What Cost Ethiopia's Dam Boom?

A look inside the Expansion of Ethiopia's Energy Sector

INTERNATIONAL RIVERS
people • water • life

Terri Hathaway
February 2008

Contents **Page**

Acknowledgements

International Rivers is thankful for the financial support from CEE Bankwatch which allowed us to participate in a joint field visit to Ethiopia with Campagna per la Riforma della Banca Mondiale (CRBM) in November 2007. I thank Caterina Amicucci of CRBM for her persistence and patience during our travel together and during the preparation of our reports, and for providing significant analysis of the involvement of Italian and European actors in Ethiopia's energy sector. I also thank Lori Pottinger for her assistance in editing this report.

I further thank those officials from the Government of Ethiopia, EEPCo, and those from the Ethiopian academic community who shared vital information, documents and insight during our field visit. Finally, I would like to thank those individuals resettled for Gilgel Gibe I Dam with whom we met. Their story is a frustrating continuation of the injustice afflicted on communities affected by large dams. We hope this report may help bring awareness and justice to their situation, and help prevent other Ethiopian communities from bearing the costs of Ethiopia's dam boom.

Cover Photos: (Top L to R) Resettlement Site 8 from Gilgel Gibe I Dam; Water release from Gilgel Gibe I Dam; Salini's project office for Gilgel Gibe III Dam. (Below) A high voltage transmission line runs above a household yet to be connected to the electricity grid.

Report Summary

The Government of Ethiopia faces the daunting challenge of providing energy to fulfill the needs of its people and support much-needed economic growth. Ethiopia's electricity master plan wants to increase supply five-fold over the next five years, based almost exclusively on large hydropower dams. A large proportion of the new supply, which cannot be fully absorbed by the domestic market, is earmarked for regional export. Ethiopia's boom in hydro dam development could lead to major social, environmental and economic harm unless safeguards and safeguard compliance are both drastically improved. The following challenges are prominent:

- Government institutions which are supposed to provide checks and balances to the energy sector lack the ability to enforce compliance with environmental and other safeguards, and report a lack of adequate personnel and financial resources to fulfill their missions. The energy sector also lacks public accountability, and civil society groups fear government repression should they attempt to criticize the energy sector.

- The quantity of financial investments needed to implement the Government's energy plans, especially in the form of commercial loans, will increase the country's debt burden; the Government has yet to implement a strategy to manage its public debt. The economic risk of new hydro dams is increased by Ethiopia's already high level of hydro-dependence in its energy sector and the sector's vulnerability to drought.

- Communities affected by dams lack any mechanism to effectively address their grievances regarding resettlement, compensation and/or other local impacts, and to legally protect their rights.

- The Gilgel Gibe III Dam does not comply with existing domestic safeguards. The awarding of the project contract was given a questionable exemption from domestic procurement requirements and does not comply with contract procurement guidelines of most of the sector's major donors. As is, this dam will likely cause significant environmental, social and economic damage.

1. Introduction

Ethiopia is home to an estimated 80 million people (10% of sub-Saharan Africa's population), and growing; the population is set to double in the next 40 years.[1] The country has one of the world's lowest rates of access to modern energy services, and relies primarily on traditional biomass to fulfill its energy needs. According to the World Bank, only 12% of Ethiopians have access to electricity, and there is a great disparity between the access rates of urban and rural residents: while 17 of every 20 Ethiopians live in rural areas, only 2% of rural residents have access to electricity, compared to 86% of urban residents.[2]

The government of Ethiopia is embarking on an unprecedented program of new electricity-sector developments. However, the current energy plan is limited almost entirely to developing large hydropower dams, including a power surplus for export. While increasing access to modern energy services is vital to poverty alleviation in Ethiopia, the current generation and grid expansion plan goes far beyond projected growth in domestic demand, raising concerns about the prioritization and financial risk of developing numerous hydropower dams simultaneously. Although Ethiopia has had billions of dollars of its external debt burden cancelled in the last few years, substantial spending on hydro dams for power export increases the likelihood of Ethiopia accumulating a new, unsustainable debt. Ethiopia's power sector is already over 85% dependent on hydropower and could grow to over 95% dependent if all hydropower dams under construction are commissioned. Such high dependence on hydropower increases the economy's vulnerability to drought, a vulnerability regularly faced by the agricultural sector. In times of drought, domestic power or power exports (or both) could be affected.

Above: The road passing over Gilgel Gibe River, near the Gilgel Gibe I Dam.

The government's hydro-based expansion will not fulfill some of the most pressing energy needs of Ethiopians, in particular, the need for alternative cooking fuels across the country and lighting in rural areas which will not be targeted by the current grid

[1] Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, 2005. World Population Prospects: The 2004 Revision. Dataset on CD-ROM. New York: United Nations. Available online at: http://www.un.org/esa/population/publications/WPP2004/wpp2004.htm.

[2] Percent of population with access to electricity is based on data from two sources: 1) the World Bank's (2008) *2007 Little Data Book on Africa*, available online at: http://siteresources.worldbank.org/INTSTATINAFR/Resources/LDB_Africa_final.pdf; and 2) United Nations, Department of Economic and Social Affairs, Population Division. 2006. *World Urbanization Prospects: The 2005 Revision*. Available on-line at: http://esa.un.org/unup/.

expansion. Yet the capital needed for these large dams is likely to impact available funding for more appropriate modern energy services to meet these needs.

Without adequate attention to environmental safeguards, downstream flow requirements, and monitoring programs, new large dams will exacerbate the poor health of many of Ethiopia's watersheds.[3] Poor land use management and population pressure are already quickly degrading many of the country's fragile watersheds. Only 7% of Ethiopia's original forestland remains and the country loses an estimated one billion tons of topsoil every year.[4] Much of the deforestation is due to expansion of crop and grazing lands and wood-based energy consumption. Approximately 85% of the population participates in the agricultural sector, which accounts for nearly half of Ethiopia's GDP and 90% of its exports. Rural, small-scale farmers form virtually the entire sector. Traditional biomass, which accounts for 95% of Ethiopia's energy consumption, is another major factor in deforestation trends. The result has been rapid soil degradation, massive erosion, and sedimentation in the country's watersheds, causing a reduction of water in rivers and underground aquifers. Water quality in many areas has also been dramatically affected by human waste.

Above (L): Agriculture is the primary economic activity for 85% of Ethiopians. (R): Population pressure is driving farmers into hilly terrain, increasing deforestation and erosion.

The country has a history of development-based resettlement programs. In 1984, the Derg regime attempted to resettle up to 1.5 million people from the drought-prone north to the south and southwest, including around the Omo River Basin. In 1985, the government undertook a villagization program and by 1986 the government had relocated 4.6 million people. However, these programs did not fulfill their development objectives and failed to improve or even restore the quality of life for most displaced households. The more recent Agricultural Development Led Industrial (ADLI) strategy, also known as the Ethiopian Road Map, included a three-year "voluntary" resettlement program launched in 2003 for farmers from the northern highlands, which has been criticized for its poor implementation. Resettlement for large dams has not improved upon this record: a visit to the Gilgel Gibe I Dam

[3] While this report is focused on the energy sector, there are numerous large dams planned particularly for large-scale irrigation projects. These projects share many of the same ecological, social and economic risks as those of hydropower dams. Tendou Dam is one such dam for large-scale irrigation which poses a number of risks and could have damaging impacts without proper project safeguards.
[4] Brown, Lester R. 2003. *Plan B: Rescuing a Planet Under Stress and a Civilization in Trouble*. New York: W.W. Norton & Co. Available at: http://www.earth-policy.org/Books/PB/PBch3_ss2.htm.

resettlement communities shows that beyond the initial move, the government is not yet addressing the problems caused by resettlement.

The development of hydropower is a heavily politicized issue in Ethiopia, where colonial-era water use agreements for the Nile Basin are seen by many Ethiopians to have stymied the country's right to earlier development of a hydro-based economy. Ethiopia is cited as having the second highest potential for hydro capacity in Africa (30,000 MW) and over 300 sites have reportedly been identified for possible future development. Ethiopia's right to develop its vast hydropower potential, which has long been obstructed by external governments, is expressed by many as an issue of national sovereignty and a prerequisite to the nation's development.

In November 2007, a field visit to Ethiopia was conducted by two international non-governmental organizations, Italy-based Campagna per la Riforma della Banca Mondiale (CRBM) and US-based International Rivers. The purpose of the field visit was to learn more about Ethiopia's national energy sector and Gilgel Gibe III Dam in particular. The visit raised concerns about the lack of checks and balances in the energy sector, highlighted by irregularities surrounding the Gilgel Gibe III Dam project planning and procurement process. This report is based on data gathered from interviews and meetings in Ethiopia and additional, publicly available information to provide a broad picture of the hydro-based Ethiopian energy sector in terms of decision-making and financing, and offers a summary of key challenges the sector faces while carrying out its expansion plan.

2. Ethiopia's Energy Sector

Ethiopia's national energy policy identifies hydropower as the backbone of its sectoral development strategy. Eight hydropower dams account for over 85% of Ethiopia's existing 767 MW of grid-based generating capacity (see Table 1).[5] Five additional hydropower sites with a combined capacity of 3,125 MW are currently under construction (see Table 2). Two of those sites, Tekeze (300 MW) and Gilgel Gibe II (480 MW), will likely be commissioned in 2008, doubling the existing national capacity. The government is attempting to fast-track many of the projects outlined in its master plan.

In 2005, the Government of Ethiopia released an aggressive, 25-year national energy master plan. The plan was based on a study prepared by Canadian based firm, Acres International, in 2003. The plan is updated annually and allows EEPCo great flexibility to easily integrate new projects. One such project is Gilgel Gibe III Dam, which only received industry and local media attention in 2006 once the construction contract was signed, signaling that the project concept is very young. The plan requires an investment of US$3.4 billion by 2015, 70% of which is earmarked for new power generation.[6] However, the plan excludes from its investment requirements those costs related to "distribution, rural electrification and network reinforcement resulting from demand growth," all of which are needed to expand domestic access.

[5] This data represents the capacity of Ethiopia's main grid, known as the Interconnected System (ICS). The Self-Contained System (SCS) is comprised of diesel and micro-hydro and has 30 MW of installed capacity.

[6] This amount does not include the committed investments of Tekeze, Gilgel Gibe II and Tana Beles dams as well as 23 transmission lines and 26 substations.

Such investments as the Universal Electricity Access Program and the Rural Electrification Fund (both discussed later) are *in addition* to the Master Plan.

Table 1. Existing Hydropower Plants in Ethiopia

	Hydropower Plant	Installed Capacity (MW)	Dependable Capacity (MW)	Average Energy (GWh)	Year of Original Commission
1	Koka	43.2	38.4	110	1960
2	Tis Abbay I	11.4	11.4	85.2	1964
3	Awash II	32	32	165	1966
4	Finchaa	134	128	640	1973
5	Awash III	32	32	165	1974
6	Melka Wakena	153	153	543	1988
7	Tis Abay II	73	68	282	2001
8	Gilgel Gibe I	192	184	847	2004
	TOTAL	670.6	646.8	2,837.2	

Source: Table 3.3. from EEPCo's *Power System Expansion Master Plan Update*. June 2006

Table 2. Hydro Power Plants Currently Under Construction in Ethiopia

Dam, Location	MW	Cost / Financiers	Construction Began	Estimated Commission Date	Contractor
Tekeze, on the Tekeze River, a tributary of Atbarah River, tributary of the Nile	300	$350 million China Exim Bank ($50 million)	Aug 2002	2008 (originally June 2006)	China National Water Resources & Hydropower Engineering Corporation (49%); China Gezhouba Water and Power (30%); Ethiopian Sur Construction (21%).
Gilgel Gibe II, the tunnel begins at the Gilgel Gibe Dam reservoir and diverts the water to the Gibe River, a tributary of the Omo River	420	$600 million (including transmission) Govt of Italy ($277 million) EIB (€50 million) GoE (30%)	2005	2008 (originally Dec 2007)	Salini Costruttori
Tana Beles, near Lake Tana, a tributary of the Blue Nile	435	$582 million Financing unknown	Jan 2007	2009	Salini Costruttori
Amerti Neshe, on the Fincha River, a tributary of the Blue Nile	100	$276 million (including expansion of cement factory) (1.3billion birr) China Exim Bank ($208 million) GoE ($68 million) (Financing contract signed Sept 2007)	unknown	unknown	China Gezhouba Group Corporation (CGGC) International
Gilgel Gibe III, on the Omo River downstream of the confluence of the Gojeb and Gibe rivers.	1,870	$1.7 billion (15 billion birr) Possible financiers include: JPMorgan Chase ($400 million commercial loan); GoE has approached AfDB, EIB, and Govt of Italy	Dec 2006	2011	Salini

Source: Data compiled from official documents, interviews and industry media sources.

The study prepared by Acres intended to double the country's generation capacity (then 473 MW) in 10 years (to 981 MW by 2012). The original study also predicted

that national demand would not reach 2,335 MW until 2025.[7] In 2005, however, the master plan sought to triple the power supply in five years (to 2,842 MW by 2010). The 2006 update shows that the Government of Ethiopia now predicts a peak domestic demand of 3,039 MW as soon as 2016 (more than five times the recorded peak demand of 587 MW in 2006).

The plan also calls for exporting nearly half (908 MW) of the new supply (2,053 MW) which the government hopes to develop by 2016. Between 2008 and 2016, EEPCo plans to export an average of 29% of its ever-expanding supply, with a peak of 41% of its total available supply predicted to be exported in 2012 (see Table 3). Investments in new, large hydropower schemes such as Gilgel Gibe III (1,870 MW) will create a surplus of electricity but are being justified by their potential export to neighboring countries (Sudan, Djibouti, and Kenya) through new transmission connections which are currently being planned.

Table 3. Ethiopia's Predicted Annual Electricity Supply, Domestic Demand and Predicted Power for Export

Year	Average System (GW·h)	EEPCO Demand (GW·h)	Total Energy for Export (GW·h)	% for Export
2006	3315	3398	0	
2007	3364	4045	0	
2008	6336	4894	1442	22.76%
2009	8178	5708	2470	30.20%
2010	8879	6806	2073	23.35%
2011	12029	7856	4173	34.69%
2012	15179	9020	6159	40.58%
2013	15179	10309	4869	32.08%
2014	17106	11792	5314	31.07%
2015	18061	13456	4605	25.50%
2016	19016	15309	3707	19.49%
Average annual percentage for export of total supply, 2008 - 2016				28.86%

Source: Table 8.1 "Excess System Energy Available for Export from Ethiopia - Target Load Forecast" from EEPCo's *Power System Expansion Master Plan Update*. June 2006

According to EEPCo, the utility predicts exporting 200 MW to Djibouti and Sudan each, 500 MW to Kenya, and a feasibility study is underway to consider exporting 50 MW to Yemen (via Djibouti) (see Table 4). The Master Plan also discusses possible future exports to Somalia, Eritrea and Egypt. The utility is currently negotiating power purchase agreements with Djibouti, Sudan and Kenya though none have been signed to date. EEPCo's predictions for export to Djibouti and Sudan are higher than those reported in associated project documents and the media, which report 120 MW for Djibouti and 100 MW for Sudan. A Sudan-Ethiopia transmission connection is being studied (although the Government of Sudan will soon commission the 1,250 MW Merowe Dam, which will double the national grid supply). Kenya has reportedly signed a Memorandum of Understanding with Ethiopia and a transmission connection is under study.

[7] EEPCO also sought expertise from German engineering firm, Lahmeyer, on four hydro projects identified in the Acres' study: Gojeb, Beles, Chemoga-Yeda, and Halele-Werabesa. Acres and Lahmeyer were both debarred by the World Bank for corruption under their respective World Bank contracts on another African dam project, the Lesotho Highlands Water Project. In 2004, Acres was debarred for three years; in 2006, Lahmeyer was debarred for seven years.

Table 4. Ethiopia's Predicted Power Export Arrangements

Country	Est Export Supply	Est Start	Est Annual Revenue	Transmission Line	Transmission Financing
Djibouti	Various reports of 120 MW, 30GWh (200MW)	2010	$80 million	230 kv over 283 km from Dire Dawa to Djibouti	African Dev. Fund ($56.1 million), seeking $19 million more
Sudan	Various reports of 100 MW, 200 MW	2010	$30 million	230 kv over 296km from Bahir Dar to the Sudanese border town of Shehedi.	World Bank IDA ($41 million)
Kenya	Various reports of 500 MW, 600 MW	2011 - 2014	€300 million	400 kv double circuit electric power to be transmitted from Gilgel Gibe III to Nairobi, Kenya.	feasibility study funded by AfDB ($1 million), $240 million needed for connection

Source: Data from EEPCo's *Power System Expansion Master Plan Update*. June 2006 and various media sources.

Ethiopia's energy expansion plan includes a series of risks, including:

- The hydro-dependence of Ethiopia's energy portfolio, particularly in light of drought and local hydrological effects from climate change;
- The financial health of EEPCo and the utility's effect on the country's overall debt burden as it embarks on substantial new capital investments with possible commercial support;
- The justice issues associated with EEPCo's plans to focus on energy exports in the face of Ethiopia's extreme energy poverty in rural areas.

Hydro-Dependency Risk

Ethiopia is already over-dependent on hydropower in its energy portfolio. With the addition of Tekeze, Gilgel Gibe II and Tana Beles dams, the country's energy supply will be 94% hydropower. If Gilgel Gibe III is commissioned, it will push the amount up to 96%. The lack of diversity in Ethiopia's energy portfolio leaves the sector economically vulnerable to drought. However, when asked if any studies had been conducted to review Ethiopia's hydrological vulnerability to drought or climate change which could negatively affect hydropower supply, a representative of the Ministry of Energy responsible for hydro projects and representatives from EEPCo were unaware of any studies addressing hydropower vulnerability to drought or climate, and seemed unconcerned about the issue. One official responded that the country includes 12 watersheds, and not all the river basins could be affected simultaneously by drought.

However, in 2003, Ethiopia suffered its most severe drought in 20 years, reducing reservoir levels across the country, and forcing sudden and severe power rationing in Addis Ababa which lasted for six months. Power cuts of 15 hours twice a week were estimated to cost the economy 15% of the daily GDP or $200 million in annual productivity, due mostly to reduced outputs of industries by up to 40%. New hydro is at risk of economic losses such as those experienced in 2003 as well as revenue losses from hydro exports. Ethiopia's plan to become an electricity exporter would benefit from adequate studies of predicted hydrological changes and risk of drought.

In 2006, an industry journal noted, "[Ethiopia's] reliance on hydroelectric generating capacity has left the power sector vulnerable to reduced production during the dry season or during the all too regular prolonged droughts. […] Yet while some African

countries, such as Tanzania, have sought to tackle this problem by developing thermal power plants in order to create a more balanced generation mix, EEPCo has decided to greatly increase its hydro generating capacity. Its reasoning seems to be that if droughts cut production at hydroelectric plants in half then it should double its capacity to cope with the cuts. Any excess electricity can be exported when there is plenty of water in order to generate further revenues."[8] If this analysis is accurate, the cost-effectiveness of such a hydro-dependent power supply is questionable.

Sedimentation

Heavy sedimentation has been experienced by Ethiopia's existing dams and is a very real risk to the lifespan of new hydro dams as well as dams for irrigation and water supply. The withholding of such sediment by Ethiopia's dams is likely affecting downstream ecological functions and may be exacerbating the rate of downstream erosion. In 2000, Addis Ababa suffered further power outages during the rainy season after turbines at the Koka Dam became clogged with sediment. According to a recent academic study, four irrigation dams constructed in the 1980s had to be abandoned due to sedimentation. In 2002, researcher Lulseged Ayalew noted that siltation had greatly reduced the lifespan of the Angereb and Melka Wakena dams, and could greatly impair the soon to be commissioned, Tekeze Dam.[9] According to the Gilgel Gibe I 1997 Environmental Assessment, a high sedimentation load was anticipated. The only mitigation measure recommended at the time was integrated watershed management, including maintaining a buffer zone around the reservoir. According to academic researchers at Jimma University, the buffer zone has not been enforced. High rates of sedimentation are also anticipated in the Gilgel Gibe III reservoir, where one-third of its space is reserved for sediment to accumulate over time.

Above: The brown color of the Omo River indicates its heavy sediment load which will be drastically altered by the construction of the Gilgel Gibe III Dam.

[8] July 2006. "Turning Potential into Power," International Water Power & Dam Construction.
[9] Ayalew, Lulseged. 2002. "Something that We Need to Know about Our River's Hydropower Potential." Available online at: http://www.mediaethiopia.com/Engineering/Lulseged_on_hydroelectric.htm.

Improving Access

Besides its 25-year master plan, EEPCO is also undertaking an aggressive five-year plan called the Universal Electrification Access Program (UEAP) to expand the domestic grid. The UEAP's goal is to increase access to electricity to 50% of the population, by extending the grid to a total of 6,000 rural towns and villages by 2010. At the beginning of the program in 2005, EEPCo had 700,000 customers in 470 towns. EEPCo reports it has electrified an additional 758 towns and villages in 2007, and that access rates have increased from 15% in 2005 to 22% in 2007. But as their official documents state, "access refers to not necessarily getting the electricity service but having low-voltage infrastructure nearby."[10] The UEAP has thus far been supported by two World Bank loans, $133.4 million approved in June 2006 and $130 million approved in July 2007.[11]

However, most energy consumption is still biomass, and successful implementation of the UEAP will likely not have a significant impact on the use of biomass for energy in rural areas. Government projects are underway to disseminate more efficient cookstoves and ramp up afforestation efforts. Evaluation of program implementation would be useful in understanding their effectiveness. It would also be useful for these program budgets to be publicly evaluated relative to grid-based expansion costs.

In 2005, the World Bank and Global Environment Facility provided funding for a rural energy access program, which supported the recently created Rural Electrification Fund (REF). The Director General of the Ethiopia Rural Energy Development and Promotion Center (EREDPC) is the manager of the REF and its secretariat employs seven officers. The REF oversees four types of energy supply projects: micro hydro, diesel, solar, and wind, but staff reported that diesel projects are no longer implemented. However, few projects have come forth for funding as the REF does not allow subsidies which could make such projects more affordable for rural areas.

Renewable Energy Options

Various studies indicate that Ethiopia is endowed with substantial renewable energy resources, development of which would help diversify the country's energy mix.[12] The Ethiopian government has taken some small steps to begin looking at renewable energies, but the interest and resources to develop these projects is disproportionately

[10] While EEPCo claims to have already increased energy access from 17% to 22% between 2005 and 2007, figures reflecting direct access to electricity remain at only 12% of the population.

[11] In late 2005, prior to its recent support of the UEAP, the World Bank's Country Director for Ethiopia raised concerns about the financial health of EEPCo amidst its expansion plans. "The financial performance of EEPCo has been weakened considerably by the ongoing investments it is undertaking, a significant part of which it is financing out of its internal cash." Although then Country Director, Mr. Ishac Diwan, was referring to the expansion of rural energy, the concerns hold true for the capital intensive investments in new supplies.

[12] See Workeneh Gashie's (2006), "Towards a Sustainable Power Sector in Ethiopia: The Potential Contribution of Renewables." Available at: http://www.afrepren.org/Pubs/Occasional_Papers/summ/oc28_sum.htm. Arguably the leading author on renewables in Ethiopia is Dr. W. Wolde-Ghiorgis at Addis Ababa University. He has authored numerous articles on renewables, such as (2002) "Renewable Energy for Rural Development in Ethiopia: The Case for New Energy Policies and Institutional Reform." Available at http://www.afrepren.org/Pubs/wpp1.htm. In 2004, the Solar and Wind Energy Resource Assessment (SWERA) published its assessment of solar and wind energy potential in Ethiopia. Available online at: http://swera.unep.net.

small and the country lacks models of success for renewable power generation. The master plan does note that, "Small-scale wind power and solar energy generation that can be made economically competitive should be considered at this point. Being relatively small, their introduction does not alter the large-scale generation expansion plan."

EEPCo is considering a wind energy project of up to 120 MW, but is still in early planning stages. Geothermal energy, with a national potential of at least 1,000 MW, has seen only 7 MW exploited to date. The one small-scale geothermal site has been poorly operated, but is currently undergoing a retrofit. A possible 50 MW geothermal project is in the early stages of consideration. One official stated that if geothermal companies lined up funders as well as hydropower companies do, the government would be more willing to exploit the country's geothermal potential.

Ethiopia's small-scale hydropower potential is estimated to be about 26 to 38 times the existing power supply of the country. Solar power has significant potential in Ethiopia but has not been successfully exploited yet in Ethiopia. In addition to solar water heating and lighting, the potential for large-scale grid-tied concentrating solar power plants is very high. There is also the possibility of at least 30 MW of power from cogeneration in some of the country's sugar factories.

3. Organization of Ethiopia's Energy Sector and Decision-making

The state-owned national utility, EEPCo, was corporatized in 1997. The Ethiopian Electricity Agency (EEA) was created at the same time as a regulatory agency for the utility. However, the power of the EEA is extremely limited and does not allow the agency to effectively hold EEPCo accountable. For example, EEA reviews EEPCo tariffs annually but does not have the power to set the tariffs nor even approve them. As one of the country's oldest and most powerful parastatals, EEPCo has a reputation for its political power and institutional opacity. The utility is also ideologically rooted in centralized grid planning as the singular model for providing energy services, and shows little enthusiasm for supply options other than large-scale hydropower, where it sees Ethiopia's clear comparative advantage.[13]

Like EEPCo, the Ministry of Mines and Energy (MME) sees a centralized electricity grid as the primary solution to Ethiopia's energy needs. "Suppressed" domestic demand coupled with the opportunity for power exports are regularly cited as justification for significant hydro-expansion. Displacement of biomass household fuels and a consumer preference for grid-based energy are also common reasons cited by government officials to support grid expansion plans. Officials expect that the grid should reach every area within 15 years.

Ethiopia's energy sector is governed primarily by MME, which works closely with EEPCo and is responsible for the authorization of new power supply projects. The Ministry of Water Resources (MoWR) is responsible for the development phase of hydropower projects. The MoWR has five department teams involved in hydropower design: 1) environment; 2) watershed; 3) dams/hydro planning; 4) electromechanical;

[13] EEPCo has been undergoing a physical decentralization of its offices in order to better serve its growing customer base across Ethiopia. In addition, EEPCo will soon undergo an analysis to determine whether or not the utility should unbundle its generation, transmission, and distribution services.

and 5) geotechnical. The teams are involved on a project-specific level, and watershed level baseline studies do not exist. When the MoWR studies a new project, it is supposed to send the project Terms of Reference to the Environmental Protection Authority (EPA), which is responsible for approving project EIAs and ensuring compliance with environmental standards. A steering committee between the MME and the MoWR meets quarterly to coordinate their work, including hydro dams, but ultimate authority for new hydrodams seems to lie with the MME.

A new hydropower project is supposed to receive three licenses prior to construction: one from the EPA, one from the MoWR for water use, and a permit from the regional authority which oversees land use. However, documentation for specific project licenses was not publicly available, and contradictory statements were made by differing government agencies about the existence of certain project licenses.

Both the EPA and MoWR have responsibilities to monitor projects during construction and operation, but both agencies cited inadequate staffing as a major barrier to fulfilling their heavy program responsibilities. According to the MoWR, it visits each dam site during construction and monitors the project after construction is complete. But the Ministry reports that it can manage to monitor only three to four dams per year. While the MoWR sends its recommendations to project authorities and says it follows up afterwards, there is no compliance mechanism in place to insure that recommendations are implemented.

The EPA similarly noted that it lacks the leverage to require compliance with environmental safeguards and often doesn't receive project EIAs until after construction has begun. At the time of our visit, the EPA had not yet received the EIA for Gilgel Gibe 3, which had already been under construction for one year. The EPA was established in 2002 in the framework of the newly adopted Environmental Impact Assessment proclamation which made the EIA compulsory in the country, but agency staff report that the under-resourced agency is not integrated into the government's objectives and was established only to satisfy the requirements of international donors. By law, the EPA is supposed to provide its opinion within one week's time of receiving an EIA—a short turnaround time under any scenario, but particularly unrealistic with only 3 staff in the unit. The EPA also notes that there is no control on the implementation of environmental management plans, nor does the agency have the capacity to challenge high profile international consultants which often conduct project EIAs.

An Environmental Monitoring Unit (EMU) was set up within EEPCo during construction of the Gilgel Gibe I Dam. An official from the EMU explained that its purpose is to monitor the environmental impacts of construction and operation of projects, and prepare Environmental and Social Impact Assessments for transmission lines. The official stated that, like MoWR and EPA, the EMU has limited capacity, while at the same time acknowledging that hydro dams cause huge impacts. The EMU does not have the power to enforce compliance with environmental safeguards, only to give advice on environmental issues and to advocate for compliance.

Accountability

Conversations with civil society groups in Ethiopia indicate that questioning the government's energy sector plans is highly risky, and there are legitimate concerns of

government persecution. Because of this political climate, no groups are actively pursuing the issues surrounding hydropower dams, nor publicly raising concerns about the risks. In this situation, extremely limited and inadequate public consultation has been organized during the implementation of Gilgel Gibe II as well in the preparation of Gilgel Gibe III.

A lack of community participation is a major problem with Ethiopia's dam planning. Communities negatively affected by dams are often not consulted, and typically do not receive adequate compensation or resettlement packages. Host communities and downstream users and given little consideration regarding the negative impacts they face. A 2006 study states that the Fincha Dam caused the involuntary dislocation of about 25,000 people between 1973 and 1986.[14] While the project engineering firm, US-based Harza, suggested a plan to resettle the majority of the displaced population to a malaria-infested downstream swamp which could be drained, the government undertook no known resettlement plan. A minimal compensation was paid to some landlords, but it's unclear what exactly happened to the majority of those displaced. The 2006 study further states:

> *In Ethiopia, dams are planned top-down, relocate people against their will, cause haphazard land use changes and cause increased soil erosion and reservoir sedimentation. Communities have not been sufficiently recognized and compensated and environmental protection measures such as land use planning and [soil and water conservation] have not been adopted in watersheds where dams have been implemented. Revenues generated from hydropower and water supply dams often benefit urban dwellers or the national economy at the costs of rural inhabitants.*[15]

One noteworthy development is the possibility that a university boom currently underway in Ethiopia will lead to increased study of the impacts of dams. The government is greatly expanding the number of state universities located around the country. At Jimma University, located near the Gilgel Gibe Dam reservoir, the Gilgel Gibe Research Centre was established in 2005 in order to collect data of the population residing in the four districts which surround the Gilgel Gibe reservoir. Data collected over time can be used by researchers and may help establish further understanding of impacts from dam reservoirs in Ethiopia. In addition to the centre, a multi-disciplinary project in collaboration with Belgian researchers is underway to look at a variety of impacts from the reservoir, including incidence of malaria and soil erosion. If EEPCo and other government bodies are open to receiving the results of such vital research, it could positively influence the policies, planning, and monitoring of future dams.

4. International Sector Assistance

Ethiopia has received $3.275 billion in committed debt relief under the HIPC initiative. However, a July 2007 report from the IMF states that Ethiopia is at risk of

[14] Bezuayehu Tefera Olana. 2006. *People and Dams: environmental and socio-economic changes induced by a reservoir in Fincha'a watershed, western Ethiopia*. (Doctoral Thesis) Wageningen University. Available at: http://library.wur.nl/wasp/bestanden/LUWPUBRD_00348649_A502_001.pdf.
[15] Ibid.

accruing an unsustainable level of debt.[16] The risk is increased when the analysis includes commercial loans to public enterprises, such as the one now sought from JPMorgan Chase for Gilgel Gibe III Dam. According to the IMF report, the government lacks a comprehensive strategy for managing its debt. The IMF strongly encouraged the government to include public enterprise debt, such as that of EEPCo, in its debt strategy and to strengthen its capacity to manage its debt. According to the report, the government agreed to be very cautious in its willingness to guarantee commercial loans, such as the one sought from JPMorgan Chase.

Although there may be new interest from private banks, the Ethiopian energy sector is supported by five main donors: the World Bank, the Italian Government, the European Investment Bank, and more recently, the African Development Bank and the Chinese Government. But the national energy plan calls for an unprecedented level of support – over $3 billion in new investments by 2015 and concerns are being raised that EEPCo may be financially spreading itself too thin.

Regardless of the massive level of investments being sought, the Government of Ethiopia is authorizing project contracts which violate the procurement guidelines of some of its major donors. Contracts for Gilgel Gibe II, Tana Beles, and Gilgel Gibe III dams were all awarded to Italian company, Salini, after a direct negotiation between EEPCo and Salini and without international competitive bidding. While this non-competitive procurement practice seems to be in violation of the Ethiopian Ministry of Finance and Economic Development's regulations on contract procurement, sector officials state that the contracts are legal and valid.[17] EEPCo and government authorities stated that the contract awards to Salini were in part due to Salini's assistance in securing the needed project financing, including funding from the Italian Development Cooperation for Gilgel Gibe II and possible commercial financing from JPMorgan Chase for Gilgel Gibe III.

Under these projects, Salini has been awarded an Engineering, Procurement, Construction (EPC) contract which is often used with capital intensive projects. The EPC contract is negotiated for a lump sum price in exchange for full completion of a project. This type of contract gives greater authority, but also technical and cost risks, to the contractor. Under these contracts, EEPCo's responsibility is reduced to paying the contractor (Salini) and monitoring the project. EEPCo is hoping this contract type will help avoid the headaches of project management as well as reduce the project time frame. Under Gilgel Gibe I, EEPCo was involved in a number of claims with contractors, some of which ended in trials.

However, in exchange for assuming technical and cost risks, an EPC contract gives significant authority to the contractor. Without adequate monitoring, the contractor may ensure its interests are fulfilled above those of the project owner. EEPCo reports that it has secured in independent, international advisor to help it monitor each of its major dams under construction, which should assist in protecting the interests of EEPCo. However, should EEPCo prove not to have the interest or capacity to monitor

[16] IMF. July 2007. The Federal Democratic Republic of Ethiopia: 2007 Article IV Consultation—Staff Report; Staff Supplement; Public Information Notice on the Executive Board Discussion; and Statement by the Executive Director for the Federal Democratic Republic of Ethiopia. Available at: http://www.imf.org/external/pubs/ft/scr/2007/cr07247.pdf.
[17] Ethiopian public procurement guidelines may be found at: http://www.mofaed.org/Procurement.asp.

certain aspects of Salini's work, including compliance with safeguards, there is no incentive for Salini to do more than necessary to fulfill project completion at the lowest cost. The quality of construction may be hindered by a lack of independent, quality management. Workplace safety requirements may also be inadequate as well as the fulfilment of environmental and social safeguards.

In April 2005, The Italian Development Cooperation provided its largest loan ever, $277 million (€220 million), for Gilgel Gibe II. Ironically, the loan came just after the Italian government agreed in January 2005 to cancel 100% of the €332 million in bilateral debt owed by Ethiopia. The EIB also contributed €50 million to Gilgel Gibe II but required that Salini use the funds to finance the project's electromechanical component based on an international, competitive tender.[18] This attempt to sub-contract around contract procurement irregularities is being considered again by the EIB should they agree to help finance Gilgel Gibe III.

The African Development Bank is also considering supporting Gilgel Gibe III through a subcontract in order to bypass the non-compliance of the main project contract with the Bank's procurement guidelines. The Bank expects the project, for which it is considering roughly $250 million in support, to go before the board in mid-2008.

The World Bank has stated that it is not ready to support Gilgel Gibe III due to the clear non-compliance with its procurement standards as well as a lack of domestic demand for the project. (The Bank did not financially support Gilgel Gibe II.) SACE, the Italian export credit agency, rejected requests by Salini for export credits on both Gilgel Gibe II and Gilgel Gibe III projects, in May 2006 and January 2008, respectively. The Italian Government replied to Ethiopia's request for Gilgel Gibe III funding by saying that it is waiting for the conclusion of Gilgel Gibe II before considering the possibility of a new loan.

The issue of Gilgel Gibe II financing has become very heated in Italy and the European Union. In 2006, members of the Ethiopian Parliament argued that irregularities surrounded the Gilgel Gibe II contractual process. OLAF, the European anti-fraud unit, is conducting a preliminary assessment of the Gibe II case based on EIB's financial support for this project, and will soon decide whether to open a formal investigation.

In January 2007, the Tax Squad of the Finance Police of Rome instigated a criminal proceeding against the Italian Ministry of Foreign Affairs for suspected corruption. To date, Italian magistrates have acquired important documentation from the Italian Foreign Affairs Ministry showing that the Italian aid board agreed a €220 million loan for the Gibe II project despite strong negative opinions expressed by experts from the Economy and Foreign Affairs Ministries.

Although the World Bank was instrumental in financing Gilgel Gibe I Dam and produced a 2006 Country Water Resource Assistance Strategy for Ethiopia which supports the construction of multi-purpose large dams, it has shied away from further

[18] The EIB subcontract was given to Voith-Siemens for the purchase and installation of electromechanical components.

financial support of large hydro dams. In 2006, the World Bank called the Government of Ethiopia's power generation expansion plan "unrealistic."[19] The Bank has instead turned its attention (in the energy sector) toward expansion of the distribution network and ongoing sector reforms. In addition to the $395 million in support of the Rural Electrification Fund, the World Bank approved a $41 million loan in December 2007 to fund the transmission line to Sudan and has stated that it is willing to consider supporting a future interconnection with Kenya.[20] Although the Master Energy Plan states that, "Regional infrastructure development co-operations are in conformity with the policy of financing institutions like the World Bank, AfDB, EIB and others who are supporting the financing of such projects," Gilgel Gibe III and other supply projects which are meant for regional supply are out of line with the contract procurement guidelines of many of these institutions.[21] It seems questionable for these institutions to finance associated infrastructure, such as regional transmission lines, when the power supply projects do not conform to their policies.

The African Development Bank is also supporting some grid expansion activities. Currently, the AfDB is embarking on its second rural grid extension project, is financing a regional transmission line between Ethiopia and Djibouti, and is financing studies for a transmission line between Kenya and Ethiopia. In addition, the AfDB has helped finance the Eastern Nile Power Trading Study, which covers Ethiopia, Sudan and Egypt. The study looks at the investment climate and identifies projects within the Eastern Nile Basin for development.

5. Case Study: Gilgel Gibe Dams, Omo River Basin

Numerous dams are planned for the Omo River Basin yet little baseline data exist nor is there any assessment of the cumulative impacts of planned dams on the basin. Below is a short update on the status of Gilgel Gibe I, Gilgel Gibe II, and Gilgel Gibe III dams. A fourth dam, Gilgel Gibe IV, is proposed downstream adjacent to the country's largest national park, Omo National Park. At 2,000 MW, the proposed Gilgel Gibe IV represents the largest hydropower supply of all the basin's dams, more than that of the other three Gilgel Gibe dams combined.

5a. Observation of Gilgel Gibe I Resettlement

Gilgel Gibe I Dam (184 MW) was commissioned in 2004 and is currently the single, largest supply of power in Ethiopia. The project was completed under a 1997 World Bank project entitled "Energy Access II" at a final cost of $331.4 million (compared to the 1997 estimate of $281.9 million).[22] Project development and its associated

[19] World Bank. June 2006. Implementation Completion Report (# 35573) for Energy II project.
[20] The World Bank is also considering $35 million in support for the proposed Tana Beles Integrated Water Resources Development Project. The Project Information Document notes that the environmental impacts of the Tana Beles Hydropower dam could constrain economic growth. More information is available on the World Bank website at: http://web.worldbank.org/external/projects/main?pagePK=64283627&piPK=73230&theSitePK=295930&menuPK=295963&Projectid=P096323.
[21] Quoted from the Executive Summary of EEPCo's Power System Expansion Master Plan Update. June 2006.
[22] Gilgel Gibe Dam was financed by a World Bank grant of $190 million, European Investment Bank ($72.8 million), and $68.7 million from the Government of Ethiopia. Final project costs are noted in the World Bank's June 2006 Implementation Completion Report (# 35573) for Energy II project.

resettlement have a long history, dating back to the 1960s.[23] Although total displacement is estimated at closer to 10,000 people, the most recent phase of resettlement, which included 706 households (about 5,000 individuals), was completed in 1999 and 2000. Of these households, 562 were resettled by the project; the rest chose to take cash compensation and manage their own resettlement. In 2001, both the government of Ethiopia and the World Bank claimed the process was a model of successful resettlement.[24] The resettlement accomplished two important achievements. First, while it was not the first dam to induce displacement in Ethiopia, it was the first official recognition by the Ethiopian Government of its responsibility to address displacement in the development of a dam project. Second, the physical resettlement was completed prior to the completion of project construction. Unfortunately, it was premature to label this resettlement a success, as many effects of resettlement may only be apparent years or even decades after the physical move.

Since then, several evaluations of the resettlement have been completed. In December 2005 the World Bank conducted a socio-economic survey of those households resettled by the project. In February 2006, the Environmental Protection Authority conducted an audit of the project impact assessment. A March 2006 completion report on Environment and resettlement was completed by EEPCo's Environmental Management Unit. While the World Bank's project completion report states that the resettlement was overall successful, and "all indications point to the fact that the [project affected people] are better off than now than prior to the resettlement effort," the reports do note the poor maintenance of community infrastructure and a reduction in farming productivity. In addition, the EPA's audit critically investigated the effectiveness of the dam's construction and management against the Environmental Management Plan contained in the EIA. Despite the lack of a strong methodology, due mainly to the lack of human resources and specialized skills that EPA faces, the report highlights a number of non-compliance elements. The audit noted that the 8 km buffer zone around the reservoir is not being respected and is being used for intensive cattle grazing and other purposes. The audit also noted that a minimum release flow of 1.1 m^3/s during the dry season is not being respected. The EPA's report states that the EIA (and related contracts) were vague and incomplete especially regarding the specific measure to be taken up, the budgetary issues and the identification of roles and responsibilities. There are several aspects that have not been foreseen in the EIA and in this regard the report expresses strong fear that water-related vector-borne diseases might be introduced or aggravated.

In November 2007, three days of our 10-day field visit were spent visiting the region near the Gilgel Gibe I Dam. One day was spent visiting the resettled communities. Time was spent speaking with informal groups of neighbors about the resettlement and visiting infrastructure built as part of the resettlement. Of the nine resettlement communities, we visited two sites (Site 5 and Site 8). We also visited one school, one

[23] For a detailed history and interviews with resettled villagers in 2001, see Kassahun Kebede's 2001 academic thesis, "Re-relocation and dislocation of communities by 'development' projects: the case of Gilgel Gibe dam (1962-2000) in Jimma zone, southwestern Ethiopia," available online at http://www.forcedmigration.org/browse/regional/ethiopia.htm.

[24] In 2001, the Parliament of Ethiopia called the Gilgel Gibe resettlement a model for future practice. In June 2001, the World Bank called the project's resettlement good practice for Eastern Africa. These statements are noted in the World Bank's June 2006 Implementation Completion Report (# 35573) for Energy II project.

mosque and one borehole. We were assisted by a local translator and an Ethiopian researcher, both of whom were able to provide some background and/or contextual information.

Evidence from the visit, supported by information collected in 2001 by Ethiopian academic researcher Mr. Kassahun Kebede, reveals that the resettled and host communities are experiencing ongoing negative effects from the resettlement, and that the government has no effective means in place to monitor the impacts of the resettlement or to address related grievances of resettled households.[25]

Families were resettled on mosquito-infested swampy land of poor agricultural quality. In many places, resettlers were moved onto lands which were already being used for grazing by host communities. Neither resettlers nor host communities have been compensated for lost grazing lands.

As described in official evaluations, villagers reported that the addition of corrugated iron roofing was an improvement to their previous housing. However, some villagers also reported that they were promised but did not receive cement floors, resulting in water-logged dirt floors during the rainy season. Others villagers noted that latrines were poorly built or not built at all.

Above: Villagers at Site 8 explain the changes to their lives since the resettlement seven years ago.

[25] Kebede, Kassahun. 2001. *Re-relocation and dislocation of communities by 'development' projects: the case of Gilgel Gibe dam (1962-2000) in Jimma zone, southwestern Ethiopia*. Available online at: http://www.forcedmigration.org/browse/regional/ethiopia.htm.

Villagers reported a decrease in their cattle and other livestock. Three heads of household from Site 8 informed us that their cattle had decreased from 20, 25, and 6 to 3, 4, and 0, respectively. The three men reported receiving 700, 1,000, and 0 Birr, respectively as compensation for crops (although the quantity of crops lost is unknown).[26] Each household received 2.5 hectares of land regardless of their previous land holdings in the reservoir area. One man in Site 5 reported having 25 cattle and 8 hectares before the resettlement. He now has 2 oxen and 2 cattle, and the allotted 2.5 hectares. "The land here is less productive, our previous land was fertile," he said. "Unless one applies fertilizer, there is no production."

Right: A herd of cattle rest on the bank of the Gilgel Gibe River, upstream from Gilgel Gibe I Dam. Cattle represent a vital store of wealth for rural Ethiopians.

Food production, which went up the first year due to project-provided fertilizers and machine plowing, has since decreased. According to the 2005 resettlement evaluation by the World Bank, the average crop yield has been reduced by 54% and the number of livestock owned by resettled households has been reduced by 72%. The report also notes that the social infrastructure such as schools, health clinics, and water points are in poor condition and in need of immediate maintenance. Regardless, the World Bank stated in its 2006 Project Completion Report: "In spite of those issues, all indications point to the fact that the [project-affected persons] are better off now than prior to the resettlement effort."

Villagers also told us that they didn't get to visit the resettlement site beforehand despite official claims that visits had been made. In Site 5, a man informed us that at least 8 families had abandoned their resettlement sites. The families had appealed to local authorities but with no effective response.

Those with whom we spoke said that EEPCO promised them more fertile land, new schools, drinking water and electricity. They had received no electricity. They were promised new schools, but none were built, although two were renovated. Teachers from the school reported a total of 1,123 students, ages seven to 22, and ten classrooms. Some of the students reportedly walk up to two hours to the school.

Left: The school at Site 5 was renovated during resettlement but still lacks electricity. Its 10 classrooms serve over 1,000 students.

[26] At the time of compensation (1999- 2000), the floating exchange rate was likely about 6-7 Birr to the US$, representing $10 – 12, $143 – 167, and $0 respectively.

At least one borehole was placed in each resettlement village but some households are so far away they instead collect water from polluted streams and stagnant pools. A teacher from the Site 5 school informed us that the borehole installed there during resettlement was now completely dry, and another borehole was added more recently by a foreign NGO, without project funding.

Right: Resettlers complained that a generator for this mosque at Site 5 was promised but never received.

Far Right: This borehole at Site 5 was installed in 1999 but no longer works.

A major issue for the resettled community, which has a very large youth population, is the lack of job opportunities, especially in light of reduced farmland for resettled communities. The traditional land tenure system would divide a father's land amongst his sons as they reached adulthood. When the father died, the family would split the rest of the land. With the loss of cropland, fathers have less land to divide amongst their sons and it seems to have spurred the rate of economic deterioration for the coming generation. "We are very worried about the fate of our children," a villager in Site 5 said. Migration to urban areas also seems to be on the rise.

Seven years later, those displaced by the Gilgel Gibe I Dam continue to suffer the effects of a poor resettlement program. Livestock wealth and crop productivity have declined, project infrastructure has not been maintained, resource conflicts between the host and resettled communities continue, and the traditional sharing of resources with the next generation has been impaired. Affected households had limited ability to influence the resettlement process beforehand, and have found no effective means to have their ongoing problems addressed.

Above: "We are very worried for our children," lamented one resettled villager at Site 5.

This has not been a model of successful resettlement, and is an indicator of the government's lack of interest or capacity to adequately address the social issues of dam development. Considering the fast-tracking of dam construction underway in

Ethiopia, a legally binding mechanism which would address grievances of dam-displaced individuals, including those resettled by Gilgel Gibe I, would help ensure the rights of displaced individuals and that those resettled by future projects benefit rather than become further impoverished by the project.

5b. Status of Gilgel Gibe II

Gilgel Gibe II will generate 420 MW by drawing water from the Gilgel Gibe I reservoir through a 26 km long tunnel to turbines located at the end of the tunnel. The project was supported by a $277 million from the Italian Development Cooperation and a €50 million loan from the EIB. The cost, budgeted at roughly $600 million (including transmission system), is 30% covered by the Ethiopian Government. Gilgel Gibe II will be connected to the grid with a long transmission line to Addis Ababa and a short one to Gilgel Gibe I.

The project was originally planned to be completed in December 2007 but as of November 2007 was facing a one-year delay due to "problematic geological conditions". Under an EPC contract, the contractor is generally responsible, not only for virtually all extra costs, but can also be sanctioned for delays. However, the current delay is covered by a contract exemption which was made for geological conditions since proper studies were not conducted prior to the start of project construction. Therefore, EEPCo has accepted responsibility for additional costs, while Salini has received an extension and is not subjected to any financial sanction.

Aside from the project delay and investigations into contract procurement and financing, a team from the European Commission monitoring the project identified several other "lessons learned":

> *The Project was defined without a comprehensive sector support strategy. Possible negative consequences are: limited coordination and policy influence for the long-term sector development in synergy with other interconnected sectors; limited scope for supporting best practices for (socio)environmental impacts of large infrastructures; absence of an accompanying programme for social development and capacity building; de-link with grant programmes and projects financed by Italian Development Cooperation in Ethiopia.*[27]

5c. Status of Gilgel Gibe III Dam

The Gilgel Gibe III Dam, now under construction, will be Ethiopia's largest infrastructure investment to date once complete. It is expected to cost $1.7 billion and consist of the construction of the largest dam in Ethiopia – 240 meters high – on the Omo River, one of the largest impoundments in the country, and a powerhouse that will generate 1,870 MW, doubling the country's power generating capacity. The reservoir will reach about 155 km in length, including where the Gojeb River joins the Gibe River, and have a capacity of 11,750 Mm^3.The project is being fast-tracked by the government, and in September 2006, the Prime Minister reportedly passed a decision to make the Gilgel Gibe III Dam a priority recipient of cement, which was in

[27] August 2007. Report of the Delegation of the European Commission to Ethiopia. Available online at: http://www.deleth.ec.europa.eu/bluebook/?q=bluebook/project/236/view.

short supply at the time.[28] The dam will be connected to the domestic grid via a transmission line from Gilgel Gibe II. A high-voltage transmission line is also being planned to connect Gilgel Gibe III directly to Kenya, where Ethiopia hopes to export energy in the future (though at this writing, no purchase agreements had been signed).

Above: The Omo River winds through this canyon which will be flooded by the Gilgel Gibe III Dam. The reservoir will reach 155 km upstream, close to the outtake of the Gilgel Gibe II plant.

The construction of Gilgel Gibe III Dam reportedly began in 2006 although the project had not received the required environmental license from the EPA, in violation of the Environmental Policy of Ethiopia. When interviewed in November 2007, the EPA stated that it had not yet received the project EIA and that the same lack of compliance with the national environmental policy was seen during construction of Gilgel Gibe II. However, dam construction for Gilgel Gibe III has been in full swing since December 2006 and the Omo River will soon be diverted.

Not only is the EIA not approved, but according to the Italian Development Cooperation, it is not yet finished. The existing EIA, prepared by Italian consulting firm, CESI, (and publicly disclosed by the Italian Export Credit Agency, SACE, prior to its consideration of a project related export credit to Italian company, Salini) only assesses the upstream impacts of the dam. It includes no substantive reference to downstream impacts associated with the new dam, including impacts which could affect the Omo National Park and a UNESCO World Heritage Site. Neither does it address the need for dam-safety monitoring or downstream warning systems for emergency releases in case of heavy flooding or dam failure. The downstream impacts are yet to be assessed by another international consultant.

In addition to the major exclusion of downstream impacts, the EIA contains numerous examples of poor analysis. Some examples of the document's poor and misleading analysis include the following:

[28] Yeneakal, Tedla. 2006. "PM orders cement delivery priority to Gilgel Gibe," The Capital. Available online at: http://www.capitalethiopia.com/archive/2006/September/week3/local_news.htm.

Unaddressed Public Health Impacts: The EIA notes that the reservoir will allow the establishment of malaria and bilharzia vectors which could have devastating effects on the health of local communities. The EIA recommends a "monitoring programme for mosquito breeding areas, the occurrence of schistosomiasis carrying snail and other vectors (onchocerciasis) in the reservoir area after the implementation of the project." However, this limited approach will not mitigate the anticipated increases in disease for the population of the affected region. Similarly, no treatment or prevention measures were officially taken to help mitigate the public health impacts from dam development around the Gilgel Gibe I reservoir. Researchers at Jimma University are finding significant increases in malaria incidence around the Gilgel Gibe I reservoir. Such increases in malaria and bilharzia are common in tropical dam reservoirs. The public health impacts from the Gilgel Gibe III reservoir should be better studied and quantified, and adequate mitigation measures included in the Environmental Management Plan.

Unaddressed Social Impacts: According to the EIA, the total population of the affected region is over 210,000 people; at least 400 families (approximately 3,200 people) will be involuntarily dislocated by Gilgel Gibe III. Resettlement cost is estimated in the EIA at less than $1 million (7.88 million birr), or $2,500 per family, compared to the average resettlement cost of $4,600 per household under Gilgel Gibe I Dam (paid in 1999/2000) which was already lower than the global average cost for resettlement for a project of its size. The EIA lists a total of only 52 affected individuals who were officially consulted. While the social impacts seem inadequately addressed as a whole, one of the most worrying is that while the EIA estimates that the grazing lands of some 275 nomadic households (about 1,400 people) will be affected by the dam's reservoir, these households are not considered for compensation, nor have they been consulted. This is an inadequate consultation process and out of line with Chapter 10, Article 92 of the Ethiopian constitution, which states that people have the right to full consultation and to the expression of their views in the planning and implementation of environmental policies and projects that affect them directly. Such an inadequate process limits the ability of affected people to influence the resettlement and compensation processes, and increases the chances that such processes will negatively affect them.

Archaeological Assessment: While the need for an "Archaeology and Cultural Remains Management Plan" is mentioned several times in the EIA, there is no clear plan in place at present, nor any mechanism for compliance, to create such a plan. Although the EIA states that the probability of encountering yet undiscovered archaeological sites is low, the Lower Omo Valley downstream is known for its rich archaeological sites. The richness of the region's archaeology should be highly valued and an appropriate plan in place immediately. According to the World Bank completion report for Gilgel Gibe I Dam, 27 archaeological sites were found during construction of that project. Supervision of the sites was hindered by the belated implementation of a cultural heritage management component under the project, which created multiple logistical, financial, administrative and political problems.

Workplace safety is also an issue. According to an unsubstantiated report from a local employee of Salini, three workers had already died while working on the dam site. Salini is responsible to report all on-site accidents including deaths, to EEPCo.

According to EEPCo, as of November 2007, no reports of any major accidents such as deaths had been reported. This raises concerns about workplace safety for Salini's local workforce, especially in light of project fast-tracking and a possible lack of project monitoring and supervision to ensure compliance with existing safeguards.

6. Challenges and Recommendations

The Government of Ethiopia faces a daunting challenge of providing sustainable energy to fulfill the needs of its people as well as support much-needed economic growth. The government is taking on a vital domestic program to increase access to electricity at a relatively rapid pace. This program, combined with EEPCo's efforts to decentralize its offices throughout the country, should be applauded. The sector has also taken on some limited but positive steps toward implementing safeguard processes into their energy sector planning, which should also be recognized, namely:

- Recognition of dam-induced displacement in Ethiopia
- Creation of institutions for monitoring environmental safeguards, such as the EPA and the EEPCo Environmental Monitoring Unit
- Creation of the Rural Energy Development and Promotion Center to promote rural access to sustainable energy
- Some interest in developing renewable energy sources, including the country's first potential large scale wind supply project

However, much more needs to be done to ensure the boom in hydro dam development does not lead to major social, environmental and economic impacts. Based on the information and analysis of this report, the following challenges are noted:

6a. Accountability and Safeguard Compliance: Institutions which are supposed to provide checks and balances to EEPCo and the Ministry of Energy require increased human resources and budgets to fulfill their missions. In addition, regulatory agencies, namely the Environmental Protection Authority and the Ethiopian Electricity Agency, should receive increased power to ensure compliance with their regulatory requirements.

The energy sector also lacks public accountability. Sector and project planning should be available to the public and public institutions, including affected communities, independent researchers, and NGOS. Civil society groups should not fear repression if they attempt to criticize government policy, hold government institutions accountable, or protect the rights or interests of the public. Sector and project planning could also greatly improve from incorporating lessons learned from academic research into planning processes, avoiding future pitfalls.

6b. Debt Risk: The quantity of financial investments of the energy sector, particularly in the form of commercial loans, will bring a greater debt burden. Safeguards to ensure a robust management of the debt and a public debt strategy which includes commercial loans are needed to support the country's financial situation and ensure that EEPCo's investments do not negatively affect it. In addition, EEPCo's investment plans should be reviewed for:

- Alignment with the country's most pressing energy needs for poverty reduction, especially rural energy needs;
- The most cost-effective strategies to meet those needs;

- Legality of project contracts and procurement processes; and
- A robust assessment of national drought scenarios and predicted impacts on hydrology and planned hydro dams. This will help assess the risk of drought on potential power exports.

6c. Addressing Displacement: A mechanism to ensure legal fulfillment of resettlement plans and address grievances (if they arise) will better protect affected communities. There is already a negative history of dam-induced displacement in Ethiopia. Some of the problems could be lessened with a mechanism to address outstanding social grievances. This will help address outstanding issues as well as create greater trust between affected communities and project planners.

6d. Addressing Risks of Gilgel Gibe III Dam: As is, Gilgel Gibe III Dam poses a serious threat to the Omo River Basin. Project planning and construction have been fast-tracked without complying with environmental safeguards. Awarding of the project contract did not comply with contract procurement guidelines of most international financiers.

Construction of Gilgel Gibe III Dam should be halted immediately until project planning can meet domestic regulations, especially completion and approval of the project EIA, and receipt of all necessary project licenses and permits, including an environmental license. A proper public consultation process should be completed which allows affected communities to participate in the planning of the resettlement and compensation. Workplace safety should be immediately investigated. A cumulative impact assessment of the Omo River Basin should be conducted which considers all the dams planned within the basin.