

ELEVENTH

REPORT
FROM

THE PUBLIC ADMINISTRATION
AND APPROPRIATIONS
COMMITTEE

EXAMINATION
OF

An Examination into the Island Wide Power Outage and
Blackout that occurred on February 16, 2022

Office of the Parliament
Parliamentary Complex
Cabildo Building
St. Vincent Street Port of Spain
Republic of Trinidad and Tobago



Public Administration and Appropriations Committee

The Public Administration and Appropriations Committee (PAAC) is established by Standing Order 102 and 92 of the House of Representatives and the Senate respectively. The Committee is mandated to consider and report to Parliament on:

- (a) *the budgetary expenditure of Government agencies to ensure that expenditure is embarked upon in accordance with parliamentary approval;*
- (b) *the budgetary expenditure of Government agencies as it occurs and keeps Parliament informed of how the budget allocation is being implemented; and*
- (c) *the administration of Government agencies to determine hindrances to their efficiency and to make recommendations to the Government for improvement of public administration.*

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Members of the Public Administration and Appropriations Committee



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Chairman



Dr. Lackram Bodoe, MP
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Mr. Wade Mark
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Mr. Randall Mitchell
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Mrs. Ayanna Webster-Roy, MP
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Mr. Laurence Hislop
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Ms. Lisa Morris-Julian, MP
Member



M1. Symon de Nobriga, MP
Member

EXECUTIVE SUMMARY

This Report of the PAAC contains the details of the examination into the Island Wide Power Outage and Blackout that occurred on February 16, 2022.

The Committee, in undertaking this examination employed two (2) mechanisms:

- Requesting written submissions; and
- Reviewing the Report of the Cabinet-Appointed Committee (Appointed on February 22, 2022 and laid in Parliament on April 29, 2022).

The Committee received written submissions from the following entities:

- The Ministry of Public Utilities (MPU);
- The Ministry of Energy and Energy Industries (MEEI);
- The Trinidad and Tobago Electricity Commission (T&TEC);
- Trinity Power Limited (TPL); and
- Trinidad Generation Unlimited (TGU).

The approach adopted by the Committee took into account the issues identified from the written submissions and from news in print, broadcast and social media around the time of the island wide power outage and blackout. The Committee made recommendations related to the issues identified.

Observations and recommendations are presented in **Chapter 3**.

INTRODUCTION

THE COMMITTEE

The Public Administration and Appropriations Committee is established by Standing Order 102 and 92 of the House of Representatives and the Senate respectively. The Committee is mandated to consider and report to Parliament on:

- examine the current public expenditure, thereby capturing the full budget cycle by providing Parliamentary oversight of the implementation of the budget; and
- conduct a real-time examination of the expenditure of Ministries and Departments.

Change in Membership

1. In the Twelfth Parliament the Members of the Committee were appointed by resolutions of the House of Representatives and the Senate at sittings held on Friday November 9, 2020 and Tuesday November 17, 2020 respectively.
2. Senator Clarence Rambharat's seat in the Senate was declared vacant on March 16, 2022 as such he ceased to be a Member of the Committee.
3. Senator Yokymma Bethelmy's seat in the Senate was declared vacant on March 16, 2022 as such she ceased to be a Member of the Committee.
4. By resolution of the House of Representatives at a sitting held on June 13, 2022, Mr. Symon De Nobriga, MP was appointed a Member of the Committee in lieu of Mr. Stephen Mc Clashie, MP.
5. By resolution of the Senate at a sitting held on Tuesday June 14, 2022, Senator Laurence Hislop was appointed a Member of the Committee in lieu of Senator Yokymma Bethelmy and Senator Randall Mitchell in lieu of Senator Clarence Rambharat.

Chairman & Vice-Chairman

By virtue of S.O. 109(6) and 99(6) of the House of Representatives and the Senate respectively, the Chairman of the Committee is the Speaker and at its First Meeting held on November 25, 2020, Dr. Lackram Bodoie was elected as the Vice-Chairman.

Quorum

Additionally, in order to exercise the powers granted to it by the House, the Committee was required by the Standing Orders to have a quorum. A quorum of three (3) Members, inclusive of the Chairman or Vice-Chairman, with representatives from both Houses, was agreed to by the Committee at its First Meeting.

METHODOLOGY

Determination of the Committee's Work Programme

The Committee agreed to conduct an Examination into the Island Wide Power Outage and Blackout that occurred on February 16, 2022.

Review of Documents

The Committee deliberated on the following documents, namely:

- i. Written Submissions;
- ii. The Report of the Cabinet Appointed Committee (appointed on February 22, 2022); and
- iii. Current news reports.

The Inquiry Process

The Inquiry Process outlines steps to be taken by the Committee when conducting an inquiry into an entity or issue. The following steps outline the inquiry process followed by the PAAC for the examination into the Power Outage and Island Wide Blackout that occurred on February 16, 2022.

- i. Identification of entity to be examined: MPU, MEEI, T&TEC, TGU and TPL.
- ii. Preparation of an Issues Paper which identified and summarised matters of concern and recommendations presented in the Reports;
- iii. Based on the recommendations and the issues identified, the Committee requested that the entities responded through the provision of written submissions which was then examined by the Committee. The requests for the submission of written responses were sent to the entities on March 11, 2022.
- iv. The responses were received on the following dates:
 - T&TEC - March 15, 2022;
 - MEEI - March 21, 2022;
 - MPU - March 22, 2022;
 - TGU - March 22, 2022; and

- TPL - March 22, 2022.

- v. Report Committee's findings and recommendations to Parliament upon conclusion of the inquiry.
- vi. Request for Ministerial Responses. Review responses; and
- vii. Engage in follow-up.

ISSUES, OBSERVATIONS AND RECOMMENDATIONS

1. The Challenges Faced by Citizens during the Island wide Blackout

On Wednesday February 16, 2022, at approximately 12:52 pm, Trinidad experienced a power outage and island wide blackout that lasted for approximately twelve and a half hours. The public was unable to access utilities including electricity, water and telecommunication services for much of this period of time. The power outage and island wide blackout had widespread impact in Trinidad: commuters endured standstill traffic, citizens experienced low water pressure or dry taps and the quality of mobile data connectivity was compromised in some cases.

Additionally, schools were dismissed early and many employees were sent home before the end of the working day, as business closed due to safety concerns. To mitigate these concerns, the Ministry of National Security (MNS) dispatched additional protective services personnel across the island.¹ The island wide blackout clearly showed that no electricity grid is without risk or immune to failure.

Observation:

- *The Committee notes that the power outage and island wide blackout exposed the risks associated with functioning of the electricity grid. Entities such as the MPU, MEEI, T&TEC, TPL and TGU should work to reduce risks to improve its efficiency and increase the standard of the quality of the services being provided.*

Recommendations:

- *T&TEC, TGU, PowerGen and TPL respectively should report to Parliament by May 31, 2023 including the following:*
 - *Details of the actions taken individually or in collaboration with other public entities to tackle the immediate issues faced by citizens at the time of the blackout;*

¹ "T&TEC investigates island wide outage: TRINIDAD IN THE DARK", Trinidad Newsday, February 17, 2022: <https://newsday.co.tt/2022/02/17/ttec-investigates-islandwide-outage-trinidad-in-the-dark/> , Accessed October 10, 2022

- *An assessment of the readiness in February 2022 of existing plans to tackle the difficulties caused by the blackout:*
- *The lessons learnt from the issues arising from the blackout;*
- *Details of the improvements made, if any, to existing systems since the blackout.*
- *T&TEC, TGU, PowerGen and TPL should each provide Parliament by May 31, 2023 with an assessment of the readiness of the improved systems to address difficulties likely to be caused by potential future blackouts by May 31, 2023, based on some form of stress test or other measurable mechanism.*

2. Lack of a Documented Power System Restoration Procedure

The lack of a power system restoration procedure was evident during the power outage and blackout. *“At a time when bulk power systems operate close to their design limits, the restructuring of the electric power industry has created vulnerability to potential blackouts. Prompt and effective power system restoration is essential for the minimisation of downtime and costs to the utility and its customers, which mount rapidly after a system blackout”.²*

The report of the Cabinet-appointed Committee into the power outage noted that sufficient coordination is critical in a crisis. T&TEC as the key service provider of electricity in Trinidad and Tobago is supported by TGU, TPL and PowerGen. The TGU facility in particular is the largest combined-cycle power plant in the Caribbean and currently supplies approximately 50% of Trinidad and Tobago’s electrical energy³. Therefore, TGU is the largest supplier of electricity to T&TEC. In case of an emergency, it is necessary for the entities that provide vital services be equipped with contingency plans.

The lack of a documented power restoration procedure at T&TEC resulted in personnel having to “learn as they go” during the restoration process. The Cabinet appointed Committee’s report noted that there seemed to be a lack of knowledge and understanding of power system operations

²Power System Restoration: Methodologies and Implementation Strategies: <https://ieeexplore.ieee.org/servlet/opac?bknumber=5273333> Accessed January 2, 2023.

³Trinidad Generation Unlimited (TGU): <https://www.tgu.co.tt/about-us/> Accessed January 2, 2023.

in such circumstances which then led to further delays in the restoration process. Should an island wide blackout re-occur, it is imperative that T&TEC as the main actor in the distribution of electricity in Trinidad and Tobago, be equipped with a power system restoration procedure.

Recommendations:

- ***T&TEC should submit a roadmap for the creation and implementation of a power system restoration procedure to be utilised in the event of future outages to Parliament by May 31, 2023; and***
- ***TGU, as the largest supplier of electricity to T&TEC, should submit a report to Parliament by May 31, 2023 detailing its current power system restoration procedure.***

3. The 12 and a half hour Delay in the Restoration of Full Power due to issues with Black Start Machines.

In its Report, the Cabinet-appointed Committee was of the view that “restoration of the grid from a state of zero power to full demand should have been completed in a period of four (4) to five (5) hours measured from the time of fault determination and remediation.”⁴

While emergencies can occur at any time, it is important that plans be established to quickly mitigate the effects of emergencies. T&TEC advised that the delay in restoration of power was caused by reasons relative to black start units. The main reasons highlighted were:

- Unavailability of the black start unit at the Trinity Power Station; and
- Poorly functioning black start units at the Point Lisas and Penal Power Stations.

After the previous national outage in 2013, T&TEC advised that a measure implemented to prevent reoccurrence was the requirement for all Power Stations to ensure that their black start unit machines were functional⁵.

Observation:

- ***The Committee notes the nonfunctional black start unit machines as an issue that must be addressed in the operations at the IPPs in Trinidad. It is also noted that***

⁴ Report on Power Outage by the Cabinet appointed expert Committee, February 16, 2022, pg. 11

⁵ T&TEC written submission to the PAAC dated March 15, 2022, pg. 3

the measure established in 2015 to help reduce the impact of future power outages was not effectively implemented.

Recommendations:

- ***T&TEC should submit a report to Parliament by May 31, 2023 including the following:***
 - i. measures implemented to ensure that the black start units of the IPPs are kept in a state of readiness and tested frequently to ensure startup; and*
 - ii. the penalties, if any, faced by the IPPs for the unavailability or non-functional black start machines during the island wide outage.*
- ***TPL should submit a report to Parliament by May 31, 2023:***
 - i. detailing the reasons why the black start unit was not functional,*
 - ii. the period of time the machine was non-functional;*
 - iii. the length of downtime the machine requires for servicing; and*
 - iv. interim measures which are implemented during downtime for servicing.*

4. The Current Design of T&TEC's Electrical Transmission and Distribution System.

T&TEC's electrical transmission and distribution system design is one that must be addressed to avoid a reoccurrence of the island wide blackout. The main line that distributes and transmits electricity is a 220kV circuit along a single route (Union to Gandhi). In the report of the Cabinet-appointed Committee, the need for another 220kV circuit route to be built connecting the Union Substation to the Gandhi Substation was recommended on numerous occasions.⁶ Additionally, the report recommended that a comprehensive review of T&TEC's transmission grid be conducted.⁷

T&TEC advised that the construction of this double circuit route commenced via contract since March 2021, a year before the island wide blackout occurred. It must be noted that after a year of construction on the double circuit route, sufficient work was not completed to assist in the remediation of an island wide blackout.

Observation:

⁶ Report on Power Outage by the Cabinet appointed expert Committee, February 16, 2022, pg. 57

⁷ Report on Power Outage by the Cabinet appointed expert Committee, February 16, 2022, pg. 25

- *The report by the Cabinet-appointed Committee recommended as an immediate action, the replacement of the 12kV line between poles 70 and 71 (which were below the 220kV lines) by an underground cable. The PAAC notes that on Thursday 17th March, 2022, a month after the island wide blackout, this recommended measure was implemented.*

Recommendations:

- v. *T&TEC should submit an update to Parliament by May 31, 2023 on:*
 - *the progress of the construction of the double circuit route. The update should include a timeline with an identified completion date.*
 - *a detailed report of the additional upgrades that are currently underway to ensure efficiency in the transmission and distribution of electricity in Trinidad and Tobago.*

5. Enterprise Risk Management Policy and Risk Register

While T&TEC informed the Committee on March 15, 2022 via its written submission that the Enterprise Risk Management Policy had been completed and the risk register was being finalized and reviewed, these documents have not been submitted to the PAAC. It must be noted that at the public hearing held on December 13, 2017, while addressing the issue of the risk involved with the increased reliance on the Trinidad Generation Unlimited (TGU), the PAAC learnt that there were no formal Risk Registers at T&TEC and TGU. The Committee recommended that T&TEC and TGU develop a risk management system to mitigate risks in the event of an emergency. T&TEC advised at that time an Enterprise Risk Management (ERM) System was being developed.

In its written response to the Committee in the aftermath of the island wide blackout on February 16, 2022, T&TEC advised that the Enterprise Risk Management System was developed and the risk register was being finalized and reviewed. Further, TGU advised that a risk register was created but it did not specifically reference a blackout or any related consequence.

Evidently, documentation regarding risk management should be prioritized. Key documents such as the risk register were not available when the report was being conducted into the reasons behind the island wide blackout.

Recommendations:

- ***TGU should review its risk register to include measures in place relative to blackouts and its related consequences and submit an update to Parliament by May 31, 2023.***
- ***T&TEC should submit copies of the following to Parliament by May 31, 2023:***
 - ***The Enterprise Risk Management Policy; and***
 - ***The Risk Register.***

6. Lack of Sufficient Communication by T&TEC to the public regarding the nature of the problem and the progress made to restore the electrical supply to the nation.

There was a lack of timely communication by T&TEC to the protective services, relevant agencies and the general public of the total power failure. T&TEC experienced challenges in information dissemination and public awareness during the island wide blackout. T&TEC's Corporate Communications Department issued its first post via social media (Facebook) at 1:31 p.m., thirty-nine (39) minutes after the blackout had occurred. The reason for this late notice was cited as a lack of telephone and internet connectivity. To mitigate this issue, satellite phones and radio broadcasts should have been utilized as primary communication mediums for the urgent dissemination of information.

While there was a documented communication policy at T&TEC, the policy does not highlight procedures to be undergone during an island wide blackout. Since electricity is essential for the operations of all sectors and industries, it is imperative that relevant information regarding loss of power - cause and nature of loss and anticipated time of restoration be disseminated in an appropriate and timely manner.

Recommendations:

- ***T&TEC should review its Communications policy with a view to including standardized communication procedures to be followed in the event of an island wide blackout and submit an update to Parliament by May 31, 2023;***

- *T&TEC should submit a report to Parliament by May 31, 2023, on the ways in which it intends to work with the relevant stakeholders such as the Ministry of National Security and the ODPM to expand its mass communication efforts in the event of future blackouts;*
- *TGU, TPL and PowerGen should respectively provide a report on their communication procedures in the event of blackouts to Parliament by May 31, 2023.*

7. Implementation of recommendations made by the Report

The report included several recommendations made by the Cabinet-appointed Committee which is aimed at reducing the likelihood of the reoccurrence of a nationwide blackout.

Some of which include:

- The implementation and testing of a full load rejection scheme at all power plants;
- Converting the remaining ten (10) 12kV circuit crossings of the 220 kV lined to underground cables;
- Perform a risk assessment of any circuit crossings on the sub-transmission 132 kV and 66 kV networks;
- Conduct a review of periphery of rights-of-way for such critical transmission circuits to refine vegetation management producers to identify adjacent risks; and
- The creation of a fast response power system islanding scheme. This scheme severs the interconnected national transmission network into several independent generating islands.

The full list of recommendations are at Appendix I.

Recommendations:

- *T&TEC should make every effort to fully adhere to the recommendations made by the Cabinet-appointed Committee and submit a timeline for the implementation of these recommendations to Parliament by May 31, 2023; and*
- *T&TEC should submit a report to Parliament by May 31, 2023 setting out its plans to work with the requisite stakeholders (TGU, TPL, MEEI and MPU) to action the recommendations made by the Cabinet appointed Committee.*

CONCLUSION

The Government of T&T is tasked with ensuring the safety, quality of life and well-being of its citizens. During the Second Session (2021-2022) of the Twelfth Parliament, the PAAC conducted a public inquiry on the island wide blackout that occurred on February 16, 2022. The following entities were questioned and engaged with to further understand and discuss the associated issues:

- The Ministry of Public Utilities (MPU);
- The Ministry of Energy and Energy Industries (MEEI);
- The Trinidad and Tobago Electricity Commission (T&TEC);
- Trinidad Generation Unlimited (TGU); and
- Trinity Power Limited (TPL).

Several issues were identified and a number of recommendations were highlighted to address these issues. The Committee is of the view that the adoption of its proposed recommendations will lead to greater efficiencies within the entities mentioned and will allow for the prevention of a future island wide or nationwide blackout and its associated issues for the public. Moreover, the Committee intends to monitor the progress made in the implementation of the recommendations proposed in this Report.

This Committee respectfully submits this Report for the consideration of the Parliament.

Sgd.
Mrs. Bridgid Mary Annisette-George
Chairman

Sgd.
Dr. Lackram Bodoë
Vice-Chairman

Sgd.
Mrs. Ayanna Webster-Roy
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Mrs. Lisa Morris-Julian
Member

APPENDIX I

Recommendations made by the Cabinet appointed Committee

- Another 220 kV circuit should be built connecting the Union Substation to the Gandhi substation. It would be prudent that this new circuit does not use the same route as the existing Union to Gandhi circuit.
- An emergency response plan must be developed as a matter of urgency for the power system operation. This response plan must include an incident commander who is an aptly trained point person who would be vested with the authority and responsibility for the restoration of the grid during the duration of the emergency.
- An annual independent power system resilience review and power system risk assessment shall be performed to identify power system vulnerabilities that can lead to catastrophic power system failure. This should be reviewed by an independent technical standing Committee.
- Power system restoration procedures must be developed, discussed and disseminated. Once confirmed, a printed copy of these procedures must be readily available and lodged in each control room. These procedures should be periodically reviewed for improvement and updated after changes to available generation plant retirements or additions.
- A perusal of the logs and a review of the communication amongst the operators highlighted the need for improved understanding of the power system operation under emergency conditions. Appropriate technical training for IPP operators as well as T&TEC operators including joint rehearsal of emergency incidents scenarios is highly recommended. This may be facilitated with appropriately developed software simulations of varying scenarios.

Amongst its other recommendations for the industry, the Union stated that all future PPAs negotiated so that T&TEC pays for “power used” as opposed to the current “take or pay” system: the construction of a strategically located power plant close to the Barataria Exchange where key power lines are located, thus decentralizing the country’s power generation from the south of the island; increased authority to the Interface Committee whereby random inspections can be done at the IPPs to ensure that the declared daily assets were indeed functional and in a state of readiness; ensuring that all IPPs have functional black start machines as CGTP was under no obligation via its PPA to have one; ensuring that the compulsory acquisition of lands is hastened so that T&TEC can construct the second 220 kV transmission line along the “right way” from TGU to Gandhi sub-station; that T&TEC revisit

the construction of all “underbuilt” along critical transmission lines; and the government appoint the requisite Boards for T&TEC and PowerGen.

6.2.4 Association of Professional Engineers of Trinidad and Tobago (APETT)

In an immediate response to the blackout, the APETT issued a media release calling for an immediate review of the national infrastructure to ensure that the country can withstand and recover from such disasters. The Association noted that the event needed to be examined in its entirety and not merely from a blackout perspective as all critical aspects of infrastructure that rely on electricity, are expected to have been designed with backup systems to allow for the uninterrupted functioning of critical services and an orderly shutdown of non-critical systems.

The Association noted the nation’s dependency on telecommunications and mobile communications which can be adversely affected and called for similar investigations into the performance or failure of the various telecommunications networks. APETT revealed that most of the traffic signals along the East-West corridor were non-functional, which resulted in chaos at the intersections, traffic gridlock and severe congestion but commended the TTPS for maintaining order at these intersections. The Association questioned the absence of battery back-up for traffic lights at these critical intersections and called upon the MOWT to address the situation.

- There should be at least one generating unit at each facility on load rejection. This capability should be periodically tested, results documented and shared.
- An islanding scheme of the power system, where the power system is separated into several independent regions with supporting generation, should be developed and implemented as a matter of priority.
- A review of the battery condition of the control networks within the substations should be urgently conducted. The reports confirmed a significant number (<80%) of low battery alarms within minutes of the outage.
- At the power generating facilities, the emergency DC supply should be reviewed to ensure that the operational voltage levels for critical machinery is appropriately maintained.

- From the audio recordings, many calls were channeled through the IPPs' PBX leading to operational delays. The use of this channel should be reviewed.
- The communication providers should consider improving the battery back-up for cell services from four (4) hours to eight (8) hours.
- An island wide power failure event should be now labelled a special case of a "Natural Disaster". This would ensure that, when triggered, it shall initiate emergency protocols of all players utilised in such an event. In this way, the ODPM will now take over the social management of the event leaving T&TEC to concentrate on the coordinated restoration of power.
- A national committee should be established comprising the power sector, WASA, the NGC, the communication providers, national security agencies, ODPM and the TTPS to relook at national disasters (including its definition) and the management of such scenarios. National disaster should not just be seen as due to nature.
- Consideration should be given to providing battery backup for the traffic lights at all major intersections.

APPENDIX II

The Inquiry Process

The Inquiry Process

The Inquiry Process outlines steps to be taken by the Committee when conducting an inquiry into an entity or issue. The following steps outlines the Inquiry process followed by the PAAC:

1. Identification of entity to be examined;
2. Preparation of Inquiry Proposal for the selected entity. The Inquiry Proposal outlines:
 - Description
 - Background;
 - Overview of Expenditure
 - Rationale/Objective of Inquiry; and
 - Proposed Questions.
3. Consideration and approval of Inquiry Proposals by the Committee and when approved, questions are forwarded to the entity for written responses;
4. Issue of requests for written comment from the public are made via Parliament's website, social media accounts, newspaper and advertisements;
5. Preparation of an Issues Paper by the Secretariat for the Committee's consideration, based on written responses received from the entities. The Issues Paper identifies and summarises any matters of concern in the responses provided by the entity or received from stakeholders and the general public;
6. Review of the responses provided and the Issues Paper by the Committee;
7. Conduct of a site visit to obtain a first-hand perspective of the implementation of a project (optional);
8. Determination of the need for a Public Hearing based on the analysis of written submissions and the site visit (if required). If there is need for a public hearing, the relevant witnesses will be invited to attend and provide evidence. There is usually no need to examine the entity in public if the Committee believes the issues have little public interest or the Committee believes that the written responses provided are sufficient and no further explanation is necessary.
9. Issue of written request to the entity for further details should the Committee require any additional information after the public hearing.

10. Report Committee's findings and recommendations to Parliament upon conclusion of the inquiry.
11. Engage in follow-up.