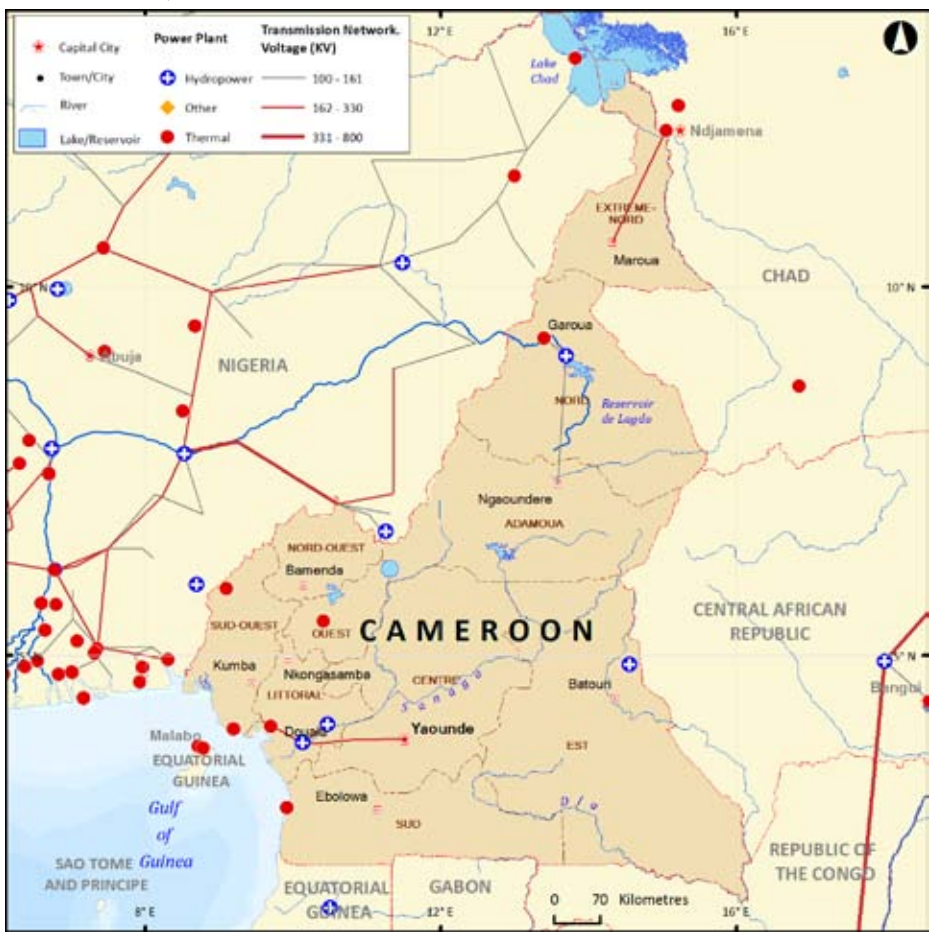
Cameroon

Figure 1: Energy profile of Cameroon



Energy Consumption and Production

In 2013, the population of Cameroon was 22.25 million (Table 1) (IEA, 2016). Total electricity produced in 2015 was 628 ktoe with 75 per cent of it from hydroelectricity. In 2015, electricity consumption was 526 ktoe; industry consumed 43.3 per cent of this (Table 2). Key consumption and production statistics are shown in Figures 2 and 3.

Table 1: Cameroon's key indicators

Key indicators	Amount
Population (2013 million)	22.25
GDP (billion 2005 USD)	22.02
CO_2 emission (Mt of CO_2)	5.90

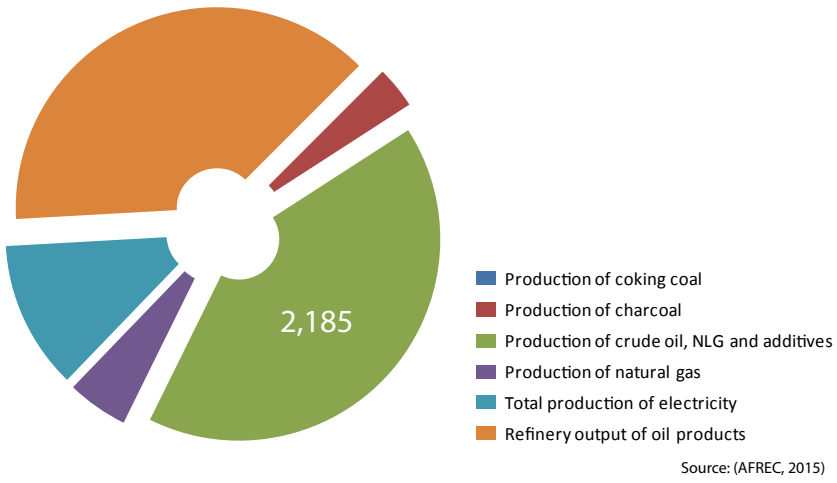
Source: (World Bank, 2015)

Energy Resources

Biomass

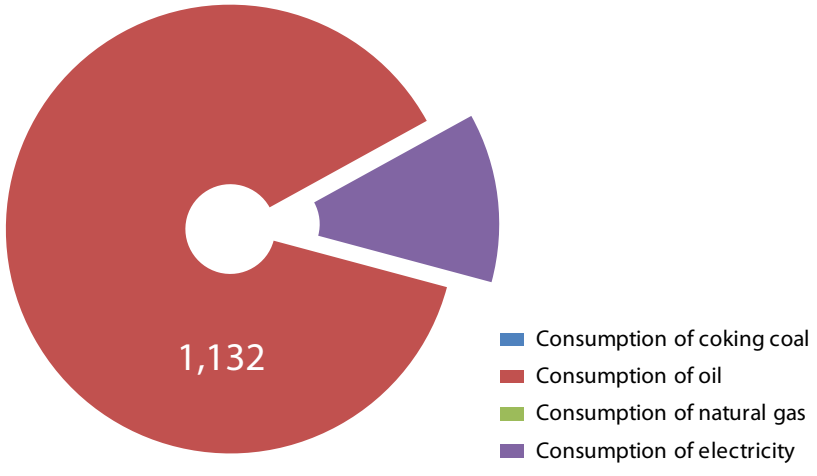
Cameroon has 18.8 million hectares of forest, amounting to the third largest biomass potential in sub-Saharan Africa (FAO, 2015); (FUAS, undated). Deforestation is a major issue occurring at a rate of 220,000 ha/yr between 1990 and 2015, with less than 2 per cent of that being replanted annually. Primary uses for biomass in the country include heating and light for the majority of the rural population (REEEP, 2012).

Figure 2: Total energy production, (ktoe)



Source: (AFREC, 2015)

Figure 3: Total energy consumption, (ktoe)



Source: (AFREC, 2015)

Use of palm oil for biodiesel is also a viable prospect for the country. However, this contributes to deforestation, as forests are often cleared to make way for palm oil farms. In 2010, estimates indicated that palm oil is grown on about 190,000 ha of land (Hoyle & Levang, 2012).

Hydropower

Hydropower is probably the most available form of energy in the country. Technically exploitable hydropower resources are 115,000 GWh, the fourth largest in Africa. The installed capacity in 2011 was 729 MW and actual generation in 2011 was 3,850 GWh (WEC, 2013). Cameroon's major power stations are Lagdo (72 MW), Edéa (263 MW) and Songloulou (388 MW) (FUAS, undated).

Oil and natural gas

According to the EIA, (2015), Cameroon is ranked 47th globally in terms of volumes of reserves and is estimated to have proven reserves of natural gas of 4.8 trillion cubic feet (4,800 bcm). Kribi-Campo basin and Ebome are the major oil fields.

The amount of oil produced has been steadily declining as reserves are depleted. For instance, between 2000 and 2015, the volume of crude oil, natural gas and additives produced declined from 6,860 to 2,185 ktoe (AFREC 2015).

Table 2: Total energy statistics (ktoe)

Category	2000	2005	2010	2015 P
Production of coking coal	-	-	-	-
Production of charcoal	73	77	157	178
Production of crude oil, NLG and additives	6860	3904	3169	2185
Production of natural gas	0	0	286	259
Production of electricity from biofuels and waste	0	0	5	6
Production of electricity from fossil fuels	3	20	136	146
Production of nuclear electricity	-	-	-	-
Production of hydro electricity	266	336	366	471
Production of geothermal electricity	-	-	-	-
Production of electricity from solar, wind, Etc.	0	0	5	6
Total production of electricity	269	356	512	628
Refinery output of oil products	1548	1821	2182	2025
Final Consumption of coking coal	-	-	-	-
Final consumption of oil	968	976	1108	1132
Final consumption of natural gas	0	0	288	157
Final consumption of electricity	234	300	457	526
Consumption of oil in industry	93	89	118	123
Consumption of natural gas in industry	0	0	0	0
Consumption of electricity in industry	130	124	239	228
Consumption of coking coal in industry	-	-	-	-
Consumption of oil in transport	649	730	857	890
Consumption of electricity in transport	-	-	-	-
Net imports of coking coal	-	-	-	-
Net imports of crude oil, NGL, Etc.	-5330	-4051	-1037	-489
Net imports of oil product	-547	-833	-699	-205
Net imports of natural gas	0	0	0	0
Net imports of electricity	0	0	0	0

- : Data not applicable
0 : Data not available
(P): Projected

(AFREC, 2015)

Peat

Peatland covers an area of 1,077 km^2 (WEC, 2013).

Wind

The potential for wind energy exists in the coastal and northern regions of Cameroon. However, wind speeds are not sufficient to develop sustainable wind energy projects (REEEP, 2012).

Geothermal

There have not been any efforts to seriously develop geothermal energy. However, hot springs are found in many areas, such as the Ngaoundéré, Mt. Cameroon and Manengoumba regions and Lake Moundou (REEEP, 2012).

Solar

Although there is potential for exploitation, solar energy is not widely used across Cameroon with only about 50 installations recorded. These are mainly small-scale localised generation systems and are mostly used for powering the cellular telecommunications network. The average solar irradiance is estimated at estimated at between 4.9-5.8 kWh/day/m^2 (REEEP, 2012). By 2015, combined production of energy from solar and wind amounted to 6 ktoe (AFREC, 2015).

Charcoal market in Yaounde, Cameroon

Tracking progress towards sustainable energy for all (SE4All)

Access to power has steadily improved, increasing from 29 per cent in 1990 to 53.7 per cent in 2012 (Table 3 and Figure 4) (World Bank, 2016). Access to electricity in Cameroon shows a big rural-urban divide: by 2012, 87.5 per cent of the urban population compared to 18.5 per cent of the rural population had access to electricity (World Bank, 2015); (World Bank, 2016). A contributing factor could be the discontinuity of the national grid, thus making the transmission of power between the three separate grids (the Eastern Isolated Grid, the Northern Interconnected Grid and the Southern Interconnected Grid) impossible. The Energy Sector Development Plan 2030 sets a target of 75 per cent total and 20 per cent rural electrification rates by 2030.

In 2012, only 21.93 per cent of Cameroonians were using non-solid fuels; 4 per cent of these are from the rural areas and 41 per cent in urban centres (World Bank, 2015); (World Bank, 2016).

The energy intensity (the ratio of the quantity of energy consumption per unit of economic output) was 6.5 MJ per US dollar (2005 dollars at PPP) in 1990 falling to 5.3 MJ per US dollar in 2012. The compound annual growth rate (CAGR) between 2010 and 2012 was -4.04 (World Bank, 2015).

The share of renewable energy in the total final energy consumption (TFEC) decreased from 81.6 to 78.1 per cent between 1990 and 2012. Traditional solid biofuels form the biggest share of renewable sources at 66.3 per cent of TFEC in 2012, while the modern solid biofuels contributed 6.7 per cent and hydro only 5.1 per cent . Renewable sources contributed 73.0 per cent share of electricity generation in 2012 (World Bank, 2015).

Table 3: Cameroon'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	29	46	49	53.7		
	7.1.2 Per cent of population with primary reliance on non-solid fuels	14	20	22	22		
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	81.6	84.5	78.6	78.1		
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)			7.6	8.2 (2011)		
	Level of primary energy intensity(MJ/$2005 PPP)	6.5		5.7	5.3	5.37	5.28

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
53.7%	21.93%	**8.57**	78.11%

Table 4: Cameroon's key aspects/key mitigation measures to meet its energy Intended Nationally Determined Contributions (INDCs)

INDC
*Put in place a regulation on energy efficiency (EE) based on the 2014 "National Policy, Strategy and Action Plan for Energy Efficiency in the Electricity Sector in Cameroon" document with a prospective goal to save 2,250 GWh of energy corresponding to 450MW of installed capacity by 2025
*Create and operationalize the Agency for the Promotion and Rationalization of Energies Utilization (APRUE)
*Develop economic incentives to promote and eliminate barriers to investments in EE
*Interconnect the three existing networks (North, South and East) in Cameroon to optimize transportation and distribution and reduce losses
*Enhance and promote Cameroon's integration and participation in regional energy market through interconnection with the other countries of the region, especially the Central Africa Power Pool (PEAC) and West Africa Power Pool (WAPP) via Nigeria
*Encourage and make regular energy audits compulsory in heavy industries with high energy intensity
*Sensitize and encourage energy audits in small and medium sized enterprises (SMEs); optimize processes by adopting more efficient technologies as well as leveling and erasure
*Assess substitution or optimization potentials (for example cogeneration or recovery)
*Limit losses (through flaring, connections, waste) by implementing regulations, and norms, taxation and incentives;
*Revisit the building code to improve energy performance through construction's thermal and retrofitting norms, and a green certification process
*Train and organize the entire low-energy consumption's construction/renovation value chain
*Regulate and impose energy rating labels for domestic appliances
*Limit constrained mobility and develop low-carbon transportation' supply
*Promote an integrated approach to the transport sector and a low-carbon transport system development through a national transport infrastructure scheme
*Embed a climate/energy dimension into national planning documents as a way to reduce distances, work on the functional mix and propose efficient public transportation policies
*Assist and support the State and local collectivities in the development of intra- and intercity low carbon public transportation plans (E.g.: tramway Yaoundé Douala)
*Encourage the purchase of less polluting vehicles and the systematic ban on very polluting ones through regulations, incentives and prohibitive measures
*Integrate climate change and households waste management, collect and recovery
*Diversify energy supply in a climate change context
Account for climate change in developing tourism and craft industries' activities regarding resources utilization in the craft industry (water, natural resources, etc.), and the development and adaptation to touristic sites
Account for climate change in industry development in Cameroon especially environment/space management, protection of climate-vulnerable areas, energy supplies, water and services, waste and pollution, and GHG emissions

Source: (ROC, 2015)

Table 5: Cameroon'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	Ministry of Mines, Water and Energy Electricity Administration
Presence of a Functional Energy Regulator	Agence de régulation du secteur de l'électricité (ARSEL) Rural Electrification Agency (AER)
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)	Integrated SONEL (Société National d'Eléctricité) National Refining Company (Sonara for Société Nationale de Raffinage) Caisse de stabilisation des prix de hydrocarbures, CSPH) - an oil price stabilization fund Cameroon Oil Storage Company (Société Camerounaise des dépots pétroliers)
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)	ExxonMobil, Royal Dutch Shell and Total S.A.
Extent to which Downstream services and operations are privatized or state-owned, or a mixture (extent)	State owned by Société Nationale des Hydrocarbures
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 Policy, Strategy and Action Plan for Energy Efficiency in the Electricity Sector in Cameroon 2014 • Energy Sector Development Plan (PDSE 2030) • Renewable energy policy • Rural electrification master plan
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	• Law No. 98/022 of 24 December 1998 governing the electricity sector • Decree No. 99 /125 of 15 June 1999 to set up the organization and functioning of the Electricity Sector Regulatory Agency • Decree No, 99 /193 of 8 September 1999 to set up the organization and functioning of the Rural Electrification Agency • Decree No. 2000/464/PM of 30 June 2000 governing the activities of the electricity sector

This table was prepared with material from (REEEP, 2012); (MINEE, 2016)

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

In September 2015, Cameroon submitted its new climate action plan to the UNFCCC, the energy-related Intended Nationally Determined Contributions (INDCs). The main aim is to reduce greenhouse gas emissions by 32 per cent compared to a business-as-usual scenario for 2035. The commitments are laid out in Table 4.

Institutional and Legal Framework

The Ministry of Water and Energy is in charge of the energy sector. The energy regulator is the Agence de regulation du secteur de l'électricité (ARSEL). The Electricity Development Corporation (EDC) is the sole generator, transmitter and distributor of electric energy. On a regional level, the country is a member of the Central Africa Power Pool. The legal framework is guided by the Law n°98/022 of 24 December 1998 governing the electricity sector.

The main sector policy is the Energy Sector Development Plan known as the PDSE 2030. It focuses on attracting investment and strengthening the energy sector through the development of renewables and especially the hydroelectric sector, since the hydro potential ranks second highest in Central Africa after that of the Democratic Republic of the Congo (DRC) (REEEP, 2012).