
The Latest Power Supply Challenges In Ghana

Power supply challenges (including instability, low voltage, and blackouts), known as ‘Dumsor’, [have plagued Ghana for years](#), and remain significant concerns for both industrial and residential customers. In just the first half of 2021, multiple major outages have occurred (see Annex), caused by three main issues:

- **Tripped transmission lines.** Transmission lines in Ghana are frequently overloaded, not well maintained, and non-redundant. In March 2021, a fault in a major line caused cascading failures that crashed the entire system for several hours.
- **Reduced water level at the Bui reservoir.** Low water levels have taken the 400MW dam mostly offline, save for a few evening hours when demand is highest. This has degraded electricity quality and caused repeated outages in Kumasi.
- **Gas/Fuel-related outages.** At least 9 major outages were related to inadequate fuel stock, gas pressure dips, or other interruptions in fuel supply.

Government Response and Recommendations

Ghana’s government is taking several measures to address these issues, including relocating the 250MW Ameri Power Plant to Kumasi and completing a series of expansions and upgrades to the transmission network. While these should help, the government should consider several additional actions to improve stability in the **near term**:

1. **Add more generation plants (in addition to Ameri) in or around Kumasi** to improve the stability of the National Interconnected Transmission System.
2. **Strengthen the western 161kV corridor**, break into the Aboadze-Anwomaso 330 kV transmission line at Dunkwa, and reconstruct the current low capacity, outdated transmission lines.
3. **Reconstruct the existing Aboadze 330 kV and 161 kV Switchyards** into new indoor gas insulated substations to eliminate heavy salt contamination on equipment.
4. **Construct the 330kV Accra (Pokuase) – Nkawkaw – Kumasi (Anwomaso) Transmission Line.**

Conclusion: Long-term, the government must place as much importance in the budget on transmission infrastructure as it does on generation and distribution. Historically, transmission investments have been mostly done through donor support, and on a few occasions, loans. The government should make specific allocations from the Energy Sector Levies to support transmission investments.

FIGURE 1: Map of Ghanaian Transmission (IAEA, Volta River Authority)



Figure 1: Map of Ghana showing Transmission Grid

Annex: Ghana's Major Grid Interruptions in 2021

1. Tripped transmission lines resulting in customer outages

- **January 5, 2021:** Transmission trips initiated by faults on Kumasi-Konongo and Anwomaso-Kumasi lines.
- **January 19, 2021:** Transmission trips initiated by faults on the Techiman-Kintampo line and the Bui substation.
- **February 3, 2021:** Snapped conductor on Tarkwa-Takoradi line resulted in cascaded trips to Aboadze-Tarkwa, Prestea-Obuasi, Dunkwa-Bogosu and Bui-Techiman lines.
- **February 17, 2021:** Transmission trips initiated by faults on Konongo-Kumasi, Anwomaso-Kumasi, Kumasi-Techiman, Kumasi-Kenyasi and Techiman-Sunyani lines.
- **February 24, 2021:** Trip on Anwomaso-Kumasi due to overload on the line.
- **March 07, 2021:** Total system collapse initiated by faults on Prestea-Obuasi and Aboadze-Anwomaso lines and the Bui substation.
- **March 19 & 28, 2021:** System disturbances initiated by faults on Kumasi-Techiman, Kenyasi-Sunyani and Ayanfuri-Asawinso lines.
- **April 3, 2021:** Trip on the Volta-Accra East line when a conductor on the line fell near the Accra East substation.
- **April 12, 2021:** System disturbances initiated by a fault on the Aboadze-Anwomaso line and cascaded trips on Aboadze-Volta, Sunon Asogli-Volta, Sunon Asogli-Dawa and Dawa-Davié 330 kV lines together with all generating units in service at Aboadze.

2. Feeder outages at Kumasi from underperforming Bui units

- **March 14, 2021:** The water in the Bui reservoir reached the minimum operating level (168 m) which restricted use to only one unit for a constrained time each day to prevent voltage collapse, resulting in low generation in the middle section of the NITS.

3. Gas/Fuel related outages

- *Compressor trip on ENI Onshore Receiving Facility (ORF):*
 - **February 27, 2021:** Interrupted gas supply to Sunon Asogli, Amandi and Karpower. The units shut down immediately to avoid tripping and took customer loads off at Mallam, Smelter II, Anwomaso, Winneba and VALCO to balance the frequency following the sudden generation shortfall.
 - **March 5, 2021:** Interrupted supply to Amandi and Karpower. Units shut down and took customer loads off at Winneba.
- *Emergency shutdown valve (ESDV) closure at the WAPCO Regulatory and Metering Station (RMS):*

- **March 1, 2021:** Gas supply to Sunon Asogli cut off. The plant shut down immediately and took customer loads off at Mallam, Winneba, Kumasi and Cape Coast.
- **March 3, 2021:** Supply to Sunon Asogli cut off. The plant shut down immediately and took customer loads off at Mallam.
- **March 14, 2021:** Supply to Sunon Asogli, TT1PP, TT2PP, CENIT cut off. The plants shut down immediately and took customer loads off at Mallam, Accra East and Kumasi.
- *Inadequate fuel stocks at ASKA:*
 - **March 2, 2021:** AKSA (as part of the strategy to meet demand during the N-Gas shutdown) attempted to come online with 200MW for the peak period but reported inadequate fuel. Customer loads were taken off at Smelter II, Winneba and Kumasi in order to balance available generation with the load, and to improve critically low voltages in Accra and Tema.
- *Sudden gas pressure dip at Takoradi RMS at Aboadze:*
 - **March 5, 2021:** TAPCO and TICO units suddenly deloaded and KTRP switched from gas to DFO due to falling gas pressure. The unit tripped while switching over and took customer loads off at Mallam and Asawinso.
- *Compressor trip at Ghana Gas:*
 - **March 24, 2021:** Interrupted supply to Karpower, CENIT, and part loading of TICO and TAPCO. Customer loads were taken off in Accra East and Winneba.
 - **March 31, 2021:** Reduced gas pressure at WAPCO shut down some generating plants resulting in outages in Accra East and Tamale.