

# São Tomé and Príncipe



Figure 1: Energy profile of São Tomé and Príncipe



Figure 2: Total energy production, (ktoe)

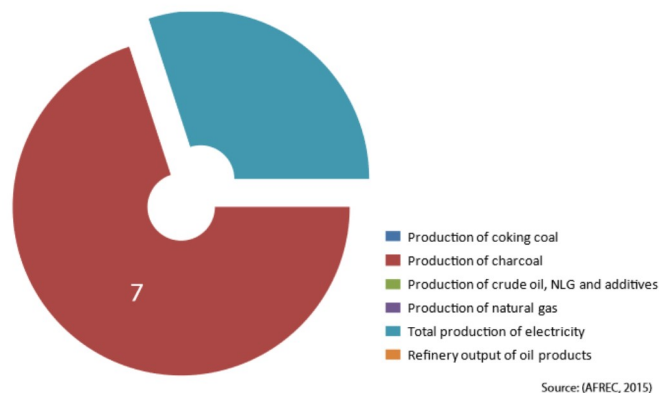
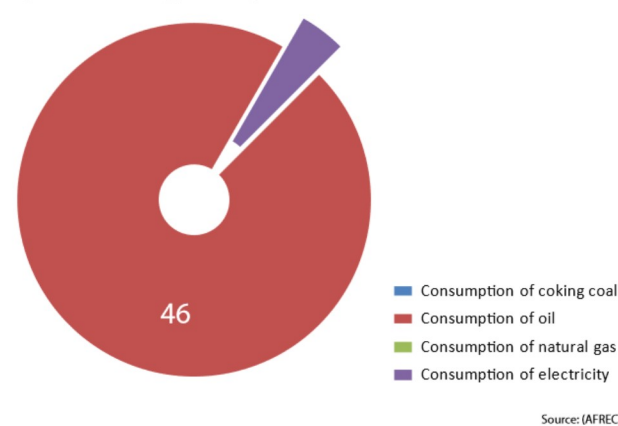


Figure 3: Total energy consumption, (ktoe)



## Energy Consumption and Production

São Tomé and Príncipe had a population of 0.18 million in 2013 as shown in Table 1. In 2015, total electricity produced was 3 ktoe, of which 66.6 per cent came from fossil fuels and 33.3 per cent from hydro sources (Table 2). Final electricity consumed was 2 ktoe (AFREC, 2015). Figures 2 and 3 show the main energy statistics

Table 1: São Tomé and Príncipe's key indicators

Key indicators	Amount
Population (million)	0.18
GDP (billion 2005 USD)	0.19
CO <sub>2</sub> emission (Mt of CO <sub>2</sub> )	0.10

Source: (World Bank, 2015)

## Energy Resources

### Biomass

In 2012, 40 per cent of the population did not have access to electricity. The energy need is met by biomass (firewood and charcoal), which is used heavily for cooking purposes. About 30 GWh/year is generated from biomass use (REEEP, 2012).

### Hydropower

Although there are indications of the potential for small hydropower, research is needed to confirm economic viability. Feasibility studies by the Municipal Water and Electricity Company (EMAE) have highlighted 14 potential sites (REEEP, 2012). Existing power plants are located on the Contadores and Guégue rivers.

### Oil and natural gas

There has been some successful offshore exploration for oil in the zone between Nigeria and São Tomé and Príncipe and oil is expected to flow as of 2016 (REEEP, 2012). The Joint Development Zone established in 2001 for joint exploration of the oil resources of Nigeria and São Tomé and Príncipe is based on a 60:40 ratio of benefit sharing, respectively. However, as a result of this emphasis on oil, there has been little research in alternative energy sources in the country (Liu, Masera, & Esser, 2013).

**Table 2: Total energy statistics (ktoe)**

Category	2000	2005	2010	2015 P
Production of coking coal	-	-	-	-
Production of charcoal	0	0	7	7
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	1	1	2	2
Production of nuclear electricity	-	-	-	-
Production of hydro electricity	1	0	0	1
Production of geothermal electricity	-	-	-	-
Production of electricity from solar, wind, Etc.	0	0	0	0
Total production of electricity	1	1	2	3
Refinery output of oil products	-	-	-	-
Final Consumption of coking coal	-	-	-	-
Final consumption of oil	20	26	35	46
Final consumption of natural gas	-	-	-	-
Final consumption of electricity	2	3	2	2
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	-	-	-	-
Net imports of coking coal	-	-	-	-
Net imports of crude oil, NGL, Etc.	-	-	-	-
Net imports of oil product	17	27	44	52
Net imports of natural gas	-	-	-	-
Net imports of electricity	-	-	-	-

- : Data not applicable

0 : Data not available

(P): Projected

(AFREC, 2015)

## Wind

The potential for wind is inadequate for exploitation (REEEP, 2012).

## Geothermal

The island is geographically located on the Cameroon volcanic mountain line and this could indicate some geothermal potential. However there has been no study to determine this potential (REEEP, 2012)

## Solar

Average daily insolation is 5.2 kWh/m<sup>2</sup>, which implies good potential for solar energy development. However, there is little development of the sector. Currently, there is minimal use of solar PV in schools and other public buildings (REEEP, 2012).

Chuck Moravec / Wikipedia / CC BY



Ponta Figo Hike Hydropower Station 1, Sao Tome

## Tracking progress towards sustainable energy for all (SE4All)

By 2012, electricity coverage extended to only 60.5 per cent of the population and supply is unreliable (Table 3) (World Bank, 2016). Domestic energy requirements are met by kerosene and candles for lighting and biomass for cooking. Coverage of electricity distribution lines is mainly in the northwestern part of the country, towards the capital city. By 2012, 68.3 per cent of urban areas had access to electricity and 47 per cent of rural areas (World Bank, 2015); (World Bank, 2016).

Access to modern fuels is low. In 2012, only 28.77 per cent were using non-solid fuels; 16 per cent of these are from rural areas and 42 per cent in urban areas (World Bank, 2015). About 85 per cent of households use firewood or coal for cooking (REEEP, 2012).

The energy intensity (the ratio of the quantity of energy consumption per unit of economic output) was 5.7 MJ per US dollar (2005 dollars at PPP) in 2012, down only slightly from 6.1 MJ per US dollar in 1990. The compound annual growth rate (CAGR) between 2010 and 2012 was -1.35 (World Bank, 2015).





The share of renewable energy in the total final energy consumption (TFEC) has been declining steadily from 62.2 in 1990 to 42.4 in 2012. Traditional solid biofuels form the biggest share of renewable sources at 41.6 per cent of TFEC in 2012, while hydro contributed only 0.8 per cent (World Bank, 2015). Renewable sources contributed 6.4 per cent share of electricity generation in 2012 (World Bank, 2015).

**Table 3: São Tomé and Príncipe'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	50	53	57	60.5		
	7.1.2 Per cent of population with primary reliance on non-solid fuels	8	20	27	28.77		
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	62.2	35.7	35.4	42.4		
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)			9.15 (2007)			
	Level of primary energy intensity(MJ/\$2005 PPP)	6.1		5.8	5.7	5.7	5.68

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
60.5%	28.77%	<b>8.62</b>	43.22%
			

**Table 4: São Tomé and Príncipe's key aspects/key mitigation measures to meet its energy Intended Nationally Determined Contributions (INDCs)**

INDC
*Build Isolated Mini Power plant (1 MW);
*Build Hydro Power plant connected to the main network (9 MW);
*Install Photovoltaic solar panels (12 MW);
*Build Mini-hydro Power plant connected to the main grid (4 MW).

Source: (MEM, 2015)

**Table 5: São Tomé and Príncipe'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"> <li>• Ministry of Natural Resources, Energy and Environment</li> <li>• National Petroleum Council</li> </ul>
Presence of a Functional Energy Regulator	No dedicated regulator
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	Central Africa Power Pool
Environment for Private Sector Participation	
Whether the Power Utility(ies) is/are vertically integrated or there is unbundling (list the Companies)	Empresa de Agua e Electricidade (Water and Electricity Company)
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)	National Petroleum Agency (ANP)
Extent to which Downstream services and operations are privatized or state-owned, or a mixture (extent)	<ul style="list-style-type: none"> <li>• Empresa Nacional de Combustíveis e</li> <li>• Óleos (National Oil Company)</li> <li>• National State Oil Company (Petrogas)</li> </ul>
Presence of Functional (Feed in Tariffs) FIT systems	
Presence Functional IPPs and their contribution	Hidroeléctrica STP Ltda (5MW)
Legal, Policy and Strategy Frameworks	
Current enabling policies (including: RE; EE; private sector participation; & PPPs facilitation) (list 5 max) most critical ones	
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"> <li>• Decreto-Lei No 14/2005 creating AGER</li> <li>• Decreto-Lei No 40/2008 EMAE statute</li> <li>• Law 3/2004 and Decree 14/2005 establishing General regulation Authority</li> <li>• Electricity sector bill (Ante-projecto de Lei de Bases do Sector Eléctrico)</li> <li>• General Law on Petroleum Exploration and Exploitation of August 2000</li> <li>• Decree No 3/2004 creates the National Petroleum Council.</li> <li>• Law No 5/2004 of June 2004 creates the National Petroleum Agency (ANP).</li> <li>• Oil Revenue Management Law (ORML) of December 2004</li> </ul>

This table was compiled with material from (REEEP, 2012)

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

São Tomé and Príncipe are already feeling the impacts of climate change and are keen to reduce these effects through adaptation. The government articulated its Intended Nationally Determined Contributions (INDCs) in 2015 and the energy-related INDCs are listed in Table 4.

## Institutional and Legal Framework

The Ministry of Natural Resources, Energy, and Environment is in charge of the energy sector (Table 5). There is no dedicated energy regulator, although the General Regulation Authority (*Autoridade Geral de Regulação* (AGER)) that was created to regulate the infrastructure sector is expected to assume responsibility for regulating the energy sector in the future. The *Empresa de Água e Electricidade* (EMAE) — the Water and Electricity Company — is the state-owned

monopoly that manages water and electricity supply. On a regional level, São Tomé and Príncipe is a member of Central Africa Power Pool. It is also a member of the Association of Energy Regulators of the Portuguese Speaking Countries (RELOP) established in 2008.

The main sector policy is the government's 2007 Program of Action that prioritizes energy. But the Electricity Sector Reform Commission is spearheading reforms in the sector.