

**Ministerial Statement on the Findings of the Cabinet Appointed  
Expert Committee on the Investigation of the Causes of the  
Islandwide Power Outage on Wednesday 16<sup>th</sup> February, 2022**

Madam Speaker, I have been authorised by the Cabinet to make the following Statement with respect to the Report of the Cabinet Appointed Expert Committee appointed to Investigate the Causes of, and the National Response, to the Island wide Power Outage that occurred in Trinidad on **Wednesday 16<sup>th</sup> February, 2022.**

On Wednesday 16<sup>th</sup> February, 2022, at approximately **12:52 p.m.** there was a failure of the entire electricity grid in Trinidad, which plunged the island into a total blackout. The blackout lasted some twelve and a half hours, with initial restoration at 6:50 p.m. and the final customers supply returning **at 1:34 a.m. on Thursday 17<sup>th</sup> February, 2022.** In response to this prolonged Island wide power outage, a three-member committee was established by the Government to investigate, among other matters, the circumstances which gave rise to the failure of the electricity supply system, the process for restoring power supply, and the status of physical security of T&TEC's facilities, and to make recommendations to avoid a recurrence of a nationwide power outage.

The members of the Committee were as follows:

- 1. Professor Chandrabhan Sharma, Retired Professor of Electrical and Computer Engineering UWI, Chairman;**

2. **Mr. Keith Sirju, Former Chairman of T&TEC;**
3. **Ag. Superintendent Allister Guevarro of the Trinidad and Tobago Police Service.**

The Committee was given a period of one month from its date of appointment, that is, by March 22, 2022 to report its findings and report to the Office of the Prime Minister and was allowed to co-opt any other expertise and resources that it required.

The Committee completed its investigations and submitted its Report to the Honourable Prime Minister on **April 5, 2022.**

### **The Power Grid before the Blackout**

Madam Speaker, the Committee reported that, at the time of the incident, the three (3) Independent Power Producers (IPPs) were supplying some 1,130 MW of electricity to T&TEC for distribution to its customers in Trinidad, from their four (4) power stations as follows:

- Trinidad Generation Unlimited (TGU) - La Brea at 537 MW **(47.5%);**
- PowerGen - Point Lisas at 472 Megawatt (MW), Penal at 50 MW **(46.2%); and**
- Trinity Power Limited - Point Lisas at 71 MW **(6.3%).**

The Committee noted that the country's electricity network is a robust one with reasonable redundancy and generally well-operated and that no electricity grid is without risk or immune to failure.

### **The Cause of the Island-wide Blackout**

According to the Report of the Committee, on Wednesday 16<sup>th</sup> February, 2022 a 21.64 m tall fungal affected Palmiste tree fell in the vicinity of Grants Trace Extension Road and the NGC private Road in Rousillac. The said tree fell onto a single phase T&TEC 12 KV distribution line. At the time of the occurrence of this trigger incident, the country was under a High Wind Yellow Alert issued by the Meteorological Office. Madam Speaker, I wish to confirm that the Committee unequivocally stated that it did not find any evidence of sabotage as the trigger for the failure.

The sequence of consequential events as recorded by the Committee was as follows:

1. The Palmiste tree eventually fell off the 12 KV line causing the line to sag, oscillate and upswing, and to come into contact with the 220KV line circuit, which transmits most of the power from the TGU generating facility to T&TEC. The 12 KV line crosses orthogonally under the 220 KV transmission by a distance of over four (4) metres, which is more than two times the minimum stipulated by international standards.

2. The fault occasioned by the two lines accidentally coming into contact with each other caused the protection relays on the two circuits on the 220 KV transmission line to trip sequentially and become de-energised thereby isolating the TGU plant from the grid.
3. The de-energizing of the 220 KV transmission line, created a large imbalance between available running generation supply (537 MW) and load (68.75 MW) resulting in a very rapid increase in generation speeds at the TGU plant, as the essentially unloaded turbines accelerated. The turbines immediately tripped on over speed protection, disconnecting all generators at TGU thereby resulting in a 47% loss of generating capacity.
4. The sudden loss of 47% of generating capacity on the grid was too fast for the system's circuit breakers to shed load to match the available generation. In the circumstances, the other IPPs experienced under-speed and under-frequency conditions which exceeded their stability limits leading to a cascading outage and the collapse of the entire electricity grid, first at the Point Lisas plants and then at Penal.

Madam Speaker, the entire episode, from the triggering of the event by the fallen Palmiste tree on the 12KV distribution line to the shutdown of the entire grid resulting in an island wide blackout, spanned about 3.6 seconds. Given the speed at which the events unfolded, **the Committee concluded that there was no time for human intervention.**

## The Response

The Report acknowledged that the safe and timely re-establishment of power on the island following a total shutdown as what occurred on Wednesday 16th February, 2022, is a complex and critical task which requires close coordination between T&TEC and the IPPs, and should be based on well documented and tested black start procedures. Such re-starts must be done under the direction and supervision of T&TEC.

In this regard, the Report noted that three (3) of the four (4) power plants in Trinidad had black start capabilities on the day, and that within one (1) hour of the outage, all three (3) generation plants operated by TGU, and Power Gen, following their procedures, attempted starting their black start units. However, there were multiple failed attempts occasioned, *inter alia*, by:

- the lack of preparedness among the agencies (IPPs and T&TEC) for such an eventuality;
- the unavailability of black start units;
- inadequate technical capacity for dealing with such a situation; and
- the absence of a documented power system restoration plan governing the sequencing procedure(s) to be followed **after a total loss of power** on the island.

Power was eventually restored at 6:50 p.m. to Penal and from there the rest of the power system was re-energized by 1:34 a.m. the following day, February 17, 2022.

## **Assessment of Response and Recommendations**

The Committee identified several weaknesses in the management of the response, including:

- ineffective communication with the public, with heavy reliance on the internet and social media which was negatively impacted by the blackout;
- the absence of the involvement of the Office of Disaster Preparedness and Management;
- the lack of a systematic approach in the restoration process which led to many unforced errors in the re-energisation process,
- The Committee was also of the opinion that no single person took on the role of Incident Commander and had overall authority, as well as detailed knowledge of the restoration process.

At the same time, the Committee recognised the initiative of the Protective Services to trigger a commendable response in the circumstances.

The Committee has made several recommendations to address the weaknesses identified, as well as, to improve the resilience of the electricity grid and to reduce the country's vulnerabilities to the recurrence of such an incident. One of the key recommendations to improve security, reliability

and efficiency of the transmission grid is the construction of another 220 KV circuit from the Union Sub-Station to the Gandhi Sub-Station. The construction of this second line is already at an advanced stage with completion scheduled for the first quarter of Fiscal 2023.

The Report noted that the unfortunate event had unmasked several issues pertaining to all parties involved, and that several of the problems encountered in restarting the plants were evident in 2013 when the system suffered a similar collapse. The need to ensure that this was not another lost opportunity for distilling valuable lessons of experience and building resilience into the system was underscored. In this regard, the Report made the following noteworthy observations:

- That one should “*never let a good crisis go to waste*”- a famous observation made by **Winston Churchill** during the bleakest days of World War II.
- All of the digital protection relays in the power sector have, inherent in their design, auto event recorders;
- This event has generated a veritable mother lode of usable data which T&TEC can mine to optimize their current models of the power system as well as updating the time constraints used in modelling the generators and turbines;

- The IPPs and T&TEC staff did make unforced errors in the re-energization process. This can be easily remedied by ensuring that the operators are schooled in the understanding of the issues involved in a de-energized grid and the safe process to re-energize the grid.

The Report concluded that while there was great inconvenience to the population there was no loss of life directly attributable to the outage; the blackout had laid bare the many shortcomings in our Disaster Preparedness and restoration procedures.

Madam Speaker, finally, the following key recommendations were made:-

- 1) Additional training of operational staff of the IPPs and T&TEC specific to the recovery of the grid from a total blackout.
- 2) Establishment of clear documented procedures related to the complete recovery of the grid from a total blackout.
- 3) Categorisation of the total blackout as a National Disaster thereby automatically fully engaging the ODPM in the process.
- 4) Establishment of the Manager System Control and Generation interface as the Incident Commander in future.
- 5) Construction of additional Transmission infrastructure to further strengthen the grid with priority on the completion of the second 220kV line as soon as possible.
- 6) An Annual independent power system resilience review and power system risk assessment should be performed to identify power system



vulnerabilities that can lead to catastrophic power system failures. This should be reviewed by an independent technical standing committee.

May I take this opportunity, Madam Speaker, to thank the members of the Committee for their diligence, patriotism, and professionalism in preparing this Report for the benefit of the citizens of Trinidad and Tobago. I wish to assure the citizens of Trinidad and Tobago that the recommendations in this report will be given urgent consideration and will form part of a programme of work in the electricity sector in the short and medium term. Madam Speaker, the Government also takes this opportunity to thank the citizens of Trinidad and Tobago for their patience during those very uncertain hours.

Today, I lay this Report and ask that it be sent for further examination by the **Committee on Public Administration and Appropriations** of the Parliament.

**I thank you Madam Speaker.**