	–	–	–	–	–		
Somalia	–	–	–	–	–	–	–	–		
South Africa	249.5	93	0	0.1	0.4	1	5.5			
South Sudan	0.5	0	0	99.6	0	0.4	0			
Sudan	11.4	0	0	21.7	78.3	0	0			
Swaziland	–	–	–	–	–	–	–	–		
Tanzania	6.2	0	42.2	15.5	41.6	0.6	0			
Togo	0.1	0	0	12	84.5	3.5	0			
Tunisia	19	0	94.2	1.8	0.3	2.8	0			
Uganda	–	–	–	–	–	–	–	–		
Zambia	14.5	0	0	2.8	97.2	0	0			
Zimbabwe	10	43.9	0	0.5	54.2	1.4	0			

Source: World Bank Development Indicators, accessed in April 2018

Table A.4 Electricity access

	Rate of access						Population without access (million) 2016 (%)
	National				Urban	Rural	
	2000 (%)	2005 (%)	2010 (%)	2016 (%)	2016 (%)	2016 (%)	
Africa	34	39	43	51	77	31	600
North Africa	90	96	99	100	100	99	<1
Algeria	98	98	99	100	100	97	<1
Egypt	94	98	100	100	100	100	–
Libya	100	100	100	100	100	99	<1
Morocco	71	88	99	99	100	97	<1
Tunisia	95	99	100	100	100	100	–
Sub-Saharan Africa	23	27	32	42	71	22	600
Central Africa	10	15	21	25	50	5	98
Cameroon	20	47	49	63	94	21	9
Central African Republic	1	2	2	3	5	1	5
Chad	2	3	4	9	32	1	13
Congo	21	23	37	43	56	16	3
Democratic Republic of the Congo	7	7	15	15	35	0	68
Equatorial Guinea	22	25	27	68	93	48	<1
Gabon	31	46	60	90	97	38	<1
East Africa	10	17	21	35	66	25	184
Burundi	4	5	5	10	35	7	10
Djibouti	46	48	50	42	54	1	<1
Eritrea	17	23	32	33	86	17	4
Ethiopia	5	15	23	40	85	29	61
Kenya	8	14	18	65	78	60	17
Rwanda	6	8	10	30	72	12	8
Somalia	5	9	14	16	35	4	9
South Sudan	0	0	0	1	4	0	13
Sudan	30	31	36	46	71	31	22
Uganda	4	9	9	19	23	19	33
West Africa	33	37	42	52	80	28	175
Nigeria	40	47	50	61	86	34	74
Benin	22	23	27	32	56	11	8
Cote d'Ivoire	50	50	59	63	88	32	9
Ghana	45	52	61	84	95	71	5
Senegal	30	35	54	64	90	44	6
Togo	9	18	28	35	74	5	5

(continued)

Table A.4 (continued)

	Rate of access						Population without access (million)
	National				Urban	Rural	
	2000 (%)	2005 (%)	2010 (%)	2016 (%)	2016 (%)	2016 (%)	2016 (%)
Burkina Faso	13	9	15	20	58	2	15
Cape Verde	59	65	70	97	100	89	<1
Gambia	18	27	35	48	66	13	1
Guinea	16	18	20	20	46	1	10
Guinea-Bissau	10	11	12	13	23	1	2
Liberia	0	1	2	12	16	3	4
Mali	12	14	17	41	83	6	11
Mauritania	15	17	19	31	47	2	3
Niger	7	8	9	11	54	0	18
Sao Tome and Principe	53	55	57	59	70	40	<1
Sierra Leone	9	11	12	9	12	6	6
South Africa	66	81	83	86	87	83	8
Other Southern Africa	14	16	22	31	65	13	135
Angola	12	17	40	35	69	6	17
Botswana	22	40	45	55	69	32	1
Comoros	30	35	40	71	89	62	<1
Lesotho	5	12	17	34	63	24	1
Madagascar	8	16	17	23	52	7	19
Malawi	5	7	9	11	49	3	16
Mauritius	100	95	99	100	100	100	–
Mozambique	7	7	15	29	57	15	21
Namibia	34	34	44	56	78	34	1
Seychelles	50	54	58	99	99	99	<1
Swaziland	25	30	35	84	90	71	<1
Tanzania	11	12	15	33	65	17	37
Zambia	12	19	19	34	67	7	11
Zimbabwe	40	36	37	34	81	11	11

Source IEA, Energy Access Outlook 2017

Table A.5 Access to clean cooking

	People without access to clean cooking				Population without access	Population relying on biomass
	2000 (%)	2005 (%)	2010 (%)	2015 (%)	(million)	
Africa	76	75	72	72	848	785
North Africa	9	3	1	1	2	1
Algeria	1	1	1	–	–	–
Egypt	16	4	1	1	<1	<1
Libya	1	1	1	–	–	–
Morocco	5	5	4	3	1	1
Tunisia	7	6	2	2	<1	<1
Sub-Saharan Africa	91	89	86	84	846	783
Central Africa	93	92	92	91	116	113
Cameroon	88	83	79	77	18	17
Central African Republic	>95	>95	>95	>95	5	5
Chad	94	>95	>95	95	13	13
Congo	94	93	86	84	4	3
Democratic Republic of the Congo	>95	>95	>95	>95	75	74
Equatorial Guinea	78	78	78	77	<1	<1
Gabon	37	42	25	15	<1	<1
East Africa	>95	95	86	90	249	240
Burundi	>95	>95	>95	>95	11	11
Djibouti	>95	>95	94	94	<1	<1
Eritrea	94	93	92	90	5	4
Ethiopia	>95	>95	84	95	94	93
Kenya	>95	>95	93	86	40	34
Rwanda	>95	>95	>95	>95	12	12
Somalia	>95	>95	>95	>95	11	11
South Sudan	n.a.	n.a.	n.a.	>95	12	12
Sudan	88	81	65	65	26	26
Uganda	>95	>95	>95	>95	38	38
West Africa	>95	95	94	87	308	263
Nigeria	>95	>95	>95	94	171	128
Benin	>95	>95	94	90	10	10
Cote d'Ivoire	94	92	80	77	17	17
Ghana	90	87	88	71	20	20
Senegal	72	56	69	71	11	10
Togo	>95	>95	>95	91	7	7
Burkina Faso	>95	>95	92	87	16	16

(continued)

Table A.5 (continued)

	People without access to clean cooking				Population without access	Population relying on biomass
					(million)	
	2000 (%)	2005 (%)	2010 (%)	2015 (%)	2015 (%)	2015 (%)
Cape Verde	33	35	26	25	<1	<1
Gambia	91	91	>95	90	2	2
Guinea	>95	>95	>95	>95	12	12
Guinea-Bissau	>95	>95	>95	>95	2	2
Liberia	>95	>95	>95	>95	5	5
Mali	>95	>95	92	50	9	9
Mauritania	80	71	68	66	3	2
Niger	>95	>95	>95	>95	19	19
Sao Tome and Principe	76	77	62	40	<1	<1
Sierra Leone	>95	>95	>95	>95	6	6
South Africa	48	36	24	18	10	5
Other Southern Africa	86	86	87	86	164	161
Angola	54	55	61	61	15	15
Botswana	54	48	44	43	<1	<1
Comoros	91	>95	95	93	<1	<1
Lesotho	79	79	67	63	1	1
Madagascar	>95	>95	>95	>95	24	24
Malawi	>95	>95	>95	>95	17	17
Mauritius	7	6	3	2	<1	<1
Mozambique	>95	90	>95	95	27	26
Namibia	64	59	57	55	1	1
Seychelles	1	2	2	2	<1	<1
Swaziland	52	60	72	50	<1	<1
Tanzania	>95	>95	>95	>95	51	50
Zambia	86	84	83	87	14	14
Zimbabwe	70	70	71	71	11	11

Source IEA, Energy Access Outlook 2017