



## **Mainstreaming Sustainable Energy Access into National Development Planning: the Case of Ethiopia**

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Cover photo: A solar panel is installed on a rooftop in Rema, Ethiopia, as part of a Stiftung Solarenergie project. Photo courtesy of Stiftung Solarenergie.

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**ABSTRACT**

Access to affordable energy for basic needs, as well as for national economic development, is a crucial concern for Least Developed Countries. Access to modern and sustainable energy services in rural areas, where the majority of the population is living in poverty, is a particularly urgent challenge, and one which has only recently been recognized as crucial within the global development agenda. The current dominant development model, focused on achieving macro-economic growth, gives priority to large-scale or centralized energy infrastructures for national growth or for meeting the demands of urban dwellers. Policy processes in most sub-Saharan African countries often fail to prioritize modern and sustainable energy services at the local level as a means to achieving economic growth at the national level. This study examines the case of Ethiopia to investigate the prospects for mainstreaming sustainable energy access into the development planning process and the implications of this for international development financiers, national policy-makers, private actors and local energy planners. In particular, the paper identifies institutional, financial and policy criteria – related both to state and non-state actors – which are required to integrate sustainable energy access and meet implementation challenges in the Ethiopian rural energy sector. Based on this analysis, the paper discusses policy implications for other sub-Saharan African countries as well.

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## 1. INTRODUCTION

Energy deeply influences the life of rural communities. It is fundamental to all aspects of human welfare, including access to clean water, health care and education and increasing agricultural productivity. Still, 2.7 billion people lack access to efficient and clean energy for cooking and heating, and 1.3 billion lack access to electricity; about 84% of this deprived population lives in rural areas of sub-Saharan Africa or Southeast Asia (IEA 2011). Many studies have shown that the cost of modern, sustainable energy services is a major barrier for the rural poor in the sub-Saharan Africa (OFID 2010; IEA 2010; UN-Energy/Africa 2007), but although countries have invested in energy development, most have not prioritized strategies that bring energy sustainably and affordably to the rural poor.

Research by the Global Network on Energy for Sustainable Development (GNESD 2004) has shown that even a modest level of modern energy services – as little as 100 kWh of electricity and 100 kgoe of modern fuels – brings multiple and substantial benefits to poor households in remote rural areas. Thus, for sub-Saharan Africa, prioritizing energy access for the rural poor may be the first step to fostering human development and achieving the Millennium Development Goals (Kirai and Hankins 2009; East African Community 2007; Arvidson 2007).

Modern, sustainable energy access is also correlated with macro- and microeconomic improvement (Terrados et al. 2010; TWAS 2008; Elias and Victor 2005). Replacing traditional fuels such as crop wastes, wood and dung with modern fuels such as liquefied petroleum gas (LPG) and ethanol reduces health hazards (especially from smoke) and frees up time for education and income generation, especially for women (UNDP 2005). Electricity supports communications and public services such as health care, and modern energy sources are vital for economic activity. As the United Nations Development Programme (UNDP) recently put it: “Few enterprises of any scale can operate without a supply of electricity, fuel and/or mechanical power with which to produce the energy services needed in appliances and processing equipment, from boilers to computers” (Hunt et al. 2012).

In the last decade, efforts have also been made to identify synergies between sustainable energy access and climate change mitigation and adaptation (Venema and Cisse 2004; Venema and Rehman 2007; Johnson and Lambe 2009). Energy access and climate vulnerability are particularly connected in Least Developed Countries (LDCs), where rural communities compete over dwindling natural resources that are being further degraded by climate change (Legros et al. 2009). Thus, modern energy access can support adaptation by easing pressure on natural resources while also helping reduce poverty.

Expanding energy access may increase LDCs’ carbon emissions, however – especially if fossil fuels are used. From an equity perspective, some would argue that this shouldn’t be a factor, given the significant gap between LDCs’ and richer countries’ emissions. But given the cost and local environmental impacts of fossil-fuel use (such as air pollution), and LDCs’ great vulnerability to climate change, there is a potential synergy between mitigation and energy access expansion: Projects may be more economically sustainable (and, of course, more environmentally sound) if they rely on low-carbon technologies, especially locally produced renewables. Targeted development aid can overcome upfront cost barriers, build local knowledge and institutional capacity, and facilitate access to funding (Schwarz and Glemarec 2009).

## 1.1 The global context: Sustainable Energy for All and the European Commission

The issue of energy access has recently ascended the global policy agenda and is now a central theme in international development policy-making. The United Nations General Assembly declared 2012 as the International Year for Sustainable Energy for All, and UN Secretary-General Ban Ki Moon is leading a global Sustainable Energy for All Initiative (SE4All),<sup>1</sup> a key objective of which is to attain universal access to modern energy services by 2030. The initiative prioritizes access to electricity and to clean fuels for household cooking and heating, as well as energy for productive uses, especially in agriculture and local industry (Birol et al. 2012). It envisions three pathways: country actions by host governments, private-sector (commercial) initiatives, and bottom-up actions led by civil society. All countries are invited to “opt in”, with support packages envisioned for three types of countries:

- *High-impact countries* that join the initiative early and commit to demonstrating leadership and “proof of concept” for other countries to follow.
- *High-need countries* with significant populations lacking access to energy which could benefit from a significant package of support; Ethiopia might fit this category.
- *High-performance countries* that have already made major strides and could achieve universal access with targeted support.

The European Union has positioned itself as a leader within this effort. In April 2012, within the SE4All framework, the European Commission launched its “Energising Development” initiative,<sup>2</sup> which aims to bring sustainable energy services to 500 million people by 2030 in developing countries that “opt in” to SE4All. The initiative builds on a prior EU commitment, through the Africa-EU Energy Partnership, to bring modern and sustainable energy services to 100 million people in Africa by 2020.<sup>3</sup>

Clearly national-level leadership will be crucial for countries to be able to seize the opportunities created by these initiatives. This paper looks at how mainstreaming sustainable energy access into national development plans, particularly in sub-Saharan Africa, could enhance the impact of these and other resources, including climate finance, in the region. The paper also shows how efforts by bilateral developmental partners (NGOs) and private actors could benefit from the mainstreaming process, which would reduce local implementation challenges, create coherent national policies and strategies, and attract external financing. Although Ethiopia is taken as case study, many of the conditions and macroeconomic platforms are similar in other countries, so the findings and messages presented here should be useful to policy-makers and other actors across sub-Saharan Africa.

## 1.2 Energy access in Ethiopia today

The vast majority of the Ethiopian population (83.2% as of 2010)<sup>4</sup> lives in rural areas, where modern energy services are rarely available. Thus, although 85.2% of the urban population had access to electricity as of 2011, only 4.8% of the rural population did (Central Statistical Agency 2012). Even in urban areas, half the households rely on traditional biomass (wood, dung and agricultural residues) for cooking, and in rural areas, virtually all do (except for 0.2% who use kerosene, and 1.2% charcoal). While many nations in sub-Saharan Africa face similar challenges, Ethiopia ranks particularly low in terms of energy progress, 62nd out of 64 per the IEA’s 2011 Energy Development Index, with an EDI of 0.017. Only the Democratic

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<sup>1</sup> For detailed information about this initiative, see <http://www.sustainableenergyforall.org>.

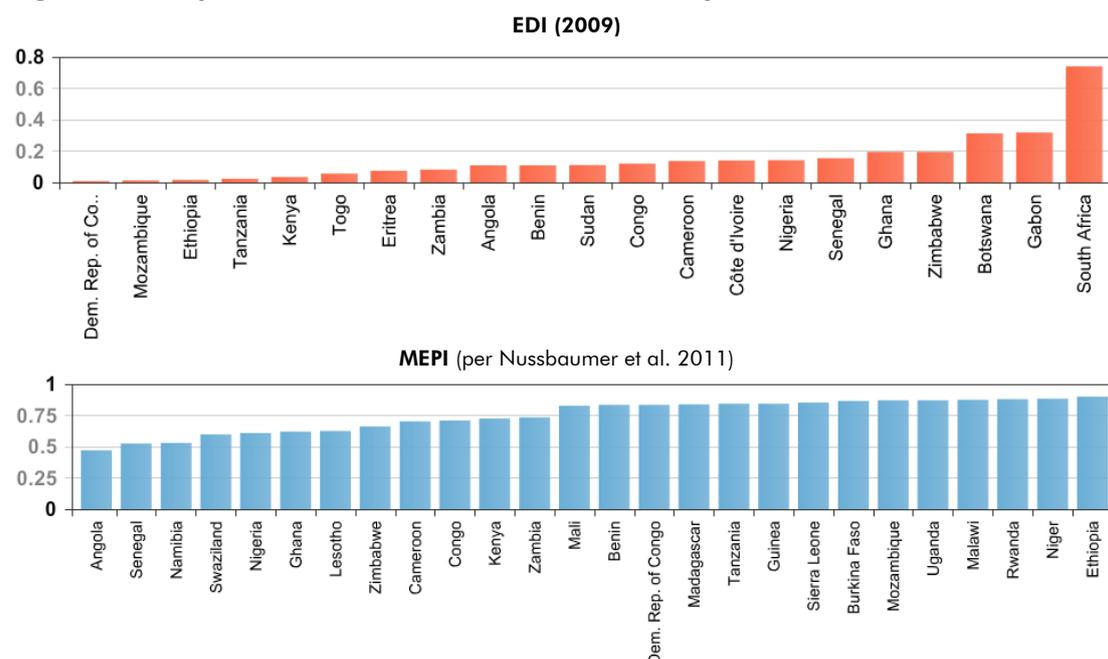
<sup>2</sup> See the European Commission press release: <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/12/372>.

<sup>3</sup> To learn more about the Africa-EU Energy Partnership, see <http://www.africa-eu-partnership.org/node/68/>.

<sup>4</sup> Per World DataBank data; see <http://data.worldbank.org/country/ethiopia> [accessed 6 December 2013].

Republic of Congo and Mozambique rated worse, with EDIs of 0.010 and 0.013, respectively (see Figure 1).<sup>5</sup> Similarly, on Oxford University’s Multidimensional Energy Poverty Index (MEPI), which measures the incidence and intensity of energy poverty, with a focus on access to modern energy services (cooking fuels, electricity, refrigeration, radio/television, telephone), Ethiopia is rated 0.9 (with 1 as total deprivation), or suffering from “acute energy poverty” (Nussbaumer et al. 2011). No African country rates worse, but Niger and Rwanda are only slightly better, with MEPIs of 0.88; the Democratic Republic of Congo’s MEPI is 0.84, and Mozambique’s, 0.87, as shown in Figure 1.

**Figure 1: Ethiopia and other sub-Saharan countries, by EDI and MEPI**



Source: UN-Energy visualization platform, <http://www.un-energy.org/measuring-energy-access>. Note that the EDI shows the level of energy development, while the MEPI measures energy deprivation.

Ethiopia has made big strides in recent years, with 48.3% of towns and villages connected to the grid as of July 2012, according to the Ethiopia Electric Power Corporation (EEPCO 2012).<sup>6</sup> Increasing energy production is also a priority under Ethiopia’s current five-year Growth and Transformation Plan (MoFED 2011), which aims to achieve GDP growth of 11–15% per year from 2010 to 2015. The plan has an estimated total cost of \$75–79 billion USD and includes specific targets on economic growth, poverty reduction, agriculture and rural development, industry and infrastructure development, and power and energy.

In terms of energy, the Growth and Transformation Plan focuses on exploiting Ethiopia’s considerable renewable-energy potential, primarily through large-scale hydropower dams, but also through wind and geothermal power and biofuels. Ethiopia’s economically feasible hydropower potential has been estimated at 162,000 GWh per year, but actual production as of 2008 was only 3,369 GWh (World Energy Council 2010). Since then, with international support, Ethiopia has commissioned several major hydropower plants, three of them (Tekezé,

<sup>5</sup> The EDI (<http://www.worldenergyoutlook.org/resources/energydevelopment/theenergydevelopmentindex/>) tracks a country’s transition towards modern fuels, as a measure of energy’s role in overall development. It is based on four indicators: per capita commercial energy consumption, per capita residential energy consumption, share of modern fuels in total residential energy use, and share of population with access to electricity.

<sup>6</sup> Notably, EEPCO has kept falling short of the government’s annual targets; for 2011/12, the target was 8,484 towns and villages, but only 6,317 were connected to the grid (EEPCO 2012).

Beles and Gilgel Gibe II, with a combined capacity of 1,180 MW) in 2009-2010 alone. Hydropower production increased by 85% within four years, to 6,241 GWh in 2011/12, supplying 99% of the country's electricity (EEPCO 2012). Several more projects are under development, most notably the 6,000 MW Grand Ethiopian Renaissance Dam on the Blue Nile, the subject of an intense dispute with Egypt and strong criticism from environmental groups.<sup>7</sup> Along with meeting Ethiopia's own energy needs, the new hydropower capacity is meant to help the country become a major exporter of electricity.

Rural electrification has also remained a priority, and the extent of high-voltage transmission lines across Ethiopia increased by a third in just three years, to 11,796 km in 2011/12 (EEPCO 2012). The total number of electricity customers had risen to 1.9 million by July 2012 (*ibid.*). In remote areas, Ethiopia is installing solar power at schools, health centres and other facilities. However, per capita electricity consumption remains at only about 200 kWh per year, far lower than the sub-Saharan average of 517 kWh in 2009, and a fraction of the 2009 world average, 2800 kWh per person.<sup>8</sup> This suggests a great deal of work remains to be done to bring power to individual households and ensure they can afford to plug in.

Scaling up access to modern energy services in Ethiopia will require significant investments, even beyond the \$200 million USD in credit that the World Bank has recently extended to support ongoing efforts (see footnote 8). Coherent policy development at the national level is also critical, to guide these investments and ensure they support Ethiopia's broader economic growth and poverty reduction goals. There is also an urgent need to develop local technical and institutional capacity and to coordinate efforts among non-state actors which could play a role in energy sector planning and policy-making.

Most non-state actors working on energy currently operate in a fragmented way, following their own objectives and policies. Yet research suggests that rural energy access projects will be most effective when they are demand-driven, not donor-driven (Mulugetta 2008; Wolde-Ghiorgis 2002). Currently most development aid is allocated for large-scale infrastructure, to support community services such as schools and health clinics. In the energy sector, the prevailing approach has been to expand the energy supply to support economic growth – which favours commercial users and urban communities that are already connected to the grid – or to export to neighbouring countries. Providing modern, sustainable energy services to poor people in rural areas is not attractive to the private sector. Integrating energy access for the rural poor into national development strategies would explicitly recognize the crucial role of energy in development and poverty reduction and help steer public and private actors' efforts accordingly.

In that context, this paper aims to address two key questions:

- How can decentralized sustainable energy access for the rural poor be mainstreamed into Ethiopia's national development planning processes?
- What roles can non-state and state actors potentially play in those processes?

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<sup>7</sup> For a brief description of the project from EEPCO, see <http://www.eepco.gov.et/project.php?pid=1&pcatid=2>. For coverage of the dispute with Egypt, see, e.g., Feteha, A. and Davison, W. (2013). Egypt and Ethiopia Disagree on Probe of Nile Dam Impact. Bloomberg, 6 November. <http://www.bloomberg.com/news/2013-11-06/egypt-and-ethiopia-disagree-on-probe-of-nile-dam-impact.html>. For other criticism, see International Rivers' overview: <http://www.internationalrivers.org/campaigns/grand-ethiopian-renaissance-dam>.

<sup>8</sup> See The World Bank (2012) Electricity Program Expands Access to Energy for Ethiopians with Support from the World Bank. Press release, May 29. <http://www.worldbank.org/en/news/2012/05/29/electricity-program-expands-access-energy-for-ethiopians-with-support-from-world-bank>. Regional and world data for comparison taken from the World DataBank, <http://data.worldbank.org>.

## 2. METHODOLOGICAL APPROACHES

The research presented in this paper is a case study designed to correspond with the analysis phase of the Logical Framework Analysis (LFA) methodology used by donors and NGOs worldwide to plan and evaluate projects. It involves four main elements: problem analysis, stakeholder analysis, objectives analysis, and strategy analysis. A basic principle behind LFA is that various stakeholder groups could have different objectives, strategies, problems, capacities and interests. This methodology explicitly recognizes these differences in the process of identifying key problems and strategic gaps. Multiple sources of evidence have been used, including literature, interviews and a survey, and the analysis has sought to identify converging findings from these sources.

The project began with a review of research literature, key documents and data. Then, during a month-long field visit to Ethiopia in January 2011, 11 open-ended interviews were conducted in individual meetings with directors and managers of eight key stakeholder organizations (both state and non-state actors) that are involved in the Ethiopian rural energy sector. The key areas of inquiry were:

- The roles and approaches taken by various actors in the sector;
- Stakeholders' views on current political commitments and institutional arrangements within the Ethiopian rural energy sector;
- Implementation challenges and types of measures applied to overcome them;
- Future opportunities envisioned given the current rural energy projects and programme portfolio;
- Perceptions about current policy, financial and institutional constraints within the Ethiopian rural energy sector.

Project appraisals, feasibility studies and other documents related to energy access projects and programmes being implemented in Ethiopia were collected during the field visit. Following the field visit, questionnaires were developed to capture stakeholders' views of the rural energy access situation, with the same general areas of inquiry as the interviews. The questionnaires were then sent by email to eight organizations; 13 of the 16 people contacted replied (see Annex 1 for a list of respondents). Where needed, informal follow-up phone interviews and email exchanges were conducted. The stakeholders' perspectives were then analysed and structured as a guide to the process of mainstreaming.

## 3. MAINSTREAMING AND SECTOR WIDE APPROACHES (SWAPS)

Most developing countries frame their policies in the context of national development plans, embracing a set of quantitative targets and qualitative goals to be achieved within a given time period. The process of development planning usually starts from an ideological paradigm that sets a direction for the strategies. The country's specific needs are at the centre of development plans, but global factors often play a role as well. The strategies then lead to specific policies and projects, and as those are implemented, the experience gained may provide new insights that lead to changes in the projects, policies and underlying strategies.

In LDCs such as Ethiopia, however, the development of decentralized energy projects and programmes, especially in rural areas, are often driven not by national plans and strategies, but by the initiatives of external donors, especially when there are no clear, nationally owned sectoral policies. As they move ahead, they may lead to the development of policies, but in the absence of clear strategy driven by the country itself, there is a risk that the resulting policies may not be in the country's long-term interest (Sagasti et al. 2005).

### 3.1 The role of SWAps

In recognition of this problem, international donors have increasingly embraced so-called Sector Wide Approaches (SWAps). Under a SWAp, donors work closely with the government to craft a sector-wide policy and spending plan that is driven by the country's own priorities; donor funds then support that unified plan, with multiple donors often pooling their resources in coordination with the government, rather than working separately.<sup>9</sup> SWAps could be very useful in integrating sustainable energy access into development and ensuring that donor-supported projects serve the country's long-term needs. By bringing all actors and their activities together under a common umbrella, SWAps also allow for different actors to take on different aspects of a complex challenge, in line with their individual strengths and interests, but all working in tandem rather than separately.

SWAps have been quite successful in health and education, though they are not perfect: donors' commitments may be limited by their desire to stick with their "core" business, for example, and cross-sectoral issues may be hard to address. Although they are meant to be driven by governments, in reality they are often donor-initiated and technocratic, disconnected from political processes that might be crucial to their success (Boesen and Dietvorst 2007). They can aim unrealistically high, or be far too modest and short-term. There is also no single proven model; rather, there are key principles that are applied progressively over time, through a process determined by each country's conditions and priorities (*ibid.*).

### 3.2 The mainstreaming process

Before delving into the mainstreaming process, it is important to clarify *what* we seek to mainstream in this case. Energy access expansion can be top-down, as with Ethiopia's efforts to connect rural areas to the national electricity grid, or they can be bottom-up, as household energy programmes initiated by donors and NGOs often are. If energy access is to be sustainable, economically and environmentally, both approaches are crucial. As Maurer and Nonay (2009) note, the cost of connecting to the grid – the "last mile" – averages \$50–100 USD per household, a fraction (3%) of the total cost of grid expansion, but a prohibitive cost in areas with annual household incomes under \$500 USD. Decentralized (not grid-connected) renewable technologies, by comparison, have proven to be cost effective and affordable in remote rural areas in Brazil and Senegal, for example (Gómez and Silveira 2010; Thiam 2010). The UNDP (2006; 2007) has called for scaling-up and replicating successful community-based energy initiatives as a major strategy in expanding energy access.

Mainstreaming sustainable energy access starts by embedding the issue in the main political agenda, and then into the development strategies, plans and policies that grow out of that agenda. Raising awareness and creating strong political will are thus key elements. Drawing lessons from mainstreaming efforts in Mali, Rwanda and Senegal, the UNDP (2007) has found that developing MDG-based poverty reduction strategies at the national and regional level "creates the impetus and political space for re-introducing energy access for poverty reduction and for examining how energy access consideration can help achieve the MDGs". The government is responsible for identifying development priorities and allocating resources, but it also needs to discuss and negotiate those priorities with non-state actors.

The literature on mainstreaming climate change adaptation into development offers a useful model for integrating sustainable energy access. The UNDP-UNEP Poverty-Environment

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<sup>9</sup> For a succinct explanation of the SWAp concept, see the World Health Organization's glossary: <http://www.who.int/trade/glossary/story081/en/>. For a more in-depth discussion of SWAps in practice, see Boesen and Dietvorst (2007), cited briefly in the text above.

Initiative (2011) defines mainstreaming as an iterative process of integrating adaptation (or in this case, energy access) into policy-making, budgeting, implementation and monitoring processes at national, sector and subnational levels. It adds that this is “a multi-year, multi-stakeholder effort”, grounded in the contribution of adaptation (or energy access) to “human well-being, pro-poor economic growth, and achievement of the MDGs”. It also entails working with “a range of government and non-governmental actors, and other actors in the development field” (p.3).

The UNDP-UNEP approach to mainstreaming involves three key steps: 1) finding the entry points and making the case; 2) mainstreaming into policy processes; and 3) meeting the implementation challenge. Applied to energy access, the process might look as follows:

- **Make the connection between sustainable energy access and development goals:** Identify linkages with established national priorities, such as poverty reduction, improved health, new income-generating opportunities, etc., and demonstrate how sustainable energy access can support those priorities. Understand the policy and institutional contexts, and find opportunities to integrate energy access, such as ongoing national or sectoral planning processes, or specific projects.
- **Integrate sustainable energy access into policy processes:** Integrate energy access issues into national and sectoral plans and policies as they are being developed, drawing on country-specific evidence.
- **Ensure effective implementation:** This means ensuring that sustainable energy access is integrated into budgets and financing, policy and project implementation, and monitoring, and working to make mainstreaming a standard practice.

The sections that follow examine those three steps in more detail. First, however, Box 1 below summarizes the key lessons from the literature about essential elements for successful mainstreaming of sustainable energy access in SWAs and national development plans.

**Box 1: Key elements for mainstreaming sustainable energy access projects into national plans and SWAs**

**Political commitment:** The national government must take the leadership role and ensure ownership of priorities, policies and strategies. This commitment must be sustained over time and be reflected in ongoing policy development and implementation.

**Strong, clear plans and policies:** National plans and policies, including sectoral policies, should build on broad stakeholder consultation and set out clear short- and medium-term goals, with a view to ambitious longer-term targets. They should consider ways to measure progress, and identify roles for different actors. An enabling policy for the energy sector should cover a range of policy instruments geared to institutions, market, incentives, subsidy, regulations, and taxation.

**Institutional framework:** A strong institutional framework is needed that encompasses all relevant state and non-state actors. It should emphasize partnership and collaboration among stakeholders to work under a common umbrella for planning, managing and implementing policies and strategies.

**Financial mechanism:** Well-functioning medium- to long-term financing is essential, with appropriate ways to leverage new financial resources for suppliers, rural energy end users and local financial institutions. Transparent, efficient and accountable government budget systems can encourage donors to provide greater local control of resources.

## 4. FINDING ENTRY POINTS FOR MAINSTREAMING ENERGY ACCESS

A first step in seeking to mainstream decentralized rural energy options is to understand Ethiopia's current energy strategy, and how it has evolved in recent years. This section provides an overview of Ethiopia's energy policies in the context of development and poverty reduction, with the goal of identifying opportunities to integrate decentralized approaches.

### 4.1 Review of the national development plans

Ethiopia's three-year Sustainable Development and Poverty Reduction Program (MoFED 2002) was developed in 2002, in consultation with the World Bank and the International Monetary Fund. The strategy paper's goal for the power sector was to improve the quality and adequacy of Ethiopia's power supply by developing hydropower and bringing "cost-effective and efficient power" to customers. Generation capacity was to increase from 327 MW to 663 MW, the number of electrified towns was to rise from 258 to 651, and the share of the population with access to electricity was to rise from 13% in 2002 to 17% in 2004/05. The paper also mentions, in one sentence, that the private sector could work on mini-hydropower, solar, wind and other renewables.

Ethiopia's second national poverty reduction strategy, the Plan for Accelerated and Sustained Development to End Poverty (MoFED 2006), built on the 2002 plan, including its prioritization of hydropower and grid expansion in the energy sector. It reported that generating capacity has increased from 473 MW in 2001/02 to 791 MW in 2004/05 (the inconsistency with the earlier plan's figures was not noted), and high-voltage transmission lines had increased from 6,304 km to 7,925 km. In a small acknowledgment of non-grid-connected options, the plan did separately report an increase in generation capacity of "self-contained systems", from 20 MW to 23 MW. And it recognized the importance of energy access, noting that electricity "is essential both as an input into the growth of the modern sector ... but also as an essential ingredient of the rural transformation agenda". Without energy access, the plan added, the rural poor are often stuck in a "vicious circle" of energy poverty, in which lack of energy limits productivity, which limits income, which limits the ability to buy improved energy services. This, in turn, perpetuates reliance on firewood, further degrading the resource base (p. 137).

The 2005/06-2009/10 plan included a major new initiative, the Universal Electricity Access Programme (UEAP), which aimed to reach more than 6,000 rural towns and villages with some 24 million residents, to bring power to about 50% of the country overall. A total of 4,091 MW in new generating capacity was to be added, based on a "least-cost analysis" which favoured small and large hydro, along with some coal, gas and wind power. "In some cases", small-localized off-grid power sources (solar and mini-hydro, e.g.) were to be built. In addition, the private sector, communities and cooperatives were to be allowed to participate in off-grid transmission, distribution, and sale of electricity. At the same time, the plan called for extending the grid to reach neighbouring Sudan, Djibouti and Kenya, to export electricity.

Ethiopia's current development plan, the Growth and Transformation Plan 2010/11–2014/15 (MoFED 2011), explicitly embraces a "Green Development Strategy" that melds continued rapid economic growth with sustainability, aiming to move Ethiopia closer to its longer-term vision of becoming a middle-income country by 2020-2023. It builds on significant progress over the previous five years; although the 2010 targets were not quite met, 5,163 towns and villages were connected to the grid, for example; electricity access was greatly expanded, and 3 million efficient biomass-burning stoves were distributed.

The new strategy sets ambitious new targets for the energy sector, including a five-fold increase in hydropower capacity, to 10,000 MW; a near-doubling of power distribution lines, a doubling of the number of consumers with electricity service, and 75% coverage of electricity services, up from 41% at the beginning of the new five-year period. Along with previously implemented measures – which also included capacity-building and energy efficiency and waste reduction efforts – the new plan adds a biofuels development programme, more alternative-energy development, a strategic petroleum reserve, and new oversight and regulation of downstream petroleum operations.

It is clear that great progress has been made, and the Ethiopian government is paying far more attention to sustainable energy access than a decade ago. Still, enormous challenges remain. For perspective, Ethiopia has 86 million people,<sup>10</sup> and as of 2011, only 23% of households had electricity (Central Statistical Agency 2012); in rural areas, where the vast majority of the population lives, just under 5% of households were connected to the grid. This highlights the importance of tracking the developmental impacts of energy infrastructure investments on the ground: yes, Ethiopia is making enormous strides in rural electrification, but for millions of people living in rural towns and villages, modern energy access is still beyond reach.

Another major challenge that arises with grid expansion in particular is that every connection increases electricity demand, and Ethiopia has not always been able to keep up. In fact, the country had to postpone a large part of the World Bank-financed Second Electricity Access Rural Expansion Project, approved in 2007, because it didn't have the generating capacity to meet projected demand (The World Bank 2011). A moratorium on residential connections was imposed from 2008 to 2010, work resumed in 2011, and the completion date was postponed from December 2011 to November 2013 (Elahi 2012). Notably, although the project's off-grid component should not have been delayed by power availability, it was delayed as well; a mid-term review in April 2012 reported that the Rural Electrification Fund was only then finalizing the bid evaluation process for 25,000 solar home systems included in the plan, and the design and technical specifications for five micro-hydro schemes were "under development" (ibid.).

#### **4.2 National bioenergy development and utilization strategies and programmes**

The Biofuel Development and Utilization Strategy of Ethiopia (Ministry of Mines and Energy 2007) aims to promote biofuels production as a form of economic development and to substitute for fossil-fuel imports, while protecting food security. It focuses on biodiesel from jatropha, castor crop and palm oil, and bioethanol from sugarcane; all four crops were already grown in Ethiopia when the strategy was developed, and some bioethanol was being produced. Citing another government study, the strategy finds potential for up to 1 billion gallons of ethanol to be produced annually, equivalent to seven times the country's gasoline consumption. It does not estimate biodiesel potential, but finds 23.3 million ha of suitable land to grow the crops. Along with meeting local demand, biofuels would be sold in international markets. It is noteworthy

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<sup>10</sup> The latest Central Statistical Agency estimate, from July 2013, is 85.9 million; see Fekade, B. (2013). Ethiopia's population projected to reach 94 mln after ten years. *The Reporter – English Edition*, 6 July. Addis Ababa. <http://www.thereporterethiopia.com/index.php/news-headlines/item/696-ethiopia%E2%80%99s-population-projected-to-reach-94-mln-after-ten-years>. However, note that the World DataBank estimate is much higher, 91.73 million in 2013; see <http://data.worldbank.org/country/ethiopia> [accessed 6 December 2013]. The CIA Factbook estimate is even higher, 93.9 million as of July; see <https://www.cia.gov/library/publications/the-world-factbook/geos/et.html> [accessed 6 December 2013]. Ethiopia's last census, in 2007, counted 73.8 million people.

that the vision involves large-scale farming and processing plants, with no measures for small-scale production to meet rural households' energy needs.<sup>11</sup>

Ethiopia also has a National Domestic Biogas Programme (NDBP), developed with SNV Ethiopia (the Netherlands Development Organisation) and launched as a pilot in 2008 (SNV Ethiopia and EREDPC 2007). Biogas has been produced in Ethiopia since 1979, but had not thrived for various technical, logistical and other reasons. Amid growing deforestation and fuelwood scarcity concerns, a new biogas push was seen as a more sustainable alternative that could meet rural households' needs and also bring cash income. The programme takes a market-based approach, inviting the private sector to market biogas to households, build facilities and distribute the gas; microfinance is to be provided to help poor households with up-front costs. External donors and carbon credits are to help finance the programme; some 14,000 households are to benefit in the five-year pilot phase.

### **4.3 Rural electrification strategies and programmes**

Previous sections have noted the role of rural electrification in Ethiopia's development plans. A key part of this is the Universal Electricity Access Programme, launched in 2005 and managed by EEPCO, which follows a multi-donor approach and depends on financial support (grant and concessional loans) from multilateral development banks (mainly the World Bank and African Development Bank. On the off-grid side, meanwhile, since 2002, the Government of Ethiopia has sought to engage the private sector and other non-state actors in rural electrification, though with limited success. The Rural Electrification Fund (REF), established in 2003, has promoted the decentralized deployment of cost-effective renewable energy technologies mainly through partnerships between the Ethiopian Rural Energy Development and Promotion Centre (EREDPC) and non-state actors. However, businesses themselves have not taken much initiative to enter this market.

Yet the opportunities are "huge", according to a Christian Aid analysis (Lakew et al. 2011). Even if Ethiopia's rural grid expansion efforts continue at a rapid pace, population growth alone will make it difficult to keep up: as of 2010, there were 67 million people in 14 million households in rural Ethiopia, and that number is expected to grow to 87 million people in 18 million households by 2020.<sup>12</sup> Even assuming that 9 or 10 million more households are connected to the grid, at least 8 million others will not be – and they are prime candidates for off-grid solutions. Christian Aid estimates that more than 5 million households could benefit from solar home systems (ibid.).

### **4.4 Climate change adaptation/mitigation action plans and strategies**

As noted earlier, Ethiopia now generates 99% of its electricity from hydropower (EEPCO 2012), and large-scale expansion of hydropower is a development policy priority. Given Ethiopia's extraordinary hydropower potential – an estimated 45 GW – this is a natural choice. However, as highlighted by a 2009 conference in Addis Ababa, it also makes the power system vulnerable to climate change and natural hazards (Heinrich Böll Foundation 2011). Climate is expected to change rainfall and temperature patterns, affecting both water and biomass resources; therefore, diversifying the power mix is crucial to reducing the energy sector's

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<sup>11</sup> The Ethiopian government is now working with the international NGO Project Gaia to pilot a distributed ethanol supply model, setting up micro-distilleries to supply both rural and urban households. For an overview, see <http://www.projectgaia.com/page.php?page=ethiopia>; or <http://www.ndf.fi/project/ncf-fuel-waste-demonstrating-feasibility-locally-produced-ethanol-household-cooking-addis>.

<sup>12</sup> Note that this refers only to the rural population, which, as noted in the introduction, was estimated to make up 83.2% of Ethiopia's total population in 2010. Rapid urbanization has led the Central Statistical Agency to project that by 2017, slightly more than 20% of the population will live in urban areas. See footnote 10 for key references.

vulnerability. There are numerous options: as noted by Gosaye Mengistie, director of energy study and development at the Ministry of Mines and Energy, at the 2009 conference, Ethiopia also has more than 5 GW of geothermal potential and 10 GW of wind power potential, plus it can develop solar power, generation from biomass residues, and other options (*ibid.*, p. 10).

The National Adaptation Programme of Action submitted by Ethiopia to the United Nations Framework Convention on Climate Change (UNFCCC) in 2007 recognizes this vulnerability, but only in passing, noting that current climate variability is already affecting Ethiopia's food security, water and energy supply, poverty reduction and sustainable development efforts, and is also causing natural resource degradation and natural disasters such as floods and droughts. "Those challenges, the NAPA notes, "are likely to be exacerbated by anthropogenic climate change" (National Meteorological Agency 2007, p.7). However, the plan does not include any proposals to diversify electricity production through decentralized sustainable energy technologies.

Ethiopia's proposed Nationally Appropriate Mitigation Actions (NAMAs), however, show a great deal more promise in this regard. They include seven wind power projects with a total of 764 MW of capacity, to be completed between 2011 and 2013; six geothermal power projects with a total of 450 MW of capacity, to be completed by 2018; projects to produce ethanol and biodiesel for transport and household use; and multiple projects to generate electricity from renewable sources for off-grid use and direct use, including installation of 150,000 solar home systems, 300 wind pumps, 300 solar pumps, 3,000 institutional photovoltaics, 3 million solar lanterns, 25,000 household biogas digesters, and 1,000 institutional biogas plants, among other measures (UNFCCC 2011, pp.15–18).

These plans are starting to come to fruition. Wind power capacity is growing rapidly, most notably with the completion, in October 2013, of the 120 MW Ashegoda wind farm, Africa's largest, built by the French Vergnet Group.<sup>13</sup> Several other projects are in the works, including a Chinese-built 204 MW facility that is under construction. Geothermal capacity is still minimal – just the 7.3 MW Aluto Langanu facility, opened in 1999 – but in October 2013, Ethiopia signed a preliminary agreement with Reykjavik Geothermal, a U.S.-Icelandic firm, to build a 1,000 MW geothermal power plant, Africa's largest, in the volcanically active Rift Valley. The company has also suggested that Ethiopia's geothermal potential could be three times as much as previously estimated, 15 GW rather than 5 GW.<sup>14</sup> And EEPSCO, the national utility, has said it intends to expand Aluto Langanu to boost production to 70 MW.<sup>15</sup>

In 2011, the Ethiopian government launched the Climate Resilient Green Economy initiative (Federal Democratic Republic of Ethiopia 2011), a long-term economic strategy that builds on the Growth and Transformation Plan. The Environmental Protection Authority (EPA) has been tasked with preparing and coordinating the strategy, with the support of the Global Green Growth Institute. A key source of funds for the proposed initiatives is international climate finance, and some proposed NAMAs are incorporated in the plan. The energy sector is prominently featured in the strategy; total power demand is projected to grow from 4 TWh in 2010 to more than 75 TWh in 2030, and the plan expresses confidence that the energy sector can not only meet that demand, entirely from clean or renewable sources, but also produce enough electricity to export.

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<sup>13</sup> See Vaughan, J. (2013). Ethiopia spearheads green energy in sub-Saharan Africa. *AFP*, 4 December. <http://news.yahoo.com/ethiopia-spearheads-green-energy-sub-saharan-africa-155249489.html>.

<sup>14</sup> See Maasho, A. (2013). Ethiopia to get \$4 billion investment for leap into geothermal power. *Reuters*, 24 October. <http://www.reuters.com/article/2013/10/24/us-ethiopia-geothermal-idUSBRE99N10920131024>.

<sup>15</sup> See Woldegebriel, E. G. (2013). Geothermal energy remains in the shadow of hydropower in Ethiopia. *Thomson Reuters Foundation*, 23 September. <http://www.trust.org/item/20130923101535-51163/>.

## 5. FIELD RESEARCH: POTENTIAL FOR ADOPTION OF THE SWAP MODEL

This section presents the findings of the field research conducted in Ethiopia in 2011 to gauge the country’s readiness for adopting the Sector Wide Approach (SWAp) model in the rural energy sector. It looks at four key factors: the institutional framework; coordination among non-state actors; financial mechanisms, and the national energy policy framework.

### 5.1 Institutional framework

Energy generation and delivery in Ethiopia involves a wide range of state and non-state actors, as shown in Table 1 below. Clearly there is a need for a strong lead institution to harmonize and coordinate all efforts. While the national grid (the “Interconnected System”, or ICS) is the sole responsibility of Ethiopia Electric Power Corporation (EPCO), the Ministry of Water and Energy is responsible for off-grid rural electrification, and the two institutions follow different approaches. Although technically, EPCO functions under the Ministry of Water and Energy, in the two-track rural electrification strategies there is no integrated master plan, implementation strategy, or clear resource planning methodology.

**Table 1: State and non-state actors involved in energy access expansion in Ethiopia**

Actor	Activity									Energy-related activities
	Financing	Consultation	Facilitation	Implementation	Promotion	Technical assistance	Policy and sector development	Capacity development	Networking or coordination	
World Bank	↑	↑	↑			↑	↑	↑		1-7,9
UNDP	↑	↑				↑				1,6
UNEP		↑	↑					↑	↑	1,3,6
African Development Bank	↑									5
EU Energy Initiative	↑							↑		-----
GIZ		↑	↑		↑	↑	↑			1,4,6
SNV						↑	↑	↑		1,8
HOAREC			↑		↑		↑			1-3, 6,9
Stiftung Solarenergie	↑			↑		↑		↑		6
Gaia Association			↑	↑	↑	↑				2,9
Ministry of Water and Energy/ EREDPC		↑	↑	↑	↑	↑	↑		↑	1-4, 6,8,9
Ethiopian Electric Power Corporation (EPCO)				↑			↑			3,5,7

1-Improved stoves; 2-Bio-ethanol /Biodiesel ; 3- Wind; 4- Micro hydro; 5- Mega hydro 6- Solar PV systems; 7- Geothermal; 8- Domestic biogas; 9- Waste to energy

Source: Survey responses. See Annex for a detailed list of respondents.

Our field research shows the lack of an integrated plan is regarded by non-state actors as the main challenge to setting comprehensive goals and achieving their organizational objectives. The World Bank is supporting the development of the grid-based system through several very large-scale projects involving EPCO. The institutional capacity of the Ministry of Water and Energy – especially the Ethiopian Rural Energy Development and Promotion Centre (EREDPC) – to manage decentralized sustainable energy access projects, however, is

considered weak by many development partners interviewed. Representatives of non-state actors such as German Development Cooperation (GIZ), the Netherlands Development Organisation (SNV) and the Gaia Association said there is a need for institutional strengthening and restructuring of EREDPC to facilitate partnerships and coordinate the currently fragmented energy access projects/programmes.

It should be noted that the Ethiopian government recognizes this problem, even if it has been slow to solve it. The project appraisal for the Second Electricity Access Rural Expansion Project (The World Bank 2007) notes that the Ministry of Energy “is working to better coordinate the existing grid and off-grid investment master plans”, and the Ethiopian Electric Agency “has identified the need to prepare a clear regulatory framework to address the physical integration of grid and off-grid systems in the future”.

## **5.2 Coordination among non-state actors**

Although EREDPC has a mandate to coordinate activities among non-state actors, almost all representatives of NGOs surveyed or interviewed reported a lack of strong government coordination, such as setting a common technical standard for specific technologies or removing barriers to private-sector participation in energy initiatives. For example, GIZ and Stiftung Solarenergie are assisting in technical capacity-building within the solar PV sector without a common national standard; SNV and the Gaia Association are facilitating private-sector involvement in scaling-up the use of modern household fuels.

There is also a need to coordinate World Bank-funded projects with other energy initiatives. For example, the World Bank is the biggest financial contributor to the Universal Electricity Access Programme and is providing institutional support to EEPKO for its implementation; the World Bank also financed Ethiopia’s master plan for off-grid rural electrification. Meanwhile, the European Union has financed capacity development projects for off-grid electrification under its Energy Initiative (EUEI). There is no evidence of noticeable coordination between the World Bank and the EU, and this has arguably undermined the implementation of the off-grid electrification master plan.

## **5.3 Financial mechanisms**

Medium- to long-term financing is indispensable for ensuring the integration of sustainable energy access in the national budget and for building a sustainable delivery framework to reach large rural communities. Access to finance for Ethiopia’s rural energy sector draws upon various funding sources, internal and external. The Universal Electricity Access Programme receives significant funding from both the national budget and from bilateral and multilateral donors (as grants or concessional lending). On the other hand, the decentralized approaches overseen by the EREDPC are funded in two ways: government-owned projects are supported by the Rural Electrification Fund, which is mainly financed by the World Bank, while energy access projects (both cooking technologies and rural electrification) supported by various development partners use a mix of end-user equity, government finance and grants, and concessional lending from the partners.

On neither front is there any assurance that funds will continue to flow in the long term – and in some cases, the end is in sight. For example, key GIZ and SNV activities are slated to be phased out at the end of this year, due to lack of continued financial commitments. Other organizations, such as the Gaia Association, the Horn of Africa Regional Environment Centre (HOAREC) and Stiftung Solarenergie do not have secure long-term finance, but rather, like most NGOs, depend on bilateral and multilateral funding sources. Several countries, including Austria, India, Germany, the UK and China, have been supporting Ethiopia’s rural

energy sector, but as officials at both EEPKO and the EREDPC noted, there is no way of knowing whether such support will continue to flow in the long term, which makes bilateral aid a highly unpredictable source of finance.

#### 5.4 National energy policy framework

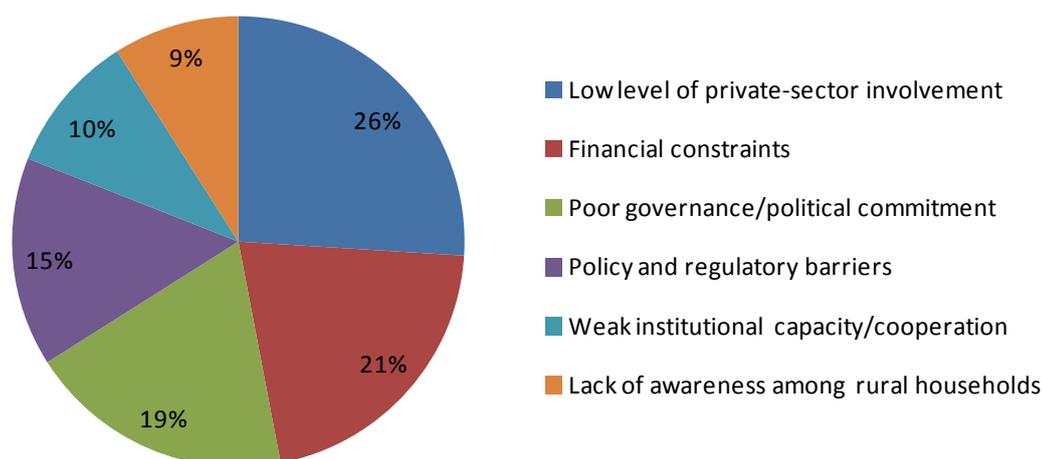
Although Ethiopia's energy and development policies, as discussed above, have increasingly recognized the importance of decentralized, sustainable energy options for rural areas, in practice, the government's efforts have focused on large-scale, grid-based electrification. Off-grid energy access expansion has been left to non-state actors, mainly local NGOs. Moreover, the national policies have failed to provide mechanisms to mainstream decentralized energy projects or to overcome implementation barriers. Thus, most survey respondents said there is a need for policy revisions to incorporate new instruments, such as a feed-in tariff, tax exemptions and other economic incentives and subsidies to encourage the participation of the private sector.

Furthermore, respondents argued that Ethiopia should learn from other developing countries and adapt its policies accordingly. One respondent cited Kenya and Tanzania as successful examples of countries that have adopted feed-in-tariffs, for example; another respondent argued that tax and import-duty exemptions for solar home systems are urgently needed to stimulate this market. The need for a comprehensive, integrated energy policy was also emphasized.

### 6. A KEY CHALLENGE: ENGAGING THE PRIVATE SECTOR

Clearly there are many challenges in implementing sustainable energy technologies in rural Ethiopia, but the single most-cited issue in the survey was the low level of private-sector involvement, followed by financial constraints. Figure 2 below shows the breakdown of responses to this survey question.

**Figure 2: What is the greatest challenge in implementing sustainable-energy initiatives in rural Ethiopia?**



Source: Survey responses.

Non-state actors see the private sector as crucial to scaling up and replicating energy access initiatives in rural Ethiopia. Most energy access projects and programmes currently being implemented are public-private partnerships where the state, donors and/or NGOs cover part of the cost. Local businesses, however, are extremely risk-averse and do not develop and initiate their own sustainable energy projects, survey respondents said; instead, they only get

involved in response to project calls. Several factors were highlighted as reasons for this low level of engagement:

- The sustainable energy market in Ethiopia is still small; effective business chains and competitive market models have not been formed.
- Rural customers lack the capacity to pay for energy technologies and services.
- There is a general suspicion of the private sector in rural areas; traditionally the private sector is viewed as profit-seeking and/or dishonest.
- There is poor management capacity and a lack of innovation in the private sector.
- Both the grid expansion and the off-grid electrification plan are revised very frequently, making it difficult to plan investments.
- Financial incentives for the rural energy sector are limited, and companies do not have enough capital of their own.

Engaging the private sector is part of the EREDPC's mandate, and the agency does work with companies to identify potential market opportunities and assists with promoting their products and services. However, the survey responses suggest there is a need for significantly more effort in this regard.

The Ethiopian government has indicated a desire to encourage private-sector development of off-grid electricity services, especially renewable energy-based "mini-grids" (The World Bank 2007). The project appraisal for the Second Electricity Access Rural Expansion Project noted that the availability of funds under existing programmes had stoked the interest of several private entities, especially rural cooperatives, and the government envisioned providing additional funds to support such initiatives, with support from the World Bank. Yet in practice, based on the minimal progress to date, this does not appear to be a priority.

The grid expansion can also directly undermine off-grid projects – and the private-sector investments that support them. While in theory, grid and off-grid projects should be serving different markets, not competing with each other, as noted above, plans change, and off-grid projects can't compete with the lower-priced power that EEPCO brings. Thus it is crucial to better coordinate both sides and try to provide some certainty for developers.

### **6.1 Lopsided investments in energy access**

The single biggest issue, however, is arguably funding: The vast majority of funds being invested in energy access in Ethiopia are still going to expanding the grid, under the direction of EEPCO. For example, the Second Rural Electricity Expansion Project allocated \$171.1 million USD (85% of the total \$200.7 million budget) to the grid expansion, and only \$20.5 million to off-grid components, including "mini-grids" and solar PV installations to support schools, clinics and other services, plus \$9.1 million for capacity-building and pilot projects (The World Bank 2007).

With limited financial support, businesses and rural cooperatives are forced to make significant up-front investments of their own, with the concomitant risks. The Rural Electrification Fund provides loans, but it is up to private actors to take the initiative – and based on information from the EREDPC, very few do. A 2009 market analysis by the German government (Shanko 2009) found potential for roughly 100 MW of micro- and pico-hydropower installations (under 500 kW each) built by the private sector and cooperatives, and for more than 1,000 MW of mini- and small-hydro installations by the private sector, NGOs and the government, primarily in the west and southwest of the country. However, given that most demand centres that could absorb and pay for mini- and small hydro, especially, are either already connected to the grid or are slated to be, the off-grid market for

such plants is “extremely limited”. This market segment will thus remain undeveloped, the analysis predicted, until there is a legal framework for developers to be able to sell power to the grid – at which point the market could develop “very quickly”. A World Bank representative interviewed for this study said the bank is encouraging the Ethiopian government to adopt a feed-in tariff and allow a full cost recovery tariffs for private operators. With favourable policies in place, NGO support, and increasing urbanization and population growth, the market for micro- and pico-hydro could be worth more than 200 million euros, and for mini- and small hydro, “over a couple of billion euros”, the German analysis predicted (Shanko 2009).

In the meantime, NGOs and individual donors are supporting private-sector development through technical assistance and promotion of sustainable energy technologies to rural communities, among other activities. Stiftung Solarenergie, for example, distributes and installs rural solar home systems in partnership with local enterprises. It sets itself up as a bridge between end users and local enterprises, offering credit to rural communities through a revolving fund and providing technical training.

## **6.2 Access to modern fuels for cooking**

Several non-state actors are involved in rural energy projects that involve providing clean energy for cooking, mostly working with local enterprises for implementation. The field research for this report suggests that stronger policy support is needed to stimulate private-sector and community-based activities.

In the National Domestic Biogas Programme, the private sector is included in activities such as promotion, user identification, importing and producing components of biogas, and service delivery (SNV and EREDRC 2007). In the first phase of the programme, SNV’s market-oriented approach envisages rural biogas users as central players who invest in new technologies and build demand for biogas. However, even though SNV is creating awareness through intensive training and promotion of biogas technologies, it is unlikely that a market-based approach will work with the rural poor. People in most rural communities have never cooked with gas, and thus have no basis on which to judge its value relative to low- or zero-cost biomass fuels. As a result, any effort to build a market has to start by getting households to try biogas, which may require providing it free or at a very low cost. Biogas is a good option for cattle-rich rural Ethiopia, a Christian Aid analysis notes (Lakew et al. 2011), but the digesters do cost a lot: Birr 8,000-16,000, with a typical unit costing Birr 13,000 (\$765 USD). Government grants cover Birr 5,000 of the cost, but users must pay the rest; credit is available from microfinance banks. Although the programme, launched in 2008, had set out to get 14,000 domestic biodigesters installed within five years, as of June 2011, only 1,400 units were in place (ibid.).

Ethanol for household cooking was introduced in Ethiopia in 2004 by the Gaia Association. As noted in an earlier section, the government has prioritized the scaling-up of biofuels production – for both household use and transport – but although the stoves were well received in Gaia’s initial pilot study, ethanol cookstoves have not gained a significant market share. A recent Stockholm Environment Institute study (Takama et al. 2011) found households in Addis Ababa were willing to invest in the stoves, but poorer households were cost-sensitive, especially with regard to up-front costs. A recent decline in kerosene use and return to charcoal, apparently linked to prices, further highlighted the affordability issue. At the moment, however, the government is subsidizing kerosene, which skews the market towards the fossil fuel. The Gaia Association is working to make ethanol stoves more affordable by promoting local production of clean cooking stoves, linking local enterprises

with European manufacturers, and also encouraging production of bioethanol from sugarcane by-products and agricultural residues.

## 7. PROSPECTS FOR SUSTAINABLE ENERGY ACCESS FINANCE: THE EU

The European Union is the world's leading donor on energy. Over the past five years, it has spent approximately €1 billion on capacity-building and energy access expansion in developing countries. It has used a range of financial instruments and engaged in all aspects of energy provision, from electricity to governance, regulation and energy efficiency. For example, The ACP-EU Energy Facility is an innovative financing mechanism set up under the EU Energy Initiative (EUEI) with the purpose of supporting projects which enhance access to sustainable and affordable energy services for the poor living in rural and peri-urban areas in African, Caribbean and Pacific countries.

In its second round of funding, the Energy Facility explicitly prioritized sustainable energy access projects which benefit rural, poor communities and make use of local resources and decentralized solutions. A new €55,000,000 call for proposals of the ACP-EU Energy Facility was open in early 2013 to support projects on increasing access to sustainable and affordable energy services for the poor living in rural and peri-urban areas, for this call the focus is decentralized solutions, grid development or extension projects are not accepted for this third round. Direct EU support for projects in Ethiopia have been limited over the past decade, but this is not surprising, since EU aid is allocated based on the priorities outlined in developing countries' strategy papers, and Ethiopia has not yet made a strong case for decentralized rural energy access expansion.

The EU's Agenda for Change (European Commission 2011) sets out to increase the impact of EU aid by focusing on a narrower set of priorities, including sectors that have "strong multiplier impact on developing countries' economies and contribute to environmental protection, climate change prevention and adaptation" – specifically, sustainable agriculture and energy. Also to be supported are sectors that serve as "foundations for growth", such as health and education, and "enabling vectors" for sustainable growth, such as strengthening the business environment and regional integration). For Ethiopia, this could serve as a catalyst to undertake sector-wide planning to mainstream sustainable energy access and accelerate off-grid development. The European Commission's Energizing Development initiative, unveiled in April 2012 and framed within the UN Sustainable Energy for All (SE4All) initiative,<sup>16</sup> provides yet another incentive: €50 million for the establishment of a Technical Assistance Facility to support countries that "opt in" to SE4All.

The UN programme itself, of course, is a powerful motivator. Countries that "opt in" are expected to create an enabling policy environment for energy schemes across all sectors of the economy, and ensure a supportive regulatory framework to allow for access to various sources of finance (Birol et al. 2012). An important output for participating countries will be the development of National Action Plans to achieve universal energy access by 2030, specifying target groups, finance mechanisms, institutional design, etc.

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<sup>16</sup> See the press release: [http://europa.eu/rapid/press-release\\_IP-12-372\\_en.htm](http://europa.eu/rapid/press-release_IP-12-372_en.htm).

## **8. THREE STEPS TO MAINSTREAMING SUSTAINABLE ENERGY ACCESS**

The policy review and field research conducted for this paper reveal strategic gaps in the national development plans and their implementation which are hampering progress towards sustainable energy access across Ethiopia. In particular, the lack of participation of non-state actors in policy processes related to finance and regulation of the energy sector was identified as a major barrier. Moreover, the low participation of private actors in the Ethiopian rural energy sector was shown to be caused by institutional and policy gaps and deficiencies. This section offers a proposed way forward, taking three steps to implement a sector wide approach (SWAp) to energy access.

### **8.1 Prioritizing sustainable energy access at the national level**

The Ethiopian government needs to make a strong commitment to prioritizing sustainable energy access in rural areas, with a new emphasis on off-grid solutions. To incorporate feedback from non-state actors, it should develop a consultative and multi-stakeholder decision-making process at the national level. To ensure that progress is accurately tracked, new indicators will have to be identified to quantify electricity access, with unambiguous national targets pegged to those indicators.

As part of this process, Ethiopia will also have to take leadership of its own energy development, moving away from the current donor-driven approach. Ensuring effective government leadership in designing plans and strategies is crucial for the success of a SWAp. However, a political shift of such magnitude is likely to be a lengthy and complex process, and to help focus it and keep it on track, non-state actors' involvement will be essential. Those actors also need to be aware of their own priorities and approaches to finance and how these can shape the long term institutional arrangements in developing countries. For instance, multilateral institutions such as the World Bank and African Development Bank have favoured large-scale energy infrastructure projects, which are valuable but will not reach significant numbers of rural residents. Ethiopia's institutions have adapted to meet the needs of those large-scale projects, but appear to be less capable of administering and coordinating smaller-scale, off-grid alternatives.

### **8.2 Meeting financial, institutional and policy conditions for a SWAp**

Appropriate, guaranteed financial mechanisms are a key part of adopting a SWAp in the rural energy sector. Short-term funding has limited the activities of non-state actors, mainly local NGOs. A SWAp can help Ethiopia secure longer-term commitments from large donors. The optimal approach should involve multiple donors with sustained partnerships and reliable funding mechanisms geared to supporting off-grid initiatives. Those financial commitments and the obligations that come with them would, in turn, put pressure on Ethiopia's government to make decentralized rural energy access a priority, truly on par with grid expansion.

Ethiopia's energy policy also has to be revised accordingly; SWAps demand a comprehensive sectoral policy. Non-state actors could provide international expertise and examples from other developing countries. Policy instruments should be designed to remove barriers for private-sector participation and help non-state actors meet their missions and objectives. A strong institutional framework can be built if all parties are engaged in planning and decision-making, under the leadership of a strong governmental institution. EEPSCO has developed a strong capacity to handle large-scale grid expansion projects; similar strength is now needed for decentralized initiatives. This could be achieved by restructuring and strengthening the EREDPC and Rural Electrification Fund within the Ministry of Water and Energy.

### **8.3 Increase participation of private actors at the local level**

Increasing participation of local-level private actors is acknowledged as essential to creating sustainable delivery systems and up-scaling sustainable energy services. This will require a concerted effort from both state and non-state actors. Steps 1 and 2 will help address the major problems and create a better environment for private-sector investment. An integrated rural electrification master plan, with both grid and off-grid tracks and a coordinated implementation strategy, will be necessary. To support other types of rural energy access initiatives, such as clean cookstoves, new financing opportunities will be particularly valuable.

## **9. CONCLUDING REMARKS**

Ethiopia has made significant progress in recent years in expanding energy access, but the country's experience also highlights many of the challenges in providing sustainable energy for all. Even though the government has recognized the importance of energy access in rural areas and included energy access in its strategic planning, only 1 in 20 rural households has electricity. The government efforts have focused on grid extension, but not all towns and villages can be reached by the grid – and even where the grid has arrived, the cost of connecting a house may be prohibitive. Off-grid options, meanwhile, have been slow to take hold because of limited funding, lack of private-sector engagement, and lack of government leadership and institutional capacity. Even promising initiatives such as the promotion of domestic biogas and clean ethanol cookstoves, both supported by international donors and NGOs, have been slow to scale-up.

Yet clearly, the potential is there, and the rise of sustainable energy to the top of the United Nations' and the European Union's agenda creates an opportunity to accelerate progress on rural energy access, in Ethiopia and across Africa. Carbon finance could also be a valuable source of funding. And several bilateral donors and NGOs are enthusiastic.

The key, then, is to address the fundamental policy and institutional gaps that have prevented the development of a coordinated, balanced, truly sustainable rural energy expansion programme for Ethiopia. Our analysis and field research suggest that Ethiopia can count on significant technical and financial assistance if it undertakes this effort – among others, from funders who are already supporting energy projects in the country. The potential benefits are huge: greatly improved quality of life and new economic opportunities in rural areas, a large infusion of new investment, new sources of revenue, and a chance to not only achieve the Millennium Development Goals, but become a model for the new “green economy” in Africa.

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**ANNEX: STAKEHOLDERS INTERVIEWED AND/OR SURVEYED FOR THIS REPORT**

<b>Category</b>	<b>Organization</b>	<b>Name and title</b>
Non-state actors	World Bank country office	Mr. Rihan Elahi, senior energy specialist
	United Nations Development Programme country office	Ms. Tigist Admassu, programme assistant, GEF small grant programme, and Mr. Zeleke Tesfaye, national coordinator
	United Nations Environment Programme liaison office	Mr. Paolo Mastropietro, project officer and energy expert
	African Development Bank	Mr. Solomon Assefa, senior energy and infrastructure specialist
	GIZ – German Development Organization	Mr. Samson Araya, bioenergy department acting head ; Mr. Mesfin Shimeles, senior energy advisor, electrification department
	SNV – Netherlands Development Organisation	Mr. Willem Boers and Dr. Getachew Assefa, senior advisors on biogas and renewable energy
	Stiftung Solarenergie	Mr Samson Tsegaye, country representative
	HOAREC/N – Horn of Africa Regional Environmental Centre /Network	Mr. Abiy Ashenafi, energy programme coordinator
	Gaia Association	Mr. Milkiyas Debebe, director; Ms. Mahder Alebachew, project coordinator
State actors	Ministry of Energy and Water	Mr. Wessenu Areda, director, alternative energy technology promotion and dissemination; Mr. Ephrem Hassen, Ethiopian Rural Energy Development and Promotion Centre
	Ethiopia Electric Power Corporation (EPPCO)	Mr Yonas Negusie, project coordinator for World Bank projects; Mr. Mekuria Lemma, corporate planning chief officer



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