



Figure 1: Energy profile of Mozambique



## Energy Consumption and Production

In 2013, Mozambique had a population of 25.83 million (Table 1). In 2015, total electricity production was 1,543 ktoe, of which most (98.9 per cent) came from hydro sources (Table 2). Final electricity consumption in the same year was 1,325 ktoe (AFREC, 2015). Figures 2 and 3 show the main energy statistics.

Table 1: Mozambique's key indicators

| Key indicators                                    | Amount |
|---|--------|
| Population (million)                              | 25.83  |
| GDP (billion 2005 USD)                            | 11.19  |
| CO <sub>2</sub> emission (Mt of CO <sub>2</sub> ) | 2.95   |

Source: (World Bank, 2015)

## Energy Resources

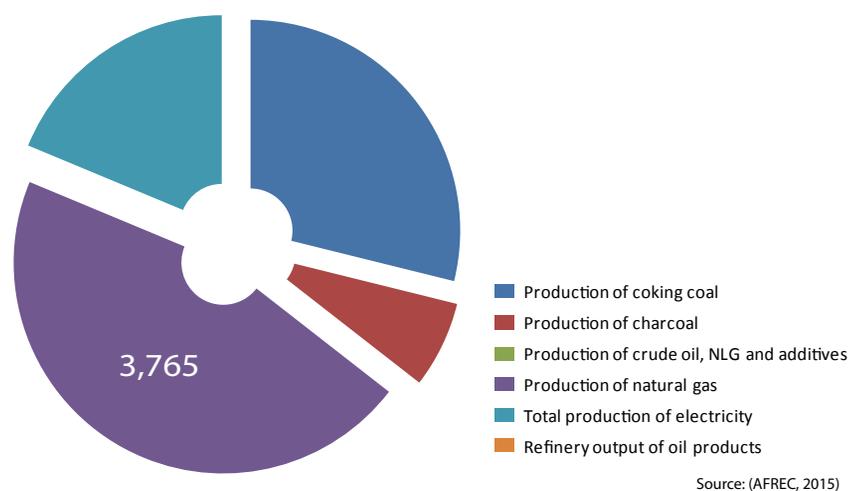
### Biomass and biofuel

Over 78 per cent of households use biomass to supply their domestic energy needs (REEEP, 2012). The use of wood fuels for energy contributes to indoor air pollution and deforestation affecting human and environmental health. There is the opportunity to use agricultural waste, such as bagasse from the sugar industry or copra wastes from the coconut industry, to generate energy (REEEP, 2012). In 2015, 15 ktoe of electricity was produced from biofuels and waste (AFREC, 2015).

### Hydropower

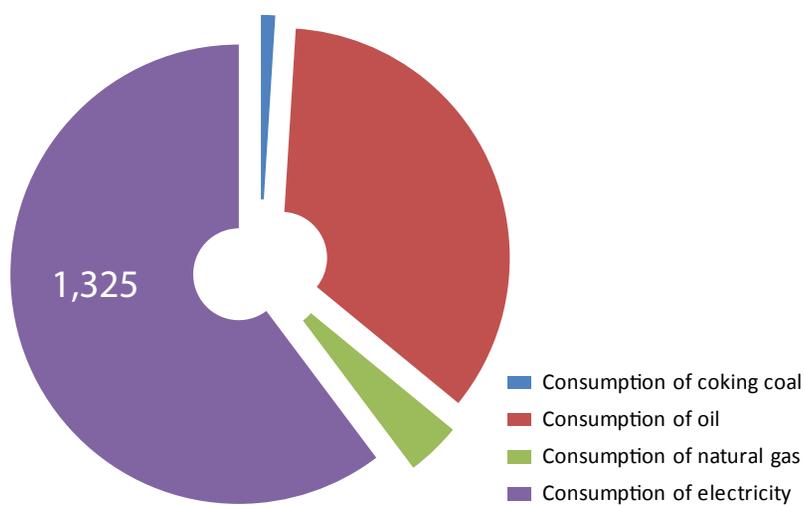
Mozambique has a large potential for hydroelectricity, with installed capacity and production in 2011 of 107 MW (WEC, 2013). The hydropower generation potential is 15,000 MW per year and currently only 14 per cent of this has been developed (REEEP, 2012). Production of electricity from hydro-sources has been steadily increasing from 760 ktoe in 2000 to 1,527 ktoe in 2015 (AFREC, 2015). Interconnections with the South African Power Pool (SAPP) provide opportunities for energy trade.

Figure 2: Total energy production, (ktoe)



Source: (AFREC, 2015)

Figure 3: Total energy consumption, (ktoe)



Source: (AFREC, 2015)

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

| Category  | 2000 | 2005   | 2010   | 2015 P |
|---|------|--------|--------|--------|
| Production of coking coal                         | 9    | 2      | 20     | 2,374  |
| Production of charcoal                            | 249  | 297    | 335    | 547    |
| Production of crude oil, NLG and additives        | -    | -      | -      | -      |
| Production of natural gas                         | 1    | 2,075  | 2,967  | 3,765  |
| Production of electricity from biofuels and waste | 0    | 0      | 0      | 15     |
| Production of electricity from fossil fuels       | 1    | 2      | 2      | 0      |
| Production of nuclear electricity                 | -    | -      | -      | -      |
| Production of hydro electricity                   | 760  | 1,140  | 1,431  | 1,527  |
| Production of geothermal electricity              | -    | -      | -      | -      |
| Production of electricity from solar, wind, Etc.  | 0    | 0      | 0      | 1      |
| Total production of electricity                   | 761  | 1,142  | 1,432  | 1,543  |
| Refinery output of oil products                   | -    | -      | -      | -      |
| Final Consumption of coking coal                  | 3    | 0      | 5      | 22     |
| Final consumption of oil                          | 434  | 499    | 693    | 767    |
| Final consumption of natural gas                  | 0    | 17     | 70     | 84     |
| Final consumption of electricity                  | 180  | 786    | 917    | 1,325  |
| Consumption of oil in industry                    | 29   | 76     | 97     | 116    |
| Consumption of natural gas in industry            | 0    | 17     | 70     | 78     |
| Consumption of electricity in industry            | 38   | 669    | 737    | 742    |
| Consumption of coking coal in industry            | 0    | 0      | 3      | 24     |
| Consumption of oil in transport                   | 305  | 479    | 534    | 613    |
| Consumption of electricity in transport           | -    | -      | -      | -      |
| Net imports of coking coal                        | -12  | -11    | -14    | -1,744 |
| Net imports of crude oil, NGL, Etc.               | 781  | -20    | -28    | -32    |
| Net imports of oil product                        | 437  | 502    | 735    | 833    |
| Net imports of natural gas                        | 0    | -2,055 | -2,838 | -3,507 |
| Net imports of electricity                        | -558 | -207   | -305   | -137   |

- : Data not applicable

(AFREC, 2015)

0 : Data not available

(P): Projected

### Oil and natural gas

In 2011, there were 127 bcm of proved recoverable natural gas reserves (WEC, 2013).

### Peat

There is 575 km<sup>2</sup> of peatland (WEC, 2013).

### Coal

Although Mozambique has some coal reserves (140 million TJ) these are not currently being fully exploited (Table 3) (WEC, 2013).

**Table 3: Mozambique's coal reserves and production**

| Country        | Coal reserves | Production |
|----------------|---------------|------------|
| Mozambique     | 212           |            |
| Rest of region | 357           | 2          |
| Africa total   | 31 617        | 255.4      |

Source: (WEC, 2013)

### Wind

There is a dearth of data to support wind energy exploitation. To that end measurements are being taken and will culminate in the production of a national wind power potential map (REEEP, 2012).

### Solar

Mozambique's solar potential is largely unexploited but has been used to extend rural electrification through isolated systems. The incident solar radiation per year across the country is just under 1.5 million GWh (REEEP, 2012). Production of electricity from solar and wind was 1 ktoe in 2015 (AFREC, 2015).

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

Mozambique has a very low electrification rate, but has been working to address this. By 2012, the national access was 20.2 per cent, with 5.4 per cent in rural areas and 54.5 per cent in urban areas (Table 4 and Figure 4). National access to non-solid fuels in 2012 was 3.80 per cent (World Bank, 2016). Disaggregated by location it was 2 per cent in rural areas and 10 per cent in urban areas (World Bank, 2015).

Mozambique's energy intensity changed at a compound annual growth rate (CAGR) of -3.76 per cent over the 20 years between 1990 and 2010 and at -4.28 per cent CAGR from 2010 to 2012. Between 2010 and 2012, the Mozambican economy's energy intensity (the ratio of the quantity of energy consumption per unit of economic output) decreased from 19.5 MJ to 17.9 MJ per US dollar (2005 dollars at PPP) (World Bank, 2015).

The share of renewable energy in total final energy consumption (TFEC) decreased from 93.1 to 88.4 per cent between 1990 and 2012. In 2012, traditional biofuels formed the biggest share of renewable sources at 66.7 per cent, followed by hydro at 12.5 per cent and modern solid biofuels at 9.1 per cent of TFEC (World Bank, 2015). Renewable sources contributed 89.8 per cent of the share of electricity capacity and 99.9 per cent of the electricity generated in 2012 (World Bank, 2015).

**Table 4: Mozambique'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                          | 6    | 7    | 15   | 20.2       |           |             |
|  | 7.1.2 Per cent of population with primary reliance on non-solid fuels            | 2    | 2    | 4    | 3.80       |           |             |
| 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               | 93.1 | 92.5 | 89.6 | 88.4       |           |             |
| 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) |      |      | 2.3  | 2.3 (2011) |           | 2.54 (2013) |
|  | Level of primary energy intensity(MJ/\$2005 PPP)                                 | 42.1 |      | 19.5 | 17.9       | 18.9      | 17.91       |

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   |
|---|---|---|---|
| 20.2%   | 3.8%  | 2.62  | 88.44%  |
|  |  |  |  |

**Table 5: Mozambique's key aspects/key mitigation measures to meet its energy Intended Nationally Determined Contributions (INDCs)**

| INDC  |
|---|
| *Implement National Climate Change Adaptation and Mitigation Strategy (NCCAMS) (2013 to 2030)     |
| *Implement the Energy Strategy (which needs to be updated and approved by 2016)                   |
| *Implement Biofuel Policy and Strategy  |
| *Implement New and Renewable Energy Development Strategy (2011 to 2025)                           |
| *Adopt Conservation and Sustainable Use of the Energy from Biomass Energy Strategy (2014 to 2025) |
| *Adopt the Master Plan for Natural Gas (2014 to 2030)   |
| *Implement Renewable Energy Feed-in Tariff Regulation (REFIT)                                     |
| *Implement the Mozambique's Integrated Urban Solid Waste Management Strategy (2013 – 2025)        |
| *Create and launch the Renewable Energy Atlas for Mozambique                                      |
| *Build and manage two solid waste landfills for the recovery of methane                           |
| *Implement the Project of Urban Mobility in the Municipality of Maputo                            |

Source: (MEM, 2015)

**Table 6: Mozambique'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 Energy   |
| Fundo Nacional de Energia (FUNAE) 1997 for rural electrification   |  |
| National Directorate of New and Renewable Energy (DNEE)  |  |
| Presence of a Functional Energy Regulator  | National Energy Council (CNELEC) 2004  |
| Ownership of sectoral resources and markets (Electricity/power market; liquid fuels and gas market)  | Electricidade de Mocambique (EDM)  |
| Level of participation in regional energy infrastructure (Power Pools) and institutional arrangements  | Southern Africa Power Pool   |
| Environment for Private Sector Participation   |  |
| Whether the Power Utility(ies) is/are vertically integrated or there is unbundling (list the Companies)  |  |
| 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)       | Empresa Nacional de Hidrocarbonetos de Mocambique (ENH)  |
| Extent to which Downstream services and operations are privatized or state-owned, or a mixture (extent)  | National Directorate of Fuel (Direcção Nacional de Combustíveis)   |
| Presence of Functional (Feed in Tariffs) FIT systems   |  |
| Presence Functional IPPs and their contribution  | Hidroelectrica de Cahora Bassa (HCB) (but government owns 82 per cent of it)   |
| Legal, Policy and Strategy Frameworks  |  |
| Current enabling policies (including: RE; EE; private sector participation; & PPPs facilitation) (list 5 max) most critical ones   | <ul style="list-style-type: none"> <li>• Energy Policy (1998)</li> <li>• Energy Sector Strategy (2000)</li> <li>• Electricity Master Plan for Development of the National Grid 2005-2019</li> </ul>      |
| 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>• Ministerial Law No. 20/97, which is the Organic Act for the National Directorate for Electrical Energy (DNEE)</li> <li>• Electricity Law (No. 21/97)</li> </ul> |

This table was compiled with material from (REEEP, 2012) and (Hivos and Practical Action, Undated)

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

Mozambique is vulnerable to the impacts of climate change and is already been subject to significant natural disasters. For example, it is estimated that the impacts of natural disasters between 1980 and 2003 cost about US\$1.74 billion (ROM, 2015). The government aims to increase community and economic resilience to climate risks and promote low-carbon development and a green economy. To that end, the government formulated its Intended Nationally Determined Contributions (INDC). Those related to energy are listed in Table 5.

## Institutional and Legal Framework

The Ministry of Energy is in charge of energy sector policy issues while the National Directorate for Electrical Energy (DNEE) is in charge of technical issues. The energy regulator is the National Electricity Council (CNELEC) created in 2004. The *Electricidade de Mocambique* (EDM) is the sole generator, transmitter and distributor of electric energy. On a regional level, the country is a member of Southern Africa Power Pool. The legal framework is provided by the Electricity Law (No. 21/97). The main sector policy is the Energy Policy (1998), which is clear on the need for energy security and efficiency (Table 6).