Energy Policy of Ethiopia

Ministry of Water and Energy

Country Report

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Background

Ethiopia is located in the Horn of Africa, with a territory of 1.04 million sq. kilo meters. Biomass fuels (fire wood, agricultural and animal wastes) and hydropower, is considered the main indigenous energy sources in Ethiopia.

Biomass fuels are the principal energy sources; which are used mainly for cooking in household. In Ethiopia biomass energy covers over 90% of the total energy consumption as it is available for and affordable to majority of the people.

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Hydropower contributes significantly to the electric generation; 1843 mega watt (MW), representing about 90% of the total electric city generation and the rest is From others, such as, solar, diesel and geothermal. Different studies indicate that, Ethiopia has about 45,000MW hydropower potential; and the land scope /mountains feature/ and hydrological conditions enables the country to generate hydropower at lower cost relatively.

Energy situation in Ethiopia

Energy resources potential

Energy resource	Exploitable potential
Woody biomass	767 million tons
Crop residue + animal waste	38 million ton/year
hydropower	45,000 MW
solar	5-6.5 kwh/M²/day
wind	3.5 – 5.5 M/S
Geothermal	5,000 - 7,000MW
coal	70 million tons
Natural gas	7. TCF (Terra Cubic Feet)

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Energy resources exploitation potential

- Hydro little exploited - 4.4%
- Biomass - uneconomical exploited
- Solar, wind, geothermal - contribute almost nothing to the energy economy
- Coal and natural gas - contribute noting to the energy consumption (share)

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Estimated Fuel wood supply and demand(million M^3			
year	Demand	Sustainable supply	Deficit
1997	52.9	11.7	41.2
2000	58.4	11.2	47.2
2005	68.5	10.4	58.1

Source: Ethiopian forestry action plan, 1996

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Petroleum products supply and consumption (tons)

year	total supply T	consumption
2007/08	1,881,272	1,880,308
2008/09	2,013,089.349	na
2009/10	2,035,265.445	na

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Energy supply:

The energy sources of Ethiopia is classified in two big blocks; traditional and modern energy.

a. Major supply sources	Minor supply sources
Traditional (>90%)	Modern (<10%)
Biomass (wood, charcoal, cow dung, agricultural residue)	Electricity
	Petroleum products
a. utilization	Utilization
Inefficient/much loss (over 85%)	Relatively efficient /significantly losses eg. Electricity over 10%

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Fuel use by sector

Sector	Energy/Fuel type		
	biomass	petroleum	Electricity
household	98.6	1.1	0.3
service	94.3	1.3	4.4
industry	75.7	17.3	7.0
transport		100	
agriculture		100	

Energy sector issues

- Biomass fuels have become difficult and time consuming to collect in rural areas; and more expensive in urban areas.
- Employing energy wasteful three stone open fires coupled with the fast population grows aggravated the biomass fuel crisis.
- Over exploitation of natural forest resources for firewood; results climate change, loss of biodiversity and productivity.
- The impact of increasing foreign currency spent for importation of petroleum products on national economy and foreign exchange availability;

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- The need to provide access to modern energy for the rural peoples/to shift from traditional to modern energy sources/ which demands heavy investment in terms of foreign currency and local resources.
- Lack of access to modern energy in rural areas
- Low efficiency of energy utilization in all sectors
- An increasing investment needs for modern energy

Objectives, rationales & priorities of energy policy

Ethiopia has energy policy document drafted in 1994.
The policy document has encouraged the use of indigenous resources and renewable energy.
Now a day, Ministry of Water and Energy of Ethiopia is an organization responsible to development of energy resources, implementation strategies, polices, sector laws ….

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Rationales of energy policy

- To develop and utilize the existing potential resources on the basis of overall development strategy of the country;
- To promote the development of renewable/alternative energy sources and technologies to secure energy supplies and reduce the use/dependency of fossil as well as traditional energy resources;
- To reduce unnecessary losses of energy resources and to ensure that energy is efficiently utilized;
- To support other economic sectors to meet their development objectives by putting in place a clearly defined energy policy; and
- To develop the efficiency and capacity of the energy sectors for improving implementation capabilities of the energy development program of the country.

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Objectives of energy policy

- To ensure sustainable and a reliable energy supply at the right time and affordable price, to support the development strategy of the country and create access to modern energy;
- To remove problems faced in the development and utilization of energy resource, and give priority to the development of indigenous energy resources;
- To set guidelines and strategy for the faster development and supply of energy;
- To increase energy utilization efficiency and reduce energy waste; and
- To ensure that the development and utilization of energy is friendly to the environment.

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Priority of the energy policy

- The development of hydropower resources is the priority focus of the government for modern energy supply, due to availability of high potential of hydropower suitable to generate electricity at lower cost relatively;
- Energy mix is encouraged for supply diversification, and renewable energy such as solar, wind and geothermal are to be developed given their cost competitiveness;
- To take appropriate energy policy measures to achieve a gradual transition from traditional to modern fuels;

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- To set issues, and publicize standards and codes which will insure that energy is used efficiently;
- To develop human resources and establish competent energy institutions;
- To provide the private sector with necessary support and incentive to participate in the development of the country's energy resources; and
- To pay due and close attention to ecological and environmental issues during the development of energy projects.

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Reasons for renewable energy

- A large segment of the population is still without modern energy services; thus, demand is expected to grow rapidly in the future;
- Suitable for decentralized application;
- Non-renewable energy resources are limited in Ethiopia; whereas, renewable energy availability is relatively high;
- The contribution of renewable energy to the total energy use is still too low.
- To save hard currency, that needs to import petroleum/fossil fuels
- To increase energy security in diversifying the energy supply;
- To minimize environmental degradation/environment-friendly

Energy development

Ethiopia is imported fossil fuel fully for transportation and to some extent for household cooking and lighting energy needs. Economic growth of the country results to increasing this and other types of energy use. To reduce the challenges and to moderate the growth of energy demand, the Government of Ethiopia is looking for renewable/alternative energy development, such as hydropower, geothermal, bio-fuel, solar, wind.

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Development of hydropower

- The economy of the country grows by 11% annually for the last 5 years. The development of countries economy demands high energy.
- Thus, the electric power consumption increased about 25% annually with emerging economies of the country.
- To meet this energy needs, only for the last three years the government is undertaken a construction of three new power plants with generation capacity of 1180 MW; and
- Ethiopian Government is planning to enhance the current 2,000MW generation capacity and 41% access to electricity to 10,000MW and 75% respectively in the next five years of growth and transformation period.

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Power generation projects (2011-2015 physical years):

No.	Projects	Sources of energy	Installed capacity MW	status
1	4	hydro	7471	Under construction
2	7	hydro	1320	committed
3	1	wind	120	Under construction
4	6	wind	752	committed
5	1	geothermal	70	committed
6	3	Co-generation /sugar factory	104	committed

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Development of solar energy

- The Government of Ethiopia looking for this alternative energy sources to address the energy needs of the rural peoples living in scattered villages.
- Thus, several measures and techniques have been employed to implement this alternative energy sources; such as duty free importation for PV technology.
- Solar energy is currently used to electrify public sectors and installing solar home system in rural areas, where there is no access to hydropower.

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Wind

The country has exploitable potential of 10,000 MW of wind energy. Currently 120 MW plant is being constructed in the northern part of the country. Wind speed measurements from metrological service – Ethiopia; as

Source: A.A University, faculty of technology, study of feasible options for rural electrification in Ethiopia final report part II, August 2001.

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station	V_0 (m/s) at 2m AGL	V' (m/s) at 20m AGL
Addis Ababa	3.9	7.0
Awash	3.8	6.9
Dire Dawa	3.6	6.5
Debre Ziet	2.9	5.2
Gode	3.3	5.9
Gondar	4.2	7.6
Gore	2.9	5.2
Jijiga	3.2	5.8
Jimma	3.2	5.9
Kebrri Daaher	3.1	5.6
Mekelle	3.5	6.3
Neghelle	3.4	6.1

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Bio-fuel

- To reduce petroleum imports, government of Ethiopia is started to produce ethanol from sugar factory and blend it with gasoline.
- The expansion plan of existing sugar factories and development of the new ones in the next five years the production capacity of ethanol may reach 181 million liters per year.
- Beside to production of ethanol, the government of Ethiopia is planning to establish Cogeneration schemes at sugar factory.

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Biogas

- Ethiopia has around 27 million cattle; principally sufficient to provide feedstock for two million family size biogas digester.
- Up to 2015 physical year, Ministry of Water and Energy planned to introduce 25,000 domestic and 1,000 institutional biogas digesters for generation of cooking energy and largely improved fertilizers.

Energy efficiency and conservation measures

To reduce unnecessary energy wastage, it is necessary to

adopt energy conservation and efficiency measures in all

sectors. Some of the measures need to be taken:-

- To give more focus on improving the efficiency of existing energy endues devices to use energy resources efficiently;
- Formulate an enforcement policies and regulations; in order to promote energy efficiency and conservation in all sectors.

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Some of the measures that had been taken were:

Biomass energy, which covers the majority energy consumption of the country, is used in a very wasteful way. Highly dependence and inefficient utilization of biomass energy have resulted in depletion of forest resources in Ethiopia, while the use of energy wasteful three stone open fire stove has been linked to indoor air pollution and poor health.

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- To minimize this effect, through the development of fuel saving stoves (Mirt & Gonzie …); conservation of biomass resources have been success fully implemented. In past five years period of time about three million fuel saving biomass stoves were introduced throughout the country.
- In the coming five years (2011 – 2015 physical years), Ministry of Water and Energy is planning to enhance the dissemination figure of fuel wood energy saving stoves to nine millions.
- Dissemination of 10,000 Mirt stoves means:

✓ Fuel wood saving of up to 6,000 tons per annum;

✓ A considerable reduction in net carbon emission, because less wood burnt; …

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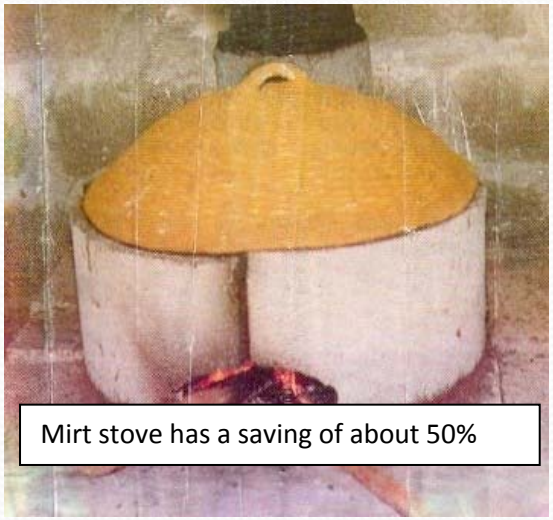
Compared to traditional three stone open fires:



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- To minimize electricity losses, the government of Ethiopia is started to change incandescent lumps and substitute with compact florescent lump (CFL).

Shortcoming of the policy

- Shortage of qualified person for formulating proper policies for the various energy sub-sectors;
- Insufficient assessment of energy resources and technologies; and
- Lack of timely updating

Participants interest area in this training:

- Energy policy and strategy formulation
- Energy demand and supply projection techniques and methodologies
- Designing an enforcement policy and regulations, to promote energy efficiency and conservation.

This will help us to recognize possibility of improving the efficiency of existing energy utilization and design sustainable energy development strategy.

Renaissance Hydropower Project

- 5250 MW
- 15177 GWh/year
- 66 billion m^3 of water storage capacity

Thank you

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