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## New Cost of Service Study Manual Developed to Help Ethiopian Energy Sector Stakeholders Design Cost-Based Electricity Rates and Expand Electricity Access



**November 2021** – With funding support from the United States Agency for International Development (USAID) and Power Africa, the National Association of Regulatory Utility Commissioners (NARUC) has produced a *Cost of Service Study (COSS) Manual* to guide Ethiopian energy sector stakeholders in conducting a future COSS and enabling the development of cost-reflective electricity tariffs. A COSS is used by utilities and regulators as a guide for designing cost-reflective tariffs that ensure the provision of

reliable electricity service. It helps to determine what it costs for the utility to reliably serve customers – both in total and by individual rate class (e.g., residential, commercial, industrial).<sup>i</sup> As a result, utilities and regulators can better ensure that 1) rates are equitably allocated to each customer rate class, and 2) existing rates are sufficient to recover utility costs and maintain financial viability.

In the case of Ethiopia, the completion of the *COSS Manual* builds on previous technical assistance under the USAID and NARUC Ethiopia Energy Regulatory Partnership to [develop an Ethiopian Uniform System of Accounts \(USoA\)](#) in 2016.<sup>ii</sup> As part of this assistance, staff from the Ethiopian regulator (the Ethiopian Energy Authority [EEA]) and utilities (the Ethiopian Electric Utility [EEU] and Ethiopian Electric Power [EEP]) received training and guidance on developing the Ethiopian USoA, which is regarded by the Government of Ethiopia as a fundamental requirement for completing a COSS.

As the EEU and the EEP are still working to implement the USoA, the *COSS Manual* has been designed to serve as a helpful reference for all three stakeholders as they progress in developing fair and reasonable rates. These efforts will improve the financial viability of the utilities, stimulate investment in new electricity infrastructure, and better position Ethiopia to participate in the East Africa Power Pool,<sup>iii</sup> thus increasing electricity access to its population. Ultimately, this development will be essential to improving power sector governance and furthering Power Africa’s goals of facilitating power generation, increasing electricity connections, and unlocking energy sector potential.

### The Dilemma of Cost-Based Rates

The Government of Ethiopia (GoE) has ambitious energy sector goals – through the launch of the National Electrification Program (NEP) in 2017, it set targets to achieve middle-income country status and universal electricity access by 2025. It is envisioned that by this time, the NEP will have implemented 8.2 million new grid connections and provided 6 million people with access to off-grid solutions that can supply electricity regardless of geographical location.<sup>iv</sup> With that said, the investment needed to implement this transformation is substantial. Updated and relaunched in 2019, the NEP 2.0 includes plans for consolidating nearly \$6 billion of financing in direct investments for on-grid and off-grid electrification.<sup>v</sup>

To help cover the costs of implementing the NEP 2.0 and fund the growing expense of energy production, Ethiopia’s electricity tariffs will also need to increase. Currently, electricity tariffs in Ethiopia are among the lowest in sub-Saharan Africa and are below the cost of electricity generation, leaving utilities unable to cover connection costs. According to information from the EEU, the existing

electric power generation, transmission, and distribution costs are, on average, about \$0.09 per kilowatt-hour (kWh), while the current tariff for electricity lies between \$0.04 and \$0.06 per kWh.<sup>vi</sup> When connection costs are not high enough to reimburse utilities, the resulting effects can include a reduction in electric service reliability as well as financial constraints that hamper the ability of the energy sector to fund electricity infrastructure projects and disincentivize private sector participation.

Moreover, though Ethiopia has achieved strong poverty reduction over the years, the poorest segment of the population – mainly concentrated in rural areas – is often unable to afford electricity connection costs charged by the utilities despite the fact that they are not cost-reflective. This exacerbates the dilemma of the utilities that need to increase rates to reflect costs in order to maintain the financial viability that will allow them to operate the system. Without proper cost recovery, it is more difficult for utilities to maintain electricity lines and provide quality service, let alone pursue service extension to more sparsely populated areas of the country. In recognition of this predicament, the GoE is working to revise the existing tariff structure, keeping in mind that electricity rates must be high enough to allow the utilities to recover their costs and finance new investment, but not so high as to inhibit demand and deny access to poor households.<sup>vii</sup>

### **Developing the COSS Manual**

Conducting a COSS would benefit the Ethiopian energy sector by allowing utilities to determine the extent to which each class is paying for the cost of providing their service. Given this information, utilities and regulators can design rates that ensure each rate class pays its fair share of the utility's costs and margins, thereby maintaining financial viability and promoting equity among utility customers.<sup>viii</sup> With this in mind, the *COSS Manual* builds on previous NARUC support for the EEA, EEU, and EEP to review tariff guidelines and methodologies, enhance analytical skills for tariff design, and review and enhance regulatory accounting practices to implement a USoA.

It is intended to help energy regulators in their individual roles to determine the filing requirements, cost structure, and overall level of costs to be used in calculating tariff filing revenue requirements. It also provides guidance in determining which costs are to be recovered by tariffs.<sup>ix</sup> To ensure that it was carefully developed to fit the Ethiopian context, NARUC analyzed existing primary and secondary legislation, tariff guidelines, stakeholder engagement, and any other available information that would generally influence the development of a COSS. Additionally, the EEA, the EEU, and the EEP contributed insights, analysis, and feedback during multiple energy sector stakeholder meetings, all of which were incorporated into the final product.

One of the key messages that NARUC emphasized throughout this process is that Ethiopian energy sector stakeholders should be on the same page in developing and implementing rate design criteria so that all aspects of the rate design process work together. Importantly, rate design criteria should:<sup>x</sup>

- Be fair and non-discriminatory – Each customer should pay his or her share of the costs of providing service.
- Minimize impact on customers – Clear communication with customers throughout the rate analysis process can minimize customer distress.
- Send the proper pricing signals to customers – Retail rates should reflect the price signal sent by the wholesale cost of power.
- Be understandable – Rates cannot be effectively used by customers unless they are understood.
- Encourage efficient and responsible usage – Conservation, energy efficiency, and the use of renewables provide customers the opportunity to lower their bill and lower the utility's costs.
- Manage evolving customer expectations – Provide customers with more sophisticated choices and options (e.g., real time pricing, prepaid metering, etc.).

- Integrate new technologies – As customers adopt new varieties of technologies such as vehicle charging and renewable energy, utilities will require metering and billing technology to take advantage of these technologies as a part of ratemaking.

By following these criteria and the steps in the *COSS Manual*, the EEA, the EEU, and the EEP will be able to advance towards achieving the GoE goal of increasing reliable electricity connections at affordable costs. Ensuring that rates are designed fairly and accurately will help to provide more equitable access to electricity, and taking measures to strengthen utilities' financial health will increase operational efficiency and promote commercial attractiveness for investors.

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<sup>i</sup> “Overview of Electric Cost of Service Studies.” The Prime Group LLC.

[http://www.theprimegrouppllc.com/COSS\\_Overview.php](http://www.theprimegrouppllc.com/COSS_Overview.php)

<sup>ii</sup> The USoA is a regulatory accounting tool to help utilities and regulators determine tariffs and conduct tariff reviews through a better understanding of the costs in delivering electricity to end users.

<sup>iii</sup> The Eastern Africa Power Pool (EAPP) is a regional institution established in 2005 to coordinate cross-border power trade and grid interconnection among nations of the Eastern Africa region. Visit <https://eappool.org/> for more information.

<sup>iv</sup> “National Electrification Program 2.0: Integrated Planning for Universal Access.” Federal Democratic Republic of Ethiopia. 2019. <https://www.powermag.com/wp-content/uploads/2020/08/ethiopia-national-electrification-program.pdf>

<sup>v</sup> Idem.

<sup>vi</sup> “Impacts and drivers of policies for electricity access: Micro- and macro-economic analysis of Ethiopia's tariff reform.” Energy and Economic Growth. <https://energyeconomicgrowth.org/node/236>

<sup>vii</sup> Diaw, Issa. “Beyond Electricity Access: Output-Based Aid and Rural Electrification in Ethiopia.” World Bank. <https://rise.esmap.org/data/files/library/ethiopia/Ethiopia%20World%20Bank%20Study-Beyond-Electricity-Access-Ethiopia.pdf>

<sup>viii</sup> “The Benefits of Cost of Service Studies.” Catalyst Consulting LLC. <http://www.catalystcllc.com/articles/the-benefits-of-cost-of-service-studies/>

<sup>ix</sup> “Complete Final Project Report.” NARUC.

<sup>x</sup> Idem.