



## Case report

## Ethiopia needs peace to accelerate its SDG 7 achievements

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## ABSTRACT

Ethiopia has been striving to achieve its SDG 7 targets by heavily investing in the power sector. Large-scale dams have been developed and are currently under construction, including the Grand Ethiopian Renaissance Dam (GERD). These developments have supported the expansion of connectivity to millions of people. However, due to political differences between the Ethiopian federal government and the Tigray regional government, a devastating war broke out in November 2020, and the conflict has since expanded to other regions of Ethiopia. These conflicts have hindered Ethiopia's economic development, derailing achievements of the SDG 7 targets. The negotiated peace settlement that was signed in Pretoria and Nairobi is encouraging and should be sustained. The government must use this opportunity and commit the country's resources to the rehabilitation of damaged critical infrastructure and initiating large-scale projects to promote lasting peace by building confidence in the population. The conflicts of the last two years should be used as a lesson for Ethiopians to resolve political differences through constructive and equitable dialogue across the political spectrum. We need to develop a culture of resolving differences by ourselves through a) strengthening institutions and norms to nurture a political culture of resolving political differences through dialogues; b) developing and strengthening an independent judicial system; c) developing a culture of providing justice for those affected and introducing a true reconciliation process; and d) developing mechanisms to ensure and protect critical infrastructures during conflicts.

## 1. Introduction

Modern energy plays a critical role in the sustainable development of countries as it has significant co-benefits and underpins most of the other developmental goals such as poverty reduction, clean water and sanitation, promoting inclusive and sustainable industrialization, creating sustainable cities and communities, climate change mitigation, and food security (Thiam, 2011; G. W. Team, 2012) and (Mainali et al., 2014). Consistent with its critical role, Sustainable Development Goal 7 (SDG 7), which stipulates ensuring access to affordable, reliable, sustainable, and modern energy for all was established as one of the 17 SDGs under the framework of the United Nation's (UN) Agenda 2030 (Cf, 2015). Ethiopia has been committed to achieving SDG 7 by investing in the development of grid-connected and off-grid energy systems from diversified energy sources. Though it could be challenging to achieve all the targets by 2030 as per the Tracking SDG7 2022 report (Who, 2022), remarkable signs of progresses have already been shown in the development of the country's power infrastructure. This may significantly improve the rates of electricity access in the region (MoWIE 2019).

However, in the midst of this progresses, a war broke out between the Federal government of Ethiopia and the Tigray regional government in November 2020 (Daba and Wroughton, 2020; Walsh, 2021). The war was mostly played out in the Tigray region; but it also spilt over to the Amhara and Afar regions in the summer of 2021 (Abay et al., 2108). The three regions account for more than 30.3% of the Ethiopian population. The Tigray and Amhara regions are historically considered the economic and political hubs of the nation (ESS, 2021). Because of their considerable economic and political power, the war in these regions has also created a security loophole in the rest of the country, leading to further sporadic conflicts in the Oromia and Benishangul-Gumuz regions. These conflicts have deeply impacted the progress made so far to achieve SDG 7, potentially even slowing, or reversing it. The war has also affected economic development, deteriorating the living standards of the Ethiopian population (Bagouri, 2021).

Given this background, therefore, the main goal of this paper is therefore to discuss details of the progress made so far towards achieving SDG 7; the impact of the conflicts on the development of energy systems; and its future consequences on the country's endeavor to achieve the

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targets of SDG 7. The results will be vital for policymakers, and the research communities, both in Ethiopia and the wider African continent, particularly in the context of understanding the impact of war on developmental efforts and to rethink approaches towards conflict resolution in the future.

## 2. Ethiopia’s progress toward achieving SDG 7

The per capita energy supply and consumption in Ethiopia is considered to be among the lowest in the world (IEA, 2019; IEA, 2020) as is the expansion of access to clean cooking (Esmap, 2022). However, the country has been committed to improving this scenario by allocating massive investments to the power sector by upgrading the existing infrastructures and developing new power generation plants in line with the guidance from the country’s evolving electrification plans. Its first Universal Electrification Plan was launched in 2005 and its implementation showed good progress albeit with critical challenges such as a lack of adequate investments for the sector.

According to a 2018 report by the Ministry of Water, Irrigation and Energy, the country has quadrupled its power generation from 850 MW to 4,300 MW in just over a decade (MoWIE2019). Further increases have since been recorded-as of 2022, generation capacity has increased to 5,273.77 MW in 2022 (EEP, 2022). Considering its abundant water sources, the country has developed and is developing several large hydropower plants including the large Grand Ethiopian Renaissance Dam (GERD), which has started generating about 750 MW. However, the development of infrastructures harnessing other renewable energy resources such as solar, wind, and geothermal have been very slow (EEP, 2022) (Gebreslassie, 2022). As a result, Ethiopia has one of the least diversified energy sources in its total energy consumption (Akrofi, 2021). As stated by the International Energy Agency (IEA) (IEA, 2019), around 88%, 9.5%, and 2.7% of the total energy supply are provided by bioenergy, petroleum, and electricity respectively. Considering only the power supply, the share of different energy sources in the grid and off-grid power generation mix of the country is given in Fig. 1. The thermal power generation comes from waste to energy, diesel generators, and sugarcane residues (bagasse).

While the Universal Electrification Plan was under implementation, the United Nations established the 17 Sustainable Development Goals in 2015 with SDG 7 relating to affordable and clean energy. The key targets of SDG 7 by 2030 consisted of: a) ensuring universal access; b) increasing the share of renewable energy in the global energy mix; c) doubling the global rate of improvement in energy efficiency; d) enhancing international cooperation to facilitate access to clean energy research and technology; e) expanding infrastructure; and f) upgrading technology for supplying modern and sustainable energy services (CF, 2015). The key indicators given in Table 1 show Ethiopia’s progress

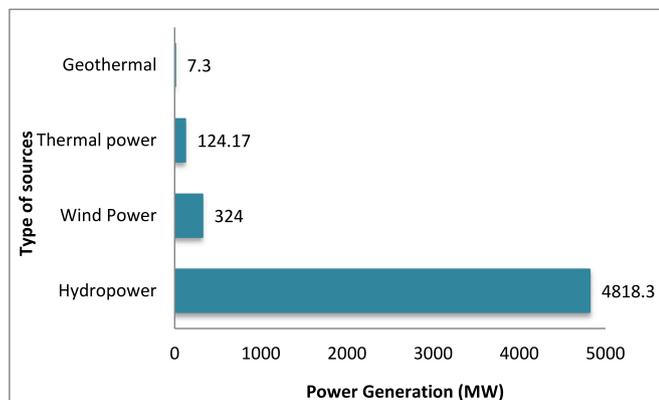


Fig. 1. Share of power generation by source in 2022 (Own elaboration using data from Ethiopian Electric Power) (EEP, 2022).

Table 1  
Ethiopia’s progress to achieve targets of SDG 7 (ESMAP, 2022).

Sustainable development indicators for SDG 7	Achievements
Population with access to electricity (% , 2020)	51
Population with access to clean cooking (% , 2020)	8
Renewable energy (% of total final energy consumption, 2019)	89
International financial flows (USD million, 2019)	56.7
Renewable capacity per capita (Watts per Capita) (2020)	41

towards achieving these targets.

The country’s performance indicators are a wake-up call that there is still a long way to achieving the expected targets. According to the Tracking SDG 7 2022 report, there is a huge concern that several countries, including Ethiopia, will be unable to achieve their expected targets based on the current rate of progress (WHO, 2022).

## 3. The impacts of the war and future consequences

Ethiopia has been making remarkable progress by investing in the power sector and increasing access to millions of people in the last three decades, with more feasible results seen in the last decade. However, it has failed to sustain these achievements due to the conflicts that has occurred since November 2020, notably the war in the Tigray region that has expanded to the Amhara and Afar regions. Not only this, the progress made so far to increase energy access to millions of people in Ethiopia will certainly be reversed in a scenario of sustained conflict, as the energy infrastructures are prone to destruction both due to budgetary constraints towards sustaining the operation of the existing power infrastructure, as well as direct attacks on them during the war.

### 3.1. Impact of the war in the Tigray region

The war in Tigray and its consequences on the power infrastructure are a typical example of how power plants in the rest of the country could be affected if the negotiated peace settlement fails to sustain and sporadic conflicts in other parts of the country continue or arise a new in the future. Experiences during the conflict show that the smooth operation of existing power plants and grid lines within the Tigray region, for example, is becoming a huge challenge due to a lack of critical spare parts and a lack of budget, causing frequent electricity blackouts. According to a report by the BBC, the extent of the blackouts in the region has been clearly shown by an image from NASA, leading to the world’s worst humanitarian crisis (BBC, 2022).

#### 3.1.1. Damage to energy substations

The Tekeze substation, which distributes electricity to the Mekelle main substation and to the Shire, was damaged by a drone attack as shown in Fig. 2 (a). The transformer and outlet to the Shire was destroyed, with the other outlets slightly damaged. The substation is now partially repaired through internal capacity and is currently providing service.

The second substation that was attacked by a drone is the Mekelle substation, which is the largest station in the region, integrating the national grid and the power generated from the Tekeze hydropower plant. The substation is also the central point for distributing power to most of the cities in the region. The impact on the substation is clearly indicated in Fig. 2 (b). The drone specifically attacked a mobile station installed within the substation to accommodate more customers and has since been repaired.

#### 3.1.2. Damages on the transmission systems

According to the damage assessment report by the Ethiopian Electric Power and the Ethiopian Electric Utility Tigray branch offices, transmission lines in the region have been subjected to artillery attacks during the war. The length of the damaged transmission lines is given in

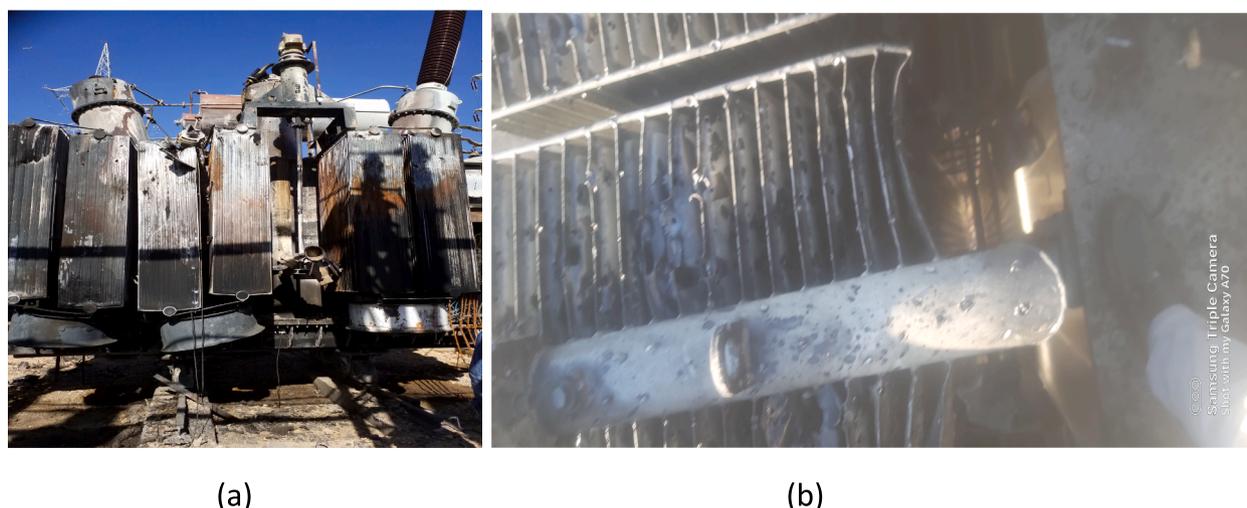


Fig. 2. (a) A Damaged transformer at the Tekeze substation and (b) Mekelle substation (Source: Own photograph in the aftermath of the attack).

Table 2  
Damaged transmission lines.

No	Damaged transmission line	Span length (km)
1	High voltage	156.601
2	Medium voltage	330
3	Low voltage transmission line	75
Total length		561.601

Table 2.

Nearly 86 transformers have been damaged – of these, 23 transformers were further damaged and went out of service due to theft, drainage of oil from the transformers, security loopholes, the dismantling and looting of parts of the transformers, and the looting of the whole transformer body.

### 3.1.3. Damages to the off-grid energy infrastructure

The war in Tigray has exacerbated challenges associated with already limited electricity access in the rural communities. The impact of the war on the off-grid electricity infrastructure has heavily affected economic activity in the region, particularly with respect to health systems, solar powered water pumping systems, households, etc. For example, according to The Nation (Nation, 2021), most health facilities that have been electrified by both on and off-grid energy systems have been either destroyed or stolen. According to the witnesses we spoke with, any solar-based energy technologies, such as solar home systems, lantern technologies, and institutional solar PV systems, have been either destroyed or stolen during the war.

### 3.2. Impact of the war in the Amhara and Afar regions

The war that started in the Tigray region has expanded to the Amhara and Afar regions in 2021, further affecting the regions’ economic activity by damaging infrastructures, including those associated with the power sector (Abay et al., 2108). During the war in these regions, there were frequent electricity blackouts and fuel shortages affecting essential services such as health and water services, and the transportation of life saving supplies (OCHA, 2022). A report by Deutsche Welle also indicated that infrastructures in the Amhara region were robbed and the economy shattered during the war (Gerth-Niculescu, 2021).

### 3.3. Future consequences

The destructions, theft, and lack of financing for sustained and smooth operation of the power sector such as that witnessed in the Tigray, Amhara, and Afar regions for the last two years are a reason for concern. A report by the Ethiopian Electric Power estimates the cost of rebuilding the power sector that was destroyed or stolen during conflicts in the Amhara and Tigray regions could be as high as €50 million (AFD, 2023). The destruction and degradation of the energy infrastructure have affected essential services such as health systems, factories, telephones, and internet networks. There is a clear indication that the costs of rebuilding infrastructure damaged during the war will be massive, further stressing the future economic development of Ethiopia. This should be seriously considered as an alarm by all stakeholders that have a hand in the conflict. They should work towards sustaining current initiatives of the negotiated peace settlement, which should also be expanded to other groups that feel excluded from the process. Any failure to sustain and foster inclusion in the current efforts at establishing peace will make the country’s future very bleak and Ethiopia will struggle to achieve its SDG 7 targets. The consequence of sustained conflict in the region will only add up to the already slow progress being made so far in achieving energy targets set by the country. There is also a high probability that current progress in this direction could be slowed or reversed due to strains in macroeconomy and/or international relationships following the war.

### 4. Conclusion

In order to reverse the current decline in economic development in Ethiopia, including those in the energy sector, the only solution is political willingness and commitment from the warring parties towards resolving their differences through sustained and inclusive negotiations aimed at bringing peace to the country. Though too late for many reasons, the current negotiated peace process signed in Pretoria and Nairobi is very encouraging. The international community has been instrumental in bringing the warring parties to the table using the economic and political leverage they have on Ethiopia and other regional partners and stakeholders. Any failure to ensure lasting peace in northern and other parts of Ethiopia will result in failure to achieve expected SDG 7. It will also have a huge trickling effect across East Africa and the wider continent because of Ethiopia’s role in the geopolitics and electricity supply across the region.

The different conflicts in the country should serve as a strong lesson for Ethiopians to resolve political differences through constructive and equitable dialogue across the whole political spectrum. We need to

develop a culture of resolving differences by ourselves, and such culture can be enabled through: (i) strengthening institutions and norms to nurture a political culture of resolving differences through dialogue, (ii) establishing powerful national institutions that can protect public infrastructure such as power stations, from any form of damages during armed conflicts, (iii) developing and strengthening an independent judicial systems with the power to hold perpetrators accountable for any breaches (as impunity is becoming the key problem for crimes to be committed in this country), (iv) developing a culture of providing justice for those who are affected, and (v) introducing a true reconciliation processes in order to avoid future conflicts that could be initiated by acts of revenge.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Data availability

Data will be made available on request.

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