Energy Transition Strategies

Ethiopia’s Low-Carbon Development Pathway

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Contents

Key Findings ........................................... 1
Backdrop: Ethiopia in Context ...................... 3
Success Story #1: Industries Without Smokestacks 7
Success Story #2: Expanding Electricity Infrastructure and Access 10
Success Story #3: Attracting Foreign Capital in the Power Sector 14
Success Story #4: Improving Urban Mobility .......... 18
About the Authors ................................... 21
Key Findings

Ethiopia is an outlier in terms of energy and climate. Since 2000, the country’s economy has expanded by a factor of five, yet the country’s carbon dioxide (CO2) emissions are trivial: in 2017, on a per capita basis, CO2 emissions from energy were the fourth-lowest in the world. It is not that Ethiopians do not consume much energy, although their consumption is below the global average; rather, the country relies so much on hydroelectricity that its carbon intensity (how much CO2 is emitted for each unit of energy used) is the second-lowest globally. Somewhat audaciously, Ethiopia aims to keep it this way.

The country’s strategy for economic growth and for dealing with climate change are one and the same, articulated in an ambitious plan called the Climate Resilient Green Economy (CRGE) strategy, first promulgated in 2011. The headline promise is eye-catching: the country intends to grow without any increase in its greenhouse gas (GHG) emissions between 2010 and 2030. Whether the country can accomplish this will hinge largely on what happens in agriculture and forestry—forestry, in particular, plays a crucial role, acting as a sink that offsets whatever emissions come from economic growth. But that offset strategy should not subtract from its serious commitment to low-carbon development.

There are few countries in the world that rely so little on fossil fuels. Ethiopia is still a predominantly rural and agricultural country, but even among its peers, its negligible use of fossil fuels stands out. What is even more unusual is the refusal to turn to fossil fuels as its economy rapidly grows. There is no coal or natural gas power plant proposed in the country. There is no decarbonization target because there is so little carbon in the power sector to begin with. Instead, Ethiopia plans to keep building dams to generate and export low-carbon electricity, and it keeps pushing for reforms that will help attract foreign investment in wind, solar, and geothermal energy.

A grid based on renewable energy makes it easier to pursue an economic development path that is not carbon intensive. Insofar as Ethiopia is seeking to attract heavy industry,
it is trying to locate it in several industrial eco-parks, which both offer attractive economic opportunities and operate under tight regulations with access to (electric-powered) rail to export goods through Djibouti. But the country is also keen to build and nurture industries that can boost living standards without a sharp rise in emissions—industries that range from tourism to horticulture. The challenge will be leapfrogging to the latest technologies while maintaining its comparative advantage as a stable, secure location with plentiful low-cost labor, but Ethiopia is committed to make it work.

Urbanization is another feature of Ethiopia’s rapid development. The population of Addis Ababa, the capital, doubled over the past 20 years and is expected to almost double again in the next 15 years, reaching almost 9 million by 2035. It is still the only city in the country with a population over 1 million people—other big cities only have a few hundred thousand people. But they too are growing fast: by 2035, there will be several cities with a population between 700,000 and 1 million. Providing these swelling urban populations with sufficient energy and transportation services will be a major challenge.

An expanded road network in one of the country’s responses. But Ethiopia as a whole, and Addis Ababa in particular, wants to avoid an undue dependence on the automobile. A light-rail transit system opened in Addis Ababa in 2015, built in partnership with Chinese investors. A bus rapid transit system finally started construction in 2020, supported by the French Development Agency. The city has an ambitious plan to build footpaths and bike lanes to encourage non-motorized travel and ensure that motorized travel takes place primarily on public transit. Few cities, especially in emerging economies, so clearly embrace the best practices that urban planners around the world are recommending.

It is hard not to look at Ethiopia and see a bold experiment underway. There are challenges, of course. In a top-heavy system, changes in leadership can lead to shifts in direction. The country’s flagship project, the Grand Ethiopian Renaissance Dam (GERD), has already caused a diplomatic row with its neighbors and might escalate into a broader crisis. Foreign investment in power generation is trickling in, but slowly. Leapfrogging technologically is good in theory, but who can turn away investment dollars and good-paying jobs from whatever corner they might come? And providing quality transportation services for a city that will grow to almost 9 million people without putting too many cars on the road will depend on a successful deployment of public transportation and cycling that is rare in the Global South.

Even if Ethiopia fails to accomplish these goals in full, the gravitational pull of the CRGE should keep it in a low-carbon orbit, potentially providing a model of green growth at the earliest stages of development for its contemporaries to follow. Experiencing no increase in GHG emissions while achieving economic growth for two decades might prove impossible. But any effort to seriously bend the emissions curve will still be a remarkable achievement—one worth praising, learning from, and replicating.
Background

Ethiopia in Context

Ethiopia is a development success story: since 2000, its gross domestic product (GDP) has increased fivefold and its per capita income has tripled. The country is still largely agrarian, with only 20 percent of the population living in cities; agriculture comprises about 80 percent of employment, 75 percent of exports, and 44 percent of GDP. This is not to say urbanization and industrialization are not relevant or that both are not increasing rapidly. Urban areas generated 62 percent of Ethiopia’s GDP in 2013, and industrialization is being driven by heavy government investment in infrastructure, agriculture, education, and industrial parks. Ethiopia was the largest recipient of foreign direct investment (FDI) in Africa in 2016, at $3.2 billion, and the country usually receives overseas development assistance (ODA) of about the same amount, as well as further multilateral development bank (MDB) loans of around $2–3 billion per year. But its structural transformation remains slow, agricultural productivity is trailing population growth, the manufacturing base is low, investment in privately-owned manufacturing firms is stagnant, and there is little export growth in industrial sectors.

Ethiopia’s energy and climate ambitions are encapsulated in its Climate Resilient Green Economy Strategy (CRGE), announced in 2011. The CRGE aims to transform Ethiopia into a lower-middle income country by 2025 without an increase in its greenhouse gas (GHG) emissions. It is, by all measures, one of the most ambitious plans put forward by an emerging economy anywhere in the world. The easiest way to visualize what Ethiopia hopes to accomplish is to look at its Intended Nationally Determined Contribution in the 2015 Paris Agreement.

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6. Ibid.
Most of Ethiopia’s emissions in the baseline year (2010) came from the agriculture and forestry sectors, with energy comprising just 12 percent of the total, split almost evenly between the four major sectors (electricity, transportation, buildings, and industry). On a per-capita basis, the country’s goal is to reduce emissions from 2010 to 2030 by almost 39 percent. The strategy for doing so has two elements.

First, there is an agriculture and forestry strategy, aimed to reduce emissions from those sectors and to turn forestry into a major sink (hence the big negative figure, anchored by a commitment to plant 20 billion trees by 2024).7 In effect, improved agricultural and forestry practices will allow emissions from the energy sector to grow without increasing the country’s overall footprint. Such practices will also increase the country’s resilience and serve as an economic strategy in their own might (e.g., through agricultural exports, tourism).

The second element is the desire to solicit cutting-edge technologies for Ethiopia’s industrialization. In a business-as-usual scenario, emissions from energy would grow sevenfold between 2010 and 2030, but improved efficiency will limit that growth to a factor of just five. Importantly, that entire growth comes from the transportation and industrial sectors—there is no targeted increase in emissions from power generation or from buildings. This rests on the continued development of hydropower and other low-carbon energy resources such as wind, solar, and geothermal. It is a pledge to avoid emissions from the start rather than looking to “decarbonize” later.

### Ethiopia: Greenhouse Gas Emissions Target

<table>
<thead>
<tr>
<th></th>
<th>Mt CO2e</th>
<th>2010</th>
<th>2030 BAU</th>
<th>2030 Target</th>
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<td>65</td>
<td></td>
<td></td>
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<td>12</td>
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<td></td>
<td>90</td>
<td>-40</td>
</tr>
<tr>
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<td>125</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>Electricity</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Transportation</td>
<td>5</td>
<td>40</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td>4</td>
<td>70</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Buildings</td>
<td>4</td>
<td>10</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>150</td>
<td>400</td>
<td>145</td>
<td></td>
</tr>
<tr>
<td><strong>per capita</strong></td>
<td>1.8</td>
<td>3.0</td>
<td>1.1</td>
<td></td>
</tr>
</tbody>
</table>


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This strategy represents ambition, but it also speaks to the country’s vulnerabilities to climate change. Ethiopia’s rural population is exposed to the effects of rising temperatures, decreasing rainfall, and increasing droughts and floods. Ethiopia’s topography results in high climate variability that is only likely to increase. In 2016, a severe drought reduced livestock and agricultural output, contributing to malnutrition for some 10 million Ethiopians. Ethiopia has suffered seven major droughts since the 1980s, five of which have resulted in famines and all have had major economic impacts—lowering GDP by between 1 and 4 percent each time. These changes will not just affect agriculture but also Ethiopia’s infrastructure, with 80 percent of roads unpaved and easily degraded by heavy rains and floods; its reliance on hydroelectricity is also expected to increase the country’s sensitivity to climate impacts, both as rainfall becomes more variable and as generation capacity rises in line with government targets.

Ethiopia is thus at the forefront of a new development paradigm. Where environmental goals were once perceived to impose limitations on industrialization and catch-up growth, Ethiopia is proactively challenging this received wisdom with innovative policy solutions and international collaboration.


12. OECD, “Chapter 5: Climate-resilient development in Ethiopia.”
13. Ibid.
with all new paradigms, settling on optimal solutions will require a period of trial and error, and Ethiopia will be no exception to this rule. The remainder of this report describes where Ethiopia has achieved initial success or made promising progress and, most importantly, the political, economic, and collaborative conditions that made these outcomes possible. Within each case study, the difficulties already encountered and the challenges yet to come are also clearly detailed.
Success Story #1

Industries without Smokestacks

What Was the Success?

Ethiopia’s economic strategy tracks the themes in the emerging “industries without smokestacks” literature, which tries to broaden the lens through which policymakers think about a country’s structural transformation to activities beyond manufacturing. Some of these activities might be classified under “services” in statistical measures, or even under “agriculture,” but they share with manufacturing an ability to benefit from scale and productivity growth.14

For Ethiopia, this strategy has meant two things. First there is a focus to nurture industries that can deliver economic growth and export revenue without associated emissions. Tourism, for example, has grown by a factor of four since 2005 to nearly a million international visitors in 2017, generating $3.5 billion in export earnings, almost 46 percent of total exports.15 Horticulture, the export of cut flowers, is another success story, growing to become the country’s fifth-largest export, generating a quarter of a billion dollars in revenue and employing more than half a million Ethiopians.

Ethiopia is also trying to attract investment in sector-specific special economic zones (SEZs) and eco-industrial parks. Its nine eco-industrial parks, which host over 150 enterprises, have created more than 70,000 jobs and generated over $130 million in exports, all while adopting sustainable technologies—running on renewable electricity, connecting through electric rail, and minimizing water pollution. Though still small in absolute terms, these SEZs help train the local workforce, demonstrate best practices, and transfer leading technologies to Ethiopian companies—with a near-zero

carbon footprint, courtesy of Ethiopia’s low-carbon grid and emphasis on low-carbon production processes.  

**How Did It Happen?**

For tourism and horticulture, Ethiopia has committed resources and political capital and has built institutions and supporting infrastructure. The Ethiopian Investment Commission has helped attract, retain, and expand foreign direct investment (FDI). The Ethiopian Tourism Transformation Council and the Ethiopian Horticulture Development Agency are sector-specific agencies that are tasked with advancing these sectors. The government has also invested in infrastructure, building a new airport in Addis Ababa and constructing roads, airports, hotels, and communication networks.

SEZs have helped attract FDI by allowing the government to effectively solve problems and partner with international players such as China. SEZs are regulated by the Ethiopian Investment Commission and guided by the country’s high-level industrial strategy. China, where SEZs were critical to rapid development, has been especially important in the development of Ethiopia’s SEZs ever since helping plan and construct Ethiopia’s first SEZ, the Eastern Industrial Park, in 2007. Chinese state-owned companies have been involved in almost every phase of SEZ development in Ethiopia, from planning and construction to supporting management practices and helping train the local workforce.

**What Comes Next?**

Ethiopia has no shortage of pressing concerns for its government to tackle, and there is always a risk that its political leadership will de-prioritize or abandon its green growth ambitions, especially as new leadership shifts the country’s focus from a “developmental state” model to one that emphasizes market reforms instead. Encouragingly, the new prime minister seems to view climate as a priority, announcing, for example, an ambitious initiative to plant 20 billion trees by 2024. Institutional continuity can be important as well. In 2014, the government created a new environmental ministry to be responsible for the CRGE, shifted various portfolios to the new agency, elevated its status as a ministry, and increased its budget.

But many of the CRGE’s goals have yet to reach the local level; several reports, including from participants at the CSIS workshop, noted that many officials and agencies have not even heard of the CRGE.

Leapfrogging to efficient technologies presents its own challenges. Ethiopia benefits from a low-carbon grid, which makes electricity consumption de facto green, but lowering

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17. Gebreeyesus, “Structural transformation and the development of clean industries in Ethiopia.”
21. Ibid.
the carbon intensity of the production process is another matter. With investment and
expertise residing overseas, Ethiopia is at the mercy of foreign technology decisions and
developments. Research on “leapfrogging” shows that emissions and efficiency standards
are vital to transferring new technologies from joint venture partners. Despite many
standards on the books, workshop participants noted that these are often only effective
for new firms (rather than existing ones) and rely on a high degree of enforcement
capacity, which is often lacking.

There is also a question of scale. Ethiopia has been able to reallocate resources from low-
productivity agriculture to higher-productivity (and often, but not always, green) sectors.
It is unclear how much of Ethiopia’s large agricultural population these sectors can absorb
before a saturation point is reached. Ethiopia is essentially in uncharted waters. None
of this is to say that Ethiopia cannot succeed, only that the government will need to
experiment and be flexible in its approach.

22. Kelly Sims Gallagher, “Limits to leapfrogging in energy technologies? Evidence from the Chinese automo-
S0301421504001739.
23. Xinshen Diao, Margaret McMillan, and Dani Rodrik, “The Recent Growth Boom in Developing Economies: A
Structural-Change Perspective,” in *The Palgrave Handbook of Development Economics*, Joseph Antonio Ocampo and
recent-growth-boom-developing-economies-structural-change-perspective.
Success Story #2

Expanding Electricity Infrastructure and Access

What Was the Success?

From 2009 to 2019, Ethiopia’s electricity generation capacity almost tripled to over 4,500 MW, and the country now has the fourth-largest generation fleet in sub-Saharan Africa (after South Africa, Nigeria, and Ghana). Most of the installed capacity, and most of the growth, has come from hydroelectric power, which also makes Ethiopia’s electricity sector among the least carbon intensive in the world. This expansion has enabled Ethiopia to supply electricity to more people: in 2017, 34 percent of Ethiopians had access to grid electricity, up from 10 percent in 2005—an increase of nearly 40 million people—and 57 percent of households have access to at least one source of electricity, including off-grid solutions. Yet only 24 percent of primary schools and 30 percent of health clinics have access to electricity, an indicator of how much work remains.

How Did It Happen?

Electrification has been supported by high-level targets, political commitment, and an ability to source the requisite investment. Ethiopia has a track record for completing infrastructure projects on time, on budget, and with relatively limited corruption. Investment in Ethiopia has been high, reaching up to 19 percent of GDP in 2011, helping

27. The country has introduced two growth and transformation plans (GTP I & II). GTP I aimed to quadruple generation capacity from 2,000 MW to 8,000 MW by 2015 and expand electricity coverage from 41 to 75 percent of the country. GTP II extended the generation goal to 17,000 MW by 2020 and increased the electricity coverage ambition to 90 percent.
to transform the transportation and power sectors.\textsuperscript{29} Financing for this infrastructure has come from domestic and external public borrowing; more recently, the country has encouraged private investment as well.\textsuperscript{30}

Ethiopia has the second-highest hydropower potential in Africa, estimated at around 45,000 MW. Since 2009, the country has commissioned five hydro dams, with a total capacity of 3,147 MW, bringing its total to 4,047 MW, the most in Africa.\textsuperscript{31} Another 8,864 MW of hydro is under construction, including Africa’s largest (and most controversial) dam, the Grand Ethiopian Renaissance Dam (GERD), with an expected capacity of 6,450 MW—almost doubling Ethiopia’s power supply. If and when the project is completed, the GERD will be able to export electricity to Djibouti, Sudan, South Sudan, Kenya, and Tanzania.

Hydropower satisfies numerous political objectives.\textsuperscript{32} Infrastructure is centrally controlled, fitting the regime’s state-led development approach. As a low-carbon source, it enables industrialization without emissions. It is a sector that has attracted foreign investment, particularly from China. Hydropower also helps Ethiopia manage the delicate balance between regional competition for water, food security, and energy development. Finally, and most simply, hydroelectricity generation helps the country meet its electricity access goals, bringing power to the 60 million, mostly rural Ethiopians who are critical to both its economic future and the government’s political fortunes.

Access remains a paramount goal. More than 90 percent of energy consumption and cooking and heating services in rural areas comes from traditional biomass fuels, generally in the form of charcoal or fuel wood. This contributes to the country’s forest degradation and indoor air pollution problem and comprises the bulk of its GHG emissions.\textsuperscript{33} The government has collaborated with development partners such as the World Bank and USAID on a series of electricity access initiatives; its aim is to achieve universal access by 2025—65 percent on the grid and 35 percent off grid, the latter building on the Lighting Africa program, in place since 2014.

Large public investment in infrastructure has been critical. Ethiopia expanded its grid infrastructure to reach 80 percent of the population over the course of 10 years, building 17,000 km of transmission lines and 163 substations, prioritizing infrastructure over household connections. The number of electrified towns and villages increased from only 667 to more than 6,000. This was made possible by strong political commitment and by

\begin{thebibliography}{9}
\bibitem{ibid} Ibid.
\bibitem{ueap} The first was the Universal Electrification Program (UEAP), which began in 2005 and successfully expanded national electricity coverage and grid infrastructure until it was replaced in 2018 with the National Electrification Program (NEP) in 2018.
\end{thebibliography}
external support—loans and technical support for design and implementation from China and multilateral institutions.\textsuperscript{35}

In off-grid electricity, success has come from a narrowly focused multilateral effort, led by the World Bank and International Finance Corporation (IFC). The program has been designed to overcome several local barriers to off-grid electricity, including limited access to foreign currency to import the necessary technologies, scant private sector participation in the market, and an unclear policy framework and absence of clear quality assurance guidelines. A pilot version of Lighting Africa was rolled out in Kenya and Ghana in 2007 and has now had success across sub-Saharan Africa in creating sustainable markets for off-grid solutions. Importantly, the IFC supports banks and microfinance institutions with a guaranteed facility to channel financing to distributors, retailers, and end users. Unlike most donor-based solutions, the end-customer is paying the full cost of the solar lighting, with no subsidy provided, helping create a self-sustaining market.

\begin{center}
\textbf{Ethiopia: Electricity Generation and Capacity}
\end{center}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{ethiopia_electricity_generation_capacity.png}
\caption{Ethiopia: Electricity Generation and Capacity}
\end{figure}

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\textbf{What Comes Next?}

Ethiopia’s hydropower ambitions have also created a geopolitical crisis. More than 90 percent of Egypt’s population lives alongside the Nile River, which supplies most of the country’s water, and Egypt sees the Grand Renaissance Dam as a threat to its water security.\textsuperscript{36} There is domestic pressure in Ethiopia to fill the dam, and mediation efforts by the African Union and United States have resolved some of the technical disagreements but failed to resolve tensions. Indeed, the U.S. decision to withhold $130 million in foreign assistance as pressure may have made matters worse. A big challenge for Ethiopia is how to complete the dam without a diplomatic crisis or, worse still, a conflict.

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Climate change presents another threat. One study estimated that the country could lose 800 GWh of hydropower due to climate change, a loss that could not be made up by increased capacity additions.\(^{37}\) A World Bank exercise showed a range of outcomes, with some scenarios showing hydro production rising and others showing it falling—a reminder of the inherent uncertainty that climate change presents for a country that so relies on hydroelectricity for its needs.\(^{38}\)

Even as capacity increases, Ethiopia’s transmission and distribution (T&D) infrastructure needs to expand and be strengthened and modernized. Years of underinvestment in the maintenance and upgrade of the existing network create problems of reliability in urban areas.\(^{39}\) This is particularly harmful for business productivity: one study found that power outages increase firms’ total costs by 15 percent on average.\(^{40}\) Unreliability also contributes to high levels of self-generation, particularly from diesel, undercutting progress toward a zero-carbon electricity system.

Ethiopia also faces the so-called “last-mile paradox,” particularly in rural areas.\(^{41}\) As much as 90 percent of Ethiopia’s population live within 10 km of grid infrastructure, but only 34 percent of households are connected to the grid, even though the cost of connections is a small fraction of overall costs. Grid extension is therefore the “low-hanging fruit” of improving energy access in Ethiopia.\(^{42}\) There has been some success with a World Bank program that allows customers to pay for their own connection fees over time, but more is needed, and faster, to meet the country’s universal electrification goals.

To make all these investments, Ethiopia will need to attract private and foreign investment. Ethiopia ranks 158th in the World Bank’s Doing Business Index and ranks low in measures like “Getting Electricity,” “Getting Credit,” and “Protecting Minority Investors.” The country’s state-driven model has delivered results, but it needs to evolve to a more flexible structure to enable the tranche of development.

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39. Ibid.
42. Hassen, “Low-carbon Development and Access to Electricity in Ethiopia.”
Success Story #3

Attracting Foreign Capital in the Power Sector

What Was the Success?

Ethiopia has signed agreements for almost 1,500 MW of renewable electricity capacity since 2015, compared to less than 200 MW in all preceding years (see table). Many of these projects involve Chinese companies, but the investor base has been broadened in recent years. Not all of these projects will be completed, of course, but they signal a significant shift in Ethiopia’s electricity market from a hydropower-based system to new energy technologies and from a state-owned model to one that includes foreign investors.

How Did It Happen?

The market-oriented reforms in Ethiopia’s power sector since 2013 reflect a broader trend toward facilitating structural transformation in the Ethiopian economy by deregulating prices, privatizing state-owned enterprises, and encouraging foreign investment. In 2013, the government split the national utility into two public enterprises, Ethiopian Electric Power (EEP) and the Ethiopian Electric Utility, partially unbundling the state-owned monopoly. Various regulatory improvements have also been implemented, including a framework that covered tariff reforms to improve cost recovery and establishing a new agency, the Ethiopian Energy Authority (EEA), to set tariffs and efficiency standards and to monitor compliance with regulations. In 2018, the government passed a public-private partnership (PPP) proclamation to allow greater private participation in the power sector through an open competitive bidding process (not just in the power sector).

44. Gebreyesus, “The Private Sector in Ethiopia’s Transformation.”
45. Narassimhan, “Electricity Sector Transitions for Green Industrialization.”
## Renewable Energy Deployment in Ethiopia

<table>
<thead>
<tr>
<th>Power Plant</th>
<th>Technology</th>
<th>Capacity (MW)</th>
<th>Cost (USD)</th>
<th>Year Started</th>
<th>Year Completed</th>
<th>Financier</th>
<th>Policy Instrument</th>
<th>EPC / IPP</th>
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<td>800 million</td>
<td>2019</td>
<td>2022 for first 50MW</td>
<td>Meridiam (51%); Reykjavik Geothermal (49%)</td>
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<td>IPP – Competitive auctions</td>
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<td>IFC scaling solar 2; MOFEC Guarantor - World Bank</td>
<td>IPP – Competitive auctions</td>
<td>TBD</td>
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<tr>
<td>Metema, Hurso</td>
<td>Solar PV</td>
<td>250</td>
<td>---</td>
<td>Planned</td>
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<td>IFC scaling solar 2; MOFEC Guarantor - World Bank</td>
<td>IPP – Competitive auctions</td>
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<td>Assela</td>
<td>Wind</td>
<td>100</td>
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<td>Planned</td>
<td>Planned</td>
<td>IFC scaling wind / MOFEC Guarantor - World Bank</td>
<td>IPP – Competitive auctions</td>
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The government is also preparing a power sector reform roadmap, which will include further unbundling and the liberalization of wholesale and retail electricity markets.

A new investment law, passed in early 2020, was explicitly designed to encourage foreign direct investment (FDI), especially in the power sector. Whereas the existing investment...
regime had been explicitly focused on attracting FDI to the manufacturing and agriculture sectors, the new law has a broader range of objectives, including improving economic competitiveness, increasing exports, generating employment, and accelerating the transfer and diffusion of knowledge and technologies.\textsuperscript{46} The law expands the definitions of “investment” and “capital” to facilitate these broader objectives and mandates that Regional Investment Bureaus coordinate with central authorities to create a uniform and efficient investment system.

The government has also reached out to multilateral institutions for technical assistance in managing the specific challenges of renewable energy. With the proliferation of PPPs over the last year, the government is working with the World Bank to conduct competitive auctions, establish a legal and regulatory framework for independent power producers (IPPs), and prepare IPP procurement documents. Known as the Renewable Energy Guarantees Program, this World Bank initiative also provides payment guarantees to cover the EEP’s power purchase obligations and loan guarantees for commercial lenders, helping derisk the off-taker and accelerate investment in the sector.\textsuperscript{47}

Several tenders have been completed, including the Corbetti geothermal project (150 MW) and the Metehara solar project (100 MW), but the projects have yet to reach financial closure and are still working through several hurdles.\textsuperscript{48} The Metehara project falls under the U.S. government’s Power Africa program and the World Bank, which has teamed up with the EEP to test its new procurement and financing structures and which launched a successful competitive bidding process in 2017. The Ethiopian government and the World Bank have also begun preparatory work on a similar approach for wind projects, though this is in its very early stages.

### What Comes Next?

The challenges to expanding non-hydro renewables mirror those for investment in the economy at large. A lack of hard currency continues to be of primary concern to foreign investors, and efforts so far to resolve this by boosting export revenues have been insufficient. Project approval is also slow and uncertain, as projects have to pass through the Council of Ministers and parliament. These delays and heightened uncertainty are compounded by domestic political instability, particularly the ever-present threat of conflict.

Despite tariff reforms, retail electricity tariffs remain below power supply costs, which undermines the financial sustainability of the sector and its attractiveness to foreign investors, although the government has committed to full cost recovery within a few years. Relatedly, there are questions over the creditworthiness of the EEP, the off-taker in the market, and despite a partial risk guarantee from the World Bank, a more sustainable solution still needs to be found. Another constraint facing many investors is land acquisition, particularly in solar and geothermal projects. The government has committed


\textsuperscript{47} Narassimhan, “Electricity Sector Transitions for Green Industrialization.”

\textsuperscript{48} Tavoulareas, “Attracting External Financing in Ethiopia’s Power Sector.”
to facilitating land acquisition on behalf of project developers, but this remains an inefficient and bureaucratic process. Similarly, the permitting and licensing requirements are over-complicated and involve numerous agencies, often with conflicting goals. Finally, several of the projects are banking on Ethiopia becoming an electricity exporter in the region, but this is uncertain given the region’s instability.⁴⁹

These barriers show that the reform process is far from complete, with several key pieces of the puzzle remaining. These include further strengthening the credibility of the PPP policy by ensuring that the off-taker, the EEP, cannot renegotiate already signed PPAs. Further, the unbundling process needs to continue, with one option being to split the EEP into separate generation and transmission and distribution (T&D) agencies. Improving coordination and building capacity within relevant government agencies is also a critical step in ensuring the implementation of new reforms matches their ambition.

⁴⁹. Ibid.
Success Story #4

Improving Urban Mobility

What Was the Success?
In Addis Ababa, the only city in Ethiopia with a population over 1 million, building a sustainable transportation system means avoiding an excess reliance on private cars and having a focus on public transit and streets that encourage cycling and walking. The Light Rail Transit (LRT) system, which opened in 2015, carries about 200,000 daily riders on 31.6 km of lines. This is just 4 percent of public transport demand in the city, but it is popular among its riders, leading to calls for additional public transit infrastructure (rail and bus). Construction also began on a bus rapid transit (BRT) system in June 2020, supported by the French Development Agency and to be constructed by a French company.50 Such a plan has been in the works for years, given that a BRT system can deliver more capacity at about a third of the cost.51 The first line is just 20 km, but experience shows that growth can accelerate after the first hurdle is cleared. The city has also expanded its road coverage from just 7 percent in 2006 to 22 percent in 2019, with most new roads including pedestrian walkways. More significantly, in its Non-Motorised Transport Strategy 2019-2028, the Addis Ababa Road and Transport Bureau set some ambitious targets: to construct 600 km of footpaths and 200 km of cycle tracks, to have non-motorized transport account for 60 percent of all trips, and for public transportation to make up 80 percent of motorized trips. If nothing else, this is one of the most ambitious strategies by a city in the Global South.

How Did It Happen?
The first two ingredients for success were governance and money. In 2004, Addis Ababa established an independent agency, the Addis Ababa City Road Authority, to develop and manage the road network, showing political commitment to the project and a willingness

to develop technocratic capacity and insulate decisions from political pressures. There are still challenges, of course, in terms of coordination, especially among local and federal authorities, but the city has also managed to allocate a growing share of its budget to roads, reaching 15.5 percent in 2019.

The city is also participating in international initiatives such as the New Climate Economy, the World Resource Institute’s Cities4Forests initiative, the C40 Cities group, and various engagements with the World Bank. The Non-Motorised Transport Strategy 2019-2028 was developed with technical assistance from the Institute for Transportation and Development Policy (ITDP) and with support from the United Nations Human Settlements Programme and UN Environment Programme.

Addis Ababa has also managed to leverage foreign investment from China. The LRT system, which cost $475 million, was 85 percent financed by the Export-Import Bank of China (China has been an important partner in several large transportation projects in the country, such as the Addis Ababa-Djibouti railway line connecting the two countries). The system was planned by the central government, and responsibility for the project was given to the Ethiopian Railway Cooperation (ERC), a state-run company, rather than Addis Ababa’s Public and Freight Transport Authority. This speaks to the central government’s desire for the project to showcase “Ethiopian renewal” and its goal to turn Addis Ababa into the “capital city of Africa.” But it also led to challenges in terms of cost, coordination, and ongoing operational and maintenance issues.

**What Comes Next?**

Ethiopia in general, and Addis Ababa in particular, faces constraints in expanding urban transport infrastructure. The first is institutional: despite multiple plans, implementation is limited by bureaucratic capacity. Central government agencies have been more successful than their local counterparts, but mostly in delivering highly visible but perhaps unsustainable showcase projects. Complex and often overlapping roles among different institutions undermine cohesion and could be addressed by governance reforms (such

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59. Ibid., 20.
as consolidating responsibilities into a single unit responsible for urban transport). Even then, there is an urgent need for greater collaboration and engagement by development agencies to improve governance at a local level.

Investment is another barrier. This is a common problem for public transportation, particularly in developing countries, and is exacerbated by the factors described above (e.g., political instability, lack of foreign currency, opaque regulations, and inadequate bureaucratic capacity). While the central government has implemented joint ventures with China, China cannot finance all of Ethiopia’s transport needs, and neither can municipal revenues. Local authorities should look to alternate options, many of which are already being pursued, such as tapping development institutions, infrastructure funds, and specialist sources of finance such as the Green Climate Fund—although none of these need to be at the expense of municipal fiscal autonomy that improves a city’s ability to provide infrastructure and public services.
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