



Country energy information Ethiopia

September 2006

SIXTH FRAMEWORK PROGRAMME PRIORITY 3

Underpinning the economic potential and cohesion of a larger and more integrated EU

SPECIFIC SUPPORT ACTION

Project Acronym: RECIPES

Project full title: Renewable Energy in emerging and developing countries: Current situation, market Potential and recommendations for a win-win-win for EU industry, the Environment and local Socio-economic development

Contract number: 513733

Start date of contract: 1st January 2005

Introduction

The information in this report was gathered from publicly available sources (the source list is available at www.energyrecipes.org), like surveys, statistical data from the internet and books and other publications. The information consists of:

1. indicators and indices;
2. descriptions of the relevant energy items/subjects /themes.

Due to differences in availability of data per country the level of detail of these reports will differ.

For all the 114 developing and emerging countries of the INCO list a report like this is available. (see also www.energyrecipes.org for the countries) Except for the following 15 countries, where more detailed reports are available.

Argentina	China	Cameroon
Brazil	India	Ghana
Colombia	Indonesia	Niger
Mexico	Pacific Islands	South-Africa
Peru	Thailand	Uganda

The RECIPES project

The RECIPES project aims to contribute to the implementation of renewable energy in emerging and developing countries. The RECIPES project is financed under the 6th Framework Programme for Research and Technological Development of the European Commission.

The main objective of the RECIPES project is to provide the European Commission and other stakeholders with pragmatic information and recommendations facilitating appropriate action to further the implementation of renewable energy in emerging and developing countries, taking into account:

- | The effects on the local socio-economic situation.
- | The competitive position of European renewable energy industry.
- | The impacts on the local and global environment.

Data collection on the situation and potential of renewable energy in emerging and developing countries is the core of the RECIPES project.

An identification of the RE market potential is carried out for 15 developing and emerging countries. Local experts gathered data for all of these countries. The results of these in-depth studies are extrapolated to 99 other developing and emerging countries for which data is gathered through desk research.

See the RECIPES website (www.energyrecipes.org) for relevant data collected and reports produced.

Environmental problems

Deforestation; overgrazing; soil erosion; desertification; water shortages in some areas from water-intensive farming and poor management

Environment - international agreements

Party to: Biodiversity, Climate Change, Desertification, Endangered Species, Hazardous Wastes, Ozone Layer Protection

signed, but not ratified: Environmental Modification, Law of the Sea

Energy situation

Most traditional energy sources are used for cooking and lighting, and thus energy consumption is dominated by the domestic sector, which represents 89 per cent of energy consumed, mostly rural homes. Ethiopia has significant oil and gas reserves which are not being exploited.¹⁴

The vast majority of Ethiopia's existing capacity (85%) is hydroelectric. The Ethiopian Electric Power Corporation (EELPA) plans to construct several new generating facilities to provide electricity to Ethiopia. Currently, less than half of Ethiopia's towns have access to electricity though EELPA electrified more than eighty towns between 2001 and 2003. Since most of Ethiopia's electricity is generated from hydroelectric dams, the country's power system is vulnerable to extended droughts. EELPA is currently constructing many more hydroelectric plants to supply power to currently unelectrified households.²

The only geothermal area exploited for electricity production in Ethiopia is Aluto-Langano, where eight deep wells (about 2,500 m) have been drilled, four of them productive (Teklemariam and Beyene, 2005). It is located on the floor of the Ethiopian Rift Valley about 200 km south east of Addis Ababa. The maximum reservoir temperature is about 350° C. The potential of the field has been evaluated up to 30 MW for 30 years.¹²

There are a few small, mini and micro hydro plants in operation, and numerous potential sites. About 10 per cent of the economically feasible potential is thought to be suitable for small scale developments. EELPA has about ten small hydro plants in operation, with a total capacity of about 18 MW, and had planned to construct about 25 small hydro projects between 1990 and 2000. Small hydro could provide considerable help to the country, by meeting the power deficit in the main interconnected grid system, substituting thermal plants in the main grid or isolated grids, helping reduce fuel imports and electrifying remote rural

areas.¹⁴

Energy sector organisation

The Ethiopian Electric Light and Power Authority, known as the EELPA, is responsible for electricity generation and supply in Ethiopia. The EELPA operates an interconnected transmission grid centring on Addis Ababa. A subsidiary of the EELPA, the Eritrea Region Electric Supply Association, operates isolated generating facilities.¹⁴

Renewable energy potential

A 7.3 MW pilot binary geothermal plant was installed in 1999. It is not fully operational for lack of operational experience. The next five-year plan of the government includes the rehabilitation of the Aluto-Langano geothermal pilot plant, and the possible installation of an additional 20 MW unit if financial support could be available.

Another area of the country where geothermal development can be carried out is the Tendaho field, where three deep wells (2,100 m) found a temperature of over 270° C.¹²

The country's gross theoretical hydro potential has been calculated as 650 000 GWh/year, and the technically feasible potential is estimated at more than 250 000 GWh/year (these figures include Eritrea). 60 percent of the water in the Nile River is supplied by the Blue Nile, which originates in the highlands of Ethiopia. A study in 1982 estimated the economically feasible hydro potential to be between 15 and 30 GW. Development of the major rivers is still at the planning stage.

Despite the vast opportunities for hydropower development the country suffers from serious shortages of electricity due to slow development of hydro. Several large plants are required, but there are severe financial limitations.¹⁴

Renewable energy

EthiopiaUnit

General		
Population (2005)	73053286	
Country area	1127127	km ²
Total density of population (people/km2)	65.000	capita/km ²
Growth of people % /year	2.360	%
Land use arable (%)	10.710	%
Land use perm crops (%)	0.750	%
Percentage of total people living in cities	15.400	%
HDI (2002)	0.359	

Social		
Illiteracy	42.700	%
Year of estimation	2003	
Corruption (CPI 2003) 0=high 10=low	2.500	
GDP in ppp mostly \$ 2004 est	54.89	billion

Economic		
Income /capita \$ mostly 2004	800	
Variability of income/capita GINI index (2004)	30.000	
Population below poverty line	50.000	%
Year of estimation	2004	
Total External Debt in % GDP (2004 est.)	0.000	%

Inflation rate (consumer prices) (%)	2.400	%
Year of estimation	2004	
Growth of economy	11.600	%
Year of estimation	2004	
EDI energy development index	0.037	

Energy development

Percentage of people connected to the grid (electricity)	2.600	%
Traditional fuel consumption (% of total energy requirements 2002) . Estimated consumption of fuel wood, charcoal, bagasse (sugar cane waste) and animal and vegetable wastes.	95.200	
Oil consumption	23000.000	bbl/day

Fossil fuel consumption

Year of estimation	2001	
Coal consumption (Million Short Tons)	0.000	millions short tonnes/year
Natural gas consumption, year 2001 if not mentioned others		
Nuclear power production (Billion Kilowatthours) 2003	0.000	billion kWh/year
Hydro electricity capacity (2003)	0.635	million kilowatts

Renewable energy situation

Geothermal, Solar, Wind, Wood and Waste Electricity Installed capacity (2003)	0.000	million kilowatts
RE biomass production of primary energy from combustible Renewables and Wast TJ/Year 2002	765091.000	
RE energy electricity consumption (2003)	0.001	billion kWh/year
Total Primary Energy Supply 2000	217.490	billion kWh/year
Share of total renewables in % of TPES 2000	93.900	%
Share of renewables excluding combustible renewables and waste in % of TPES 2000	0.800	%
TPES 2003	238.400	billion kWh/year
Share of Renewables in TPES % (2003)	92.200	%
Hydro (2003)	1.000	%
Geothermal, Solar, Wind, Tide (2003)	0.000	%
Combustible Renewables and Waste (2003)	99.000	%
Total kWh per capita	3359.000	

Energy consumption for various sectors

Industry	2.000	%
Transportation	4.000	%
Agriculture	0.000	%
Commercial and public services	0.000	%
Residential	2.000	%
Other purposes	92.000	%
Total oil production	0.000	bbl/day

Energy production

Total coal production (Million Short Tons)	0.000	millions short tonnes/year
Total natural gas production		
Total Electricity Production GWh	2045.000	GWh

Electricity

Electricity production from coal %	0.000	%
Electricity production from oil %	1.000	%

Electricity production from gas %	0.000	%
Electricity production from biomass %	0.000	%
Electricity production from waste %	0.000	%
Electricity production from nuclear %	0.000	%
Electricity production from hydro %	99.000	%
Electricity production from geothermal %	0.000	%
Electricity production from solar thermal and PV %	0.000	%
Electricity production from other sources %	0.000	%
Electricity consumption GWh (2003)	1914.000	GWh
Total final electricity consumption GWh (2002)	1702.000	GWh
Electricity used by Industry % (2002)	41.000	%
Electricity used by Transport % (2002)	0.000	%
Electricity used by Agriculture % (2002)	0.000	%
Electricity used by Commerce and Public Services % (2002)	23.000	%
Electricity used by Residential % (2002)	35.000	%
Electricity used by Other Non-Specified % (2002)	1.000	%
Electricity used by Non-Energy Use % (2002)	0.000	%