FAIR TRADING COMMISSION

DECISION

The Barbados Light & Power Company Limited Motion to Review and Vary the Decision of the Fair Trading Commission on the Application of the BL&P to Recover the Costs of the 5MW Energy Storage Device through the Fuel Clause Adjustment

Document No.: FTCUR/MTNDECESD/BL&P-2019-01 **Date of Issue: April 23, 2019**

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DOCUMENT TITLE: Decision on The Barbados Light & Power Company Limited Motion to Review and Vary the Decision of the Fair Trading Commission on the Application of the BL&P to Recover the Costs of the 5MW Energy Storage Device through the Fuel Clause Adjustment

ANTECEDENT DOCUMENTS

Document Number	Description	Issue Date
FTCUR/STYDEC2018-01	Decision on Application For a Stay of Item (III) - Implementation of Heat Rate Targets - of The Commission's Decision Dated April 13, 2018	10 September, 2018
FTCUR/DECESD/BL&P-2018-02	Decision on the Barbados Light & Power Company Limited Application to Recover the Costs of the 5MW Energy Storage Device through the Fuel Clause Adjustment	16 April, 2018

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SECTION 1 SUMMARY

1.0 On 18 May, 2018, the Barbados Light and Power Company Limited (BL&P) submitted its Motion to Review and Vary the Fair Trading Commission (FTC) Decision on the Application to Recover the Cost of the 5 MW Energy Storage Device (ESD) through the Fuel Clause Adjustment (FCA) ('Decision') dated 13 April, 2018. The Motion contests part (iii) of the said Decision on the following grounds:

(i) Ground 1 – Error of Fact – 'The BL&P asserts that the Commission erred in fact when it misapplied the information which was provided by the BL&P in relation to determining suitable heat rate targets in its utilisation of Regression and Trend Line Analysis to determine the ascribed heat rate targets. Neither the BL&P nor any other party to the consultation was given the opportunity by the Commission during the consultation to respond to the appropriateness of this type of methodology being applied to set heat rate targets. Such error went to the core of the Commission's Decision and has played a substantial role in its Decision outcome'[1];

(ii) Ground 2 – Important Matter of Principle – 'The BL&P contends that the Commission's Decision raises an important matter of principle as the heat rate maintenance/improvement programme, as presently constructed, causes the BL&P in the dispatch of its generation fleet to make decisions that require a tradeoff between cost optimisation that would benefit customers or meeting the Commission's ascribed heat rate targets'[2];

(iii) Ground 2 – Important Matter of Principle - The BL&P acknowledges the prescribed penalty or reward in a performance incentive mechanism must be such that it sufficiently incentivizes efficiency. However, the penalty as presently determined would present financial

[1] See paragraph 46 of the BL&P's Motion to Review dated 18 May, 2018
[2] See paragraph 48 of the BL&P Motion to Review dated 18 May, 2018

risk which could cause hardship to the BL&P on a month to month basis which is not easily resolved due to the regulatory constraints of raising debt. At its extreme this could ultimately be to the detriment of customers. This is another important matter of principle, which has been raised by the Decision as rewards or penalties can be unduly high if they are aligned to volatile or uncertain factors such as international oil prices.'[3]

1.1 Under each ground, the BL&P has identified two sub-grounds which may be set out as follows:

(i) Ground 1 – Error of Fact – Misapplication of Information provided by BL&P

(ii) Ground 1 – Error of Fact – Failure to consult on methodology used to set heat rate targets, i.e. Trend Line Analysis and Regression Analysis

(iii) Ground 2 – Important Matter of Principle – Trade-off between Cost Optimisation and meeting heat rate targets

(iv) Ground 2 – Important Matter of Principle – Financial Risk and Hardship to BL&P & Detriment to Customers.

1.2 The Motion was subject to consultation and Intervenors were invited to submit comments. Additionally, pursuant to the BL&P's request, the Commission heard oral submissions on 20 December, 2018. This allowed the BL&P the opportunity to appear and reiterate its position before the Fair Trading Commission's (the Commission) Electricity Panel. Intervenors were also given the opportunity to participate at this hearing.

1.3 The Commission carefully considered all relevant information, including Intervenors' submissions, presentations at the oral hearing and the Commission's own research. The Commission also noted the provisions of the Barbados National

[3] See paragraph 50 of the BL&P's Motion to Review dated 18 May, 2018.

Energy Policy (BNEP)[4] and the stated objective therein, to move to 100% renewable energy (RE) by 2030, and the impact that such movement could have on any heat rate targets set. While the Commission is not persuaded that the Decision should be varied on all the grounds raised by the BL&P in the Motion, the Commission has determined that there is some justification for variation of the Decision to remove heat rate targets from peaking units. As such, the Commission has determined that the Decision be varied as follows:

(i) The implementation of a heat rate maintenance/improvement programme shall be restricted to all baseload plant. Heat rate targets shall be based on the prior five (5) years' heat rate performance. The statistical tools Trend Line Analysis and Integrated Cumulative Sum (CUSUM) shall be utilised to determine heat rate targets. The gross generation shall be used in the computation of heat rates. Targets shall be subject to review annually or as warranted at the discretion of the Commission.

(ii) The BL&P shall be required to submit to the Commission the results of standard heat rate tests for all plant/units every six (6) months and no later than 30 days after 30 June and 31 December of each year. Tests conducted shall comply with international performance standards and guidelines. The results of heat rate tests must be signed by the BL&P's senior management or the contracting party performing the heat rate tests.

(iii) The BL&P may apply to the Commission for applicable exemptions, where its operations are considered to be subject to force majeure events. Such requests shall describe the nature of the event, the cause, resolution plan and future mitigation strategies.

[4] Forde, Sheena. 2018. "Barbados Green Energy Target is Achievable." *Government Information Service.* July 20. Accessed April 8, 2019. https://gisbarbados.gov.bb/blog/barbados-green-energy-target-is-achievable/.

(iv) The approved heat rate targets are as follows:

- **(Low Speed Diesel 1) LSD1 – 9,067.28 BTU/kWh;**
- **(Low Speed Diesel 2) LSD2 – 7,980.52 BTU/kWh; and**
- **(Steam plant) S1 and S2 – 15,370.20 BTU/kWh.**

(v) Gas turbine units (peaking units) shall not be assigned heat rate targets.

(vi) The Commission requires the BL&P to submit the heat rate performance of all plant/unit on a quarterly basis as part of its continuous regulatory reporting.

1.4 All other aspects of the 13 April, 2018 Decision remain the same.

SECTION 2 BACKGROUND

2.0 On 13 April, 2018 the Commission issued its Decision, No. FTCUR/DECESD/BL&P-2018-2, on the BL&P's Application to recover the costs of the 5MW ESD through the FCA (Decision). In summary, the Decision allowed prudently incurred costs of the 5MW ESD to be recovered via the FCA for a period not exceeding three (3) years. The Decision also stipulated that the BL&P should engage in a heat rate improvement programme based on ascribed targets for each generation plant/unit.

2.1 On 18 May, 2018, the BL&P submitted its Motion to Review and Vary the Decision, supported by an affidavit from Mr. Rohan Seale, Director of Asset Management of the BL&P. In the Motion, the BL&P requested that item (iii) of the Decision, regarding the implementation of heat rate targets, be varied. Part (iii) of the Decision states as follows:

> "The BL&P shall pursue a heat rate maintenance/improvement programme based on the following heat rate targets for each plant type and the individual unit in the case of the gas turbines:
>
> - Steam plant - 15,370.20 BTU/kWh
> - LSD1 - 9,067.28 BTU/kWh
> - LSD2 - 7,980.52 BTU/kWh
> - Gas Turbines:
>   - ❖ GT01 - 17,514.40 BTU/kWh
>   - ❖ GT02 - 15,209.60 BTU/kWh
>   - ❖ GT03 - 14,070.30 BTU/kWh
>   - ❖ GT04 - 13,007.80 BTU/kWh
>   - ❖ GT05 - 12,872.50 BTU/kWh
>   - ❖ GT06 - 12,861.30 BTU/kWh
>
> The heat rate targets shall be reviewed and amended annually or from time to time, as is warranted. The results of heat rate tests of plant/unit performance shall be signed by senior management of the BL&P or contracting party performing the tests, prior to its submission to the

Commission. In the event that the BL&P's operations are impacted by perceived force majeure conditions, it shall be eligible to apply to the Commission for exemptions. Such submissions shall detail the nature and cause of the event, resolution plan and future mitigation."

The Motion contested this part of the Decision only.

2.2 Under Rule 53(6) of the Utilities Regulation (Procedural) Rules 2003 (URPR), the Motion should have been submitted within 14 business days of the Decision. In accordance with Rule 7 of the URPR, the BL&P sought and was granted an extension of time within which to submit the Motion.

2.3 In its Motion, the BL&P requested a stay of implementation of the Decision pending the review. This request was repeated in a letter sent to the Commission by the BL&P dated 13 August, 2018. By Order No. FTCUR/STYORD2018-01 dated 10 September, 2018 and related Decision No. FTCUR/STYDEC2018-01 dated 10 September, 2018, the Commission granted the BL&P's request and granted the stay of the implementation of part (iii) of the Decision until after the Motion was heard and determined.

2.4 By way of written correspondence, the Commission invited the Intervenors who had participated in the hearing of the initial application to make submissions on the Motion no later than 16 October, 2018. The Commission also published a Notice in the press inviting submissions from the general public on the Motion to Review on or before 16 October, 2018.

2.5 Two (2) Intervenors made requests for an extension of the deadline to make submissions on the Motion, namely:

(i) Mr. Brian Anthony Haynes, Chief Project Analyst at the Ministry of Energy and Water Resources by letter dated 18 October, 2018; and

(ii) The Barbados Renewable Energy Association (BREA), by letter dated 18 October, 2018.

The deadline for submission on the motion was extended to 26 October, 2018, and granted to all Intervenors.

2.6 In total the following three (3) Intervenors made submissions on the Motion:

- Mr. Brian Anthony Haynes
- Mr. Anthony Gibbs
- BREA

2.7 The Commission issued interrogatories to the BL&P (copied to all Intervenors) on 25 September, 2018, with a response deadline of 16 October, 2018. The interrogatories in particular sought the BL&P's views on the use of numerical averages, Trend Line Analysis, Cumulative Sum (CUSUM) and Regression Analysis to assess and determine heat rate targets. Additional financial information was also requested of the BL&P on 25 September, 2018 in exercise of the Commission's powers under Rule 20 of the URPR.

2.8 In correspondence from the BL&P dated 4 December, 2018, the BL&P informed the Commission that it intended to make further submissions in support of its Motion for Review by 14 December, 2018. The BL&P's letter, dated 5 December, 2018, requested the opportunity to appear and present its position before the Electricity Panel of the Commission, to present further evidence on the implementation of a heat rate improvement programme.

2.9 Additional correspondence from the BL&P dated 7 December, 2018, informed the Commission that, in the absence of procedural directions confirming closure of said proceeding, it sought the opportunity to make further submissions in support of its Motion. The BL&P confirmed that it did not propose to amend previously submitted arguments. The BL&P also indicated that the information requested by the Commission with regard to the Affidavit from its Director of Finance was submitted to the Commission in the Affidavits of Rohan Seale, dated 18 May and 16 October, 2018.

2.10 On 12 December, 2018, the BL&P submitted, via Affidavit of Rohan Seale, a Memorandum from the Brattle Group, a consultant retained by the BL&P, as further written evidence to support its Motion.

2.11 Under Rule 8(6) of the URPR, permission was granted to the BL&P to make oral submissions. Intervenors were also allowed to make oral submissions. Procedural directions were issued on 14 December, 2018, in accordance with Rule 4 of the URPR. The hearing was convened on 20 December, 2018, at 10:00 a.m. The BL&P, Mr. Anthony Gibbs and BREA made submissions.

SECTION 3 LEGISLATIVE FRAMEWORK

3.0 Pursuant to Section 36 of the Fair Trading Commission Act, CAP. 326B of the Laws of Barbados (FTCA), the Commission has jurisdiction on its own motion or on application from a party to review, vary or rescind any decision made by it. By virtue of the FTCA, the authority of the Commission to allow a review is discretionary. Section 36 of the FTCA states:

> *'The Commission may on application or on its own motion review and vary or rescind any decision or order made by it and, where under this Act a hearing is required before any decision or order is made, such decision or order shall not be altered, suspended or revoked without a hearing.'*

3.1 Reviews are governed by the Utilities Regulation (Procedural) Rules, 2003, S.I. 2003 No. 104 of the Laws of Barbados and the Utilities Regulation (Procedural) (Amendment) Rules, 2009, S.I. 2009 No.82 of the Laws of Barbados (together 'URPR'). Rule 53(2) of the URPR provides as follows:

> '*Any party to a proceeding may by motion request a review of a final decision or order*.'

3.2 The BL&P must first demonstrate, on a *prima facie* basis, the existence of the permissible grounds of review. Rule 54(1) of the Rules requires that every Notice of Motion must state the grounds on which the Commission should review a decision made in a utility regulation proceeding. Rule 54(1) states, *inter alia,* that:

> '*Every Notice of Motion made under rule 53(2), in addition to the requirement of rule 8 shall*
>
> *(a) Set out the grounds upon which the motion is made sufficient to justify a review or raise a question as to the correctness of the order or decision and the grounds may include*
>
> *(i) Error of law or jurisdiction;*
>
> *(ii) Error of fact;*

(iii) *A change in circumstances;*

(iv) *New facts that have arisen;*

(v) *Facts that were not previously placed in evidence in the proceedings and could not have been discovered by reasonable diligence at the time; and*

(vi) *An important matter of principle that has been raised by the order or decision.'*

3.3 The Application must first pass the threshold test as provided for by Rule 55 of the URPR. Rule 55(1) states:

> *'The Commission shall determine with a hearing, in respect of a motion brought under Rule 53 the threshold question of whether the matter should be reviewed or whether there is reason to believe the order should be rescinded or varied.'*

3.4 According to Rule 55(3), the Commission may adopt whatever procedures it deems to be just and expeditious in the individual circumstances of each motion, including providing for the combining of consideration of the threshold question and the review on the merits. In this regard, both were considered together. The matter was dealt with by way of a written hearing, however, the BL&P was allowed to make oral submissions to the Commission, at its request, in exercise of the Commission's powers under Rule 8(6) of the URPR.

SECTION 4 RATIONALE FOR DECISION

The Threshold Question

4.0 The BL&P asserts, (at paragraphs 36 to 40 of the Motion), that the Motion meets the threshold test and that the matters raised by the BL&P are sufficient on a *prima facie* basis to answer the question of whether the Decision should be reviewed or whether there is reason to believe the Order should be rescinded or varied.

4.1 The grounds raised by the BL&P in support of this contention that the threshold test has been met are as follows[5]:

'*Methodology for arriving at the Heat Rate Targets*

(i) The methodology used for calculating the targets departs significantly from the methodology and proposed targets initially presented by the Commission and discussed at length during the consultation process.

(ii) The Commission utilized trend line and regression analysis in its Decision as the methodology to determine the heat rate targets without giving the parties to the consultation an opportunity to interrogate this methodology as to its reasonableness.

(iii) The trend line and regression analysis methodology as applied by the Commission to determine the heat rate targets departs from the methodology commonly used in the industry for determining such targets. The Applicant has been unable to identify other jurisdictions where this methodology is utilised to determine heat rate targets. The Applicant has however observed precedent internationally for using historical averages - the only methodology presented by the Commission during the consultation process - as the basis for setting heat rate targets.

[5] The BL&P, Application for Motion for Review and Variation, 2018, paragraph 39-40

(iv) There is little clarity in the Decision as to how the regression analysis and the trend line was utilized to determine the targets. Regression analysis is a commonly used statistical technique for estimating the relationship among variables, rather than for determining targets.

(v) Regression analysis is very sensitive to outliers and therefore would not be the most appropriate methodology for determining targets for heat rate performance especially among peaking plants where heat rate outliers are commonly driven by instantaneous response to system demands placed on the plants.

(vi) An effective incentive mechanism should provide a reasonable opportunity to achieve the targets. However, as demonstrated in Exhibit "RS1" of the Affidavit of Mr. Rohan Seale, there exist a low probability of the Applicant achieving the targets given its historical heat rate performances especially the targets related to the Gas Turbines.

(vii) Heat rate targets should adequately and realistically reflect the available generating plant's technical capabilities and system constraints.

(viii) The Commission's approach to the heat rate maintenance/improvement programme would incentivize the Applicant to substitute lower heat rate/higher fuel cost generation units for higher heat rate/lower fuel cost generation units in an effort to achieve the targets. As outlined in Exhibit "RS2" of the Affidavit of Mr. Rohan Seale, compliance with the targets would require the Applicant to increase its gas turbines share of system load, resulting in higher overall fuel cost to customers.

(ix) The Applicant does not consider the targets presented in the Decision to be reasonable, because given its current least cost dispatch methodology, the Decision would penalize the Applicant for facilitating higher penetration of renewables and expose the Applicant to considerable financial risks given the targets marked deviation from the current heat rate performance of the plants.

Financial Exposure & Customer Impact

(x) *The pursuit of heat rate targets in isolation does not allow for cost optimization given the different plant and fuel types. Simply put, heat rate optimization will in many instances drive higher fuel costs to customers.*

(xi) *The decision not to implement a cap on the financial exposure presents a significant risk to the Applicant and its customers as demonstrated in Exhibit "RS3" of the Affidavit of Mr. Rohan Seale.*

(xii) *The absence of a limit on the level of financial exposure can undermine the financial viability of the Applicant given the magnitude of fuel cost relative to its other expenses and normal operating cash flows. This is further exacerbated by the volatility of market fuel prices and possible heat rate degradation caused by factors outside of the control of the Applicant such as fuel quality and supplier delays.*

(xiii) *Subjecting the Applicant to unlimited financial exposure could affect the Applicant's ability to provide a sustained safe, affordable and reliable service to customers. This we do not believe to be the intent of the Commission.'*

Intervenor Submissions on the Threshold Question

4.2 No Intervenors made submissions on the matter of whether the BL&P's Motion passed the threshold test.

Decision on the Threshold Question

4.3 The Commission, in making its determination on the threshold question, must consider whether the BL&P established, on a *prima facie* basis, that any of the grounds the BL&P relies on satisfies the threshold test. Black's Law Dictionary defines a *prima facie* case as: '*the establishment of a legally required rebuttable presumption; a party's production of enough evidence to allow the fact-trier to infer the fact at issue and rule in the party's favour*'.[6]

[6] Garner, B. A. (2014). *Black's law dictionary.* 10th ed. (USA)

4.4 The Ontario Energy Board has previously determined[7] in its *Natural Gas Electricity Interface Review Decision*, EB-2006-0322/0338/0340, May 22, 2007, that in order for an applicant to meet the threshold test on filing a motion to review, it must demonstrate that the error which it alleges in the decision it wishes reviewed is identifiable, material and relevant to the decision which was made. Such an applicant must show, on a *prima facie* basis, that there is enough substance to the issues raised in their motion for review that a review based on those issues could lead to a variation or rescission of the original decision. It is insufficient for an applicant to demonstrate that it is dis-satisfied with the decision, which is the subject of the Motion, and the Motion must not be used as an opportunity to simply re-argue the applicant's case[8].

4.5 The Commission noted that the BL&P has articulated grounds for its submissions on the threshold test which do not mirror those submitted in support of the Motion, although the former arguably relate to the latter. Regarding the BL&P's submissions on the threshold test the Commission is of the view that the two (2) matters raised under Ground 1 (i.e. that the Commission misapplied the information utilised in its methodology and that either insufficient or no consultation was undertaken by the Commission on the methodology to be employed by the Commission in setting heat rate targets, when such consultation was legally required) would be, if substantiated, material, relevant and identifiable issues which could lead to a variation or rescission of the Decision. The Commission notes that the alleged lack of consultation was also cited as a ground of the application at paragraph 46 of the Motion.

In assessing the Motion, the Commission is of the view that the BL&P has made a legally rebuttable presumption as it relates to lack of consultation and therefore a possible breach of statutory duty and/ or the principles of natural justice, which raises a question as to the correctness of the

[7] See for example the Ontario Energy Board *Hydro One Decision* EB 2007-0797 and *Natural Gas Electricity Interface Review Decision*, EB-2006-0322/0338/0340, May 22, 2007, p. 18

[8] Ontario Energy Board *Natural Gas Electricity Interface Review Decision* (the "NGEIR Decision"), EB-2006-0322, -0338, -0340, May 22, 2007) at page 18

Commission's decision. The Commission has therefore determined that the Motion has met the threshold test on the matter of the adequacy of consultation on the methodology to be utilised in setting heat rate targets.

4.6 **On the matter of the appropriateness of the methodology used by the Commission in setting heat rate targets, i.e. Trend Line Analysis, the Commission is of the view that the issues raised by the BL&P in this regard also present a *prima facie* case which would suggest that the correctness of the Decision may be challenged. In this regard, the Commission notes that this issue is indirectly raised as a stated ground of the application at paragraphs 44 to 51 of the Motion.**

4.7 Regarding the likelihood of the Decision resulting in higher fuel costs to customers, financial risk to the BL&P and the contention that the heat rate targets set are not achievable by the BL&P, addressed at paragraphs 47 to 51 of the Motion, the Commission is of the view that, were these matters to be substantiated on a *prima facie* basis, a question could be raised as to the correctness of the Decision. **The BL&P was asked, in a letter from the Commission dated 25 September, 2018 to provide financial information to support its allegation of financial risk to the BL&P likely to be caused by the Decision. The BL&P failed or refused to provide the information requested. The Commission therefore finds that the BL&P has not produced adequate evidence to establish a *prima facie case of* the financial risk and hardship the BL&P alleges and has therefore not met the threshold question on the matter of financial risk.**

The Commission will therefore consider the following grounds of the BL&P's Motion

(i) Ground 1 – Error of Fact – Misapplication of Information provided by BL&P

(ii) Ground 1 – Error of Fact – Failure to consult on methodology used to set heat rate targets, i.e. Trend Line Analysis and Regression Analysis

(iii) Ground 2 – Important Matter of Principle – Trade-off between Cost Optimisation and meeting heat rate targets

Ground 1 – Error of Fact - Misapplication of Information in Methodology

The BL&P's Submissions on Misapplication of Information in Methodology

4.8 The BL&P indicated in its Motion that the Commission's methodology used in the determination of heat rate targets deviated from the initial methodology presented to the BL&P, which was the average historical heat rate performance and discussed as part of the consultation process[9,10]. It commented that the methodology described in the Commission's April 13, 2018 Decision, detailing the application of Trend Line and Regression Analysis to determine heat rate targets, departed from accepted industry practice. The BL&P emphasised that internationally, the preference for Historical Averages was widely accepted for setting heat rate targets[11].

4.9 The BL&P further claimed that the Commission's Decision lacked clarity as it relates to the application of Trend Line Analysis in the determination of the heat rate targets and that such analysis, was commonly utilised to determine the relationship among variables instead of determining targets[12]. The BL&P surmised that Regression Analysis would not be suitable for determining heat rate targets for peaking plant, given their unique role, as the analysis was sensitive to data outliers[13].

4.10 In response to the Commission's interrogatories, the BL&P reiterated that heat rate targets based on numerical averages was preferred internationally and Trend Line Analysis, CUSUM and Regression Analysis were "sensitive to

[9] The BL&P, *Application for a Motion to Review and Variation Decision Dated April 13, 2018 – 5MW Energy Storage Device*, (25), (39, 1.a).
[10] The BL&P, Affidavit: *Affidavit of Rohan Seale in Support of Notice of Motion*, May 18, 2018, 6 (21).
[11] The BL&P, *Application for a Motion to Review and Variation Decision Dated April 13, 2018 – 5MW Energy Storage Device*, (39, 1.c).
[12] Ibid, (39, 1.d).
[13] Ibid, (1.e).

outliers"[14]. The BL&P suggested that these methodologies were not appropriate to determine heat rate targets for peaking plant given their obligation to respond to unpredictable load events on the grid[15].

Intervenors' Submissions on Ground 1 – Error of Fact - Misapplication of Information in Methodology

4.11 In his affidavit of 16 October 2018, Mr. Anthony Gibbs asserted that while Trend Line Analysis is more suitable for the avoidance of outliers and more accurately estimating potential performance, the BL&P is correct in stating that the use of Trend Line Analysis and Regression Analysis "depart significantly from the methodology that is commonly used in the industry by regulators".[16] He also stated that the role of Regression Analysis in the setting of the targets bears explanation. While acknowledging the inherent challenges due to issues such as large outliers in the data, Mr. Gibbs suggested that Historical Averages ought to be the approved methodology as it is a familiar approach, which inspires confidence. He also underscored the need for transparency, stating that the setting of targets is best done collaboratively[17].

4.12 Mr. Brian Haynes, in his affidavit dated October 31, 2018, asserted that given the impending increase in RE on the grid, a strict focus on past performance may not be sufficient due to an increasing amount of randomness in the data. Additionally, he cautioned that the use of Trend Line and Regression Analysis to determine heat rate targets could be quite challenging if the data is stochastic in nature (i.e. random). He suggested the use of Autoregressive Integrated Moving Average models (ARIMA) instead, due to their effectiveness in handling the stochastic nature of some trends.[18]

Determination on Ground 1 – Error of Fact - Misapplication of Information in Methodology

[14] The BL&P, Submission of the Barbados Light & Power Company Limited in Response to the Interrogatories of the Fair Trading Commission Dated October 16, 2018, 5.
[15] Ibid, 6
[16] Anthony Gibbs, Affidavit of Anthony Gibbs, October 2018, page 9.
[17] Ibid, paragraph 44, page 10.
[18] Ministry of Energy and Water Resources, Affidavit of Bryan Haynes, 2018, paragraph 34-35.

4.13 The Commission is of the view that Trend Line Analysis is a standard technique used to analyse the results of the data under evaluation. As highlighted on page 19 of its April 13, 2018 Decision, the Commission described the method it employed to determine heat rate targets. It was explained that Trend Line Analysis was applied to the historical heat rate performance data to arrive at heat rate targets; it stated that Trend Line Analysis was primarily used to establish targets and that these were then verified using Regression Analysis.

4.14 The Commission's consultation on the determination of heat rate targets was based on the average of the prior five (5) years' heat rate performance (2012 – 2016). The targets derived from this data set were ascribed on a plant-by-plant basis. This was the only data available to the Commission for consideration at the time. However, during the consultation process with the BL&P, the BL&P recommended the assignment of heat rate targets to individual gas turbines[19], given that these differed by technology and fuel systems. The BL&P also provided heat rate targets (Averages) for its thermal fleet with the exception of GT01; these were based on the most recent five (5) years (2013 - 2017) and three (3) years (2015 – 2017)[20] of heat rate performance data. The Commission accepted the aforementioned recommendation of the BL&P.

4.15 Trend Line Analysis was utilised to model the heat rate performance of the BL&P for the five (5) year period (2013 - 2017) and assessed the variance between baseline and actual fuel consumption; this methodology examined whether performance improved or worsened over time, identified areas of acceptable performance, changes in consumption patterns and highlighted areas for intervention and potential improvement. Understanding how the heat rate performance changed over the course of the five (5) years, provided critical information to guide the setting of heat rate targets.

[19] The BL&P, Affidavit of Rohan Seale, 23 February, 2018, paragraph 6, Item (a), page 6.
[20] Ibid, page 8,

4.16 Trend Line Analysis also offered a superior approach to numerical averages; this approach established the degree of fit between the data for the variables used to evaluate fuel input (BTU) and generation (kWh), based on the prior five (5) years' heat rate performance.

4.17 CUSUM analysis was also employed to determine reasonable targets. This technique allowed a model to be constructed to test expected performance against the actual performance[21].

4.18 The Commission holds the view that Trend Line Analysis is an established methodology to evaluate and determine heat rate targets and as such, within the stated context has been appropriately applied. Trend Line Analysis was applied to the same raw data which was submitted by the BL&P and this analysis was an improvement on the use of numerical averages. As a consequence, the Commission was able to gain and utilise more insightful heat performance information. The statistical techniques used allowed inferences to be drawn from the models developed, thus reinforcing and quantifying the level of the target obtained.

4.19 The Commission also considered the impact of Historical Averages in terms of scale and the preference for its use, in jurisdictions with continent type grids, whose inherent characteristics are vastly, more complex, in terms of network topology, grid infrastructure, network capacity, market structure and type of plant compared to an island grid. Average heat rates and the resulting numerical averages introduces a greater degree of slack and this tend to mask plant inefficiency. Based on this assessment, the Commission is of the view that Historical Averages is inappropriate and does not adequately fit our efficiency objectives under the heat rate improvement/programme.

[21] Industrial Energy Management Training Course, Module 7: Energy Monitoring, Targeting and Reporting, accessed July 12, 2018, Http://www.energy.gov.za/EEE/Projects/industrial%20Energy%2Management/IEM%20Training/Modules/IEMTCModule7_final.pdf.

4.20 The Commission is of the view that while the use of Historical Averages may be widely accepted in other jurisdictions, the Commission has the regulatory duty to determine the methodology that is pertinent to unique local circumstances and the type of monitoring programmes required to ensure a safe, reliable and efficient service.

4.21 While Historical Averages is an appropriate methodology in other jurisdictions, this does not automatically qualify it as suitable for our immediate operating environment. The Commission upholds the preference for Trend Line Analysis as a rigorous methodology to Simple Historical Averages, given that the reliance on averages does not provide an accurate reflection of heat rate performance; outliers tend to skew the final result (averages) and hence can portray incorrect information (artificially high heat rates); these results, if utilised will only perpetuate greater inefficiency.

4.22 The Commission is satisfied that there was no misapplication of the information provided, as claimed by the BL&P. Trend Line Analysis was used to develop a historical trend of past performance in order to give an indication of achievable future performance. Historical Averages essentially achieves the same goal but it does so in a less precise and less appropriate manner. Consequently, the information provided was not misapplied. On the contrary, the methodology used actually facilitated more accurate results.

4.23 The Commission noted the concerns of the BL&P with regard to the methodology used to determine heat rate targets. In its original Decision (13 April, 2018), the Commission described the method it employed to determine heat rate targets. It was explained that Trend Line Analysis was applied to the historical heat rate performance data to arrive at heat rate targets. Regression Analysis was used only to verify said targets. The applicability of Regression Analysis in thermal power plant performance

assessment is well documented.[22,23] Regression Analysis outcomes can be used to align the plants' operational performance i.e. the output of the regression model can update and tune the plants' control systems, to respond to corrective signals, when subnormal conditions are prevalent[24,25]. The Commission also noted, that the adopted methodology is used by energy efficiency industry practitioners[26].

4.24 Understanding how the heat rate performance changed over the course of the five (5) years provided critical information to guide the setting of heat rate targets. However, a review of the data and methodology revealed data validity issues. The Commission also highlighted the potential impact of outliers, which may skew the result. The Commission considered that the use of Historical Averages, given its intended application, did not provide sufficient information about heat rate performance over the period of interest; this led to further research for a more robust methodology, which would guide the determination of realistic and reasonable targets. The data set for each plant/unit was screened to take into consideration the existence of outliers, and it was further evaluated using Trend Line Analysis.

4.25 It is expected that, as the industry transitions from fossil fuel to RE, a wider scope of analysis will be required to adequately evaluate and respond to the nuances of the shift, given the inherent characteristics of variable generation.

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[22] United States Department of Energy, "Better Plants: Energy Intensity Baselining and Tracking Guidance", Accessed July 12, 2018, https://www.energy.gov/sites/prod/files/2015/02/f20/Energy%20Intensity%20Baselining%20and%20Tracking%20Guidance.pdf

[23] U.S. Energy Information Administration (EIA), Analysis of Heat Rate Improvement Potential at Coal – Fired Powered Plants, https://www.eia.gov/analysis/studies/powerplants/heatrate/pdf/heatrate.pdf.

[24] Thanrawee Phurithititanapon and Jongsawas Chongwatpol, Improving the Thermal Efficiency of Coal-Fired Power Plants: A Data Mining Approach, Accessed July 12, 2018, http://support.sas.com/resources/papers/proceedings14/1805-2014.pdf.

[25] Konrad Swirski, Power Plant Performance Monitoring Using Statistical Methodology Approach, Journal of Power Technologies 91 (2) (2011) 63-67, Accessed July 12, 2018, http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.837.998&rep=rep1&type=pdf.

[26] The Carbon Trust is one such institution which utilises this technique as well as other approaches. More information can be obtained at the link: https://www.carbontrust.com/media/31683/ctg008_monitoring_and_targeting.pdf.

4.26 While the Historical Averages based methodology has merit, there is no one-size-fits-all solution in every situation. Consequently, the Commission considered it prudent to subject the data to a somewhat more rigorous treatment in order to determine heat rate targets, which are applicable to the prevailing circumstances and are as accurate as possible. The importance of this was compounded by the BL&P's request, i.e. recovery of the ESD's costs through the FCA. Such a consideration is without precedent in the Barbados energy sector and as such, greater scrutiny of the BL&P's energy efficiency is required to ensure that consumers are not charged more than necessary for the fuel used in electricity generation.

4.27 **The Commission therefore finds that the information that was presented to it by the BL&P over the prior five (5) year period (2013 - 2017) was appropriately applied, contrary to the BL&P's submission.**

Ground 1 – Error of Fact - Lack of Consultation on Methodology

The BL&P's Submission on Ground 1 – Error of Fact - Lack of Consultation on Methodology

4.28 The BL&P acknowledged that it was consulted by the Commission on the matter of the implementation of heat rate targets prior to the issuance of the Decision. At paragraphs 20 to 23 of the Motion, the BL&P acknowledges that:

(i) the Commission issued a public notice on the commencement of written hearings on the Application to recover the costs associated with the ESD through the Fuel Clause Adjustment and invited Intervenors to participate[27];

(ii) the BL&P responded to interrogatories issued by the Commission and Intervenors related to the ESD[28];

(iii) the BL&P received and responded to correspondence from the Commission which '*proposed heat rate targets for respective*

[27] See paragraph 20 of the Motion
[28] See paragraph 21 of the Motion

generating plants based on a methodology that utilized an average of the plant's prior five (5) years heat rate performance'[29].

4.29 The BL&P however asserted that the Commission erred in fact by:

(i) failing to consult on the methodology actually applied by the Commission to determine the heat rate targets reflected in its Decision. The BL&P states that the methodology used for calculating the heat rate targets and the final targets in the Decision departed significantly from the methodology and targets initially presented by the Commission and discussed at length during the consultation process;

(ii) utilising Trend Line and Regression Analysis as the methodological basis for heat rate targets determination without giving the BL&P and other parties to the consultation the customary due process to interrogate this methodology to consider its reasonableness; and

(iii) failing to engage the services of an independent consultant as part of the process of hearing the initial application and setting heat rate targets. The BL&P contends that designing incentive mechanisms is a specialized area and remarks that in the past, when major regulatory adjustments were undertaken, the Commission has engaged the services of various independent consultants. This, asserts the BL&P, is one such occasion where this treatment is required.

[29] See paragraph 22 of the Motion

Intervenors' Submission on Ground 1 – Error of Fact - Lack of Consultation on Methodology

4.30 On the matter of consultation, Intervenor Mr. Anthony Gibbs, submitted that target setting in general ought to be pursued in an atmosphere of transparency and should always be a collaborative effort.[30] He also intimated that the intervention by a consultant would depend on the terms of references, which would guide the process[31].

4.31 BREA remarked that an experienced independent consultant who is skilled in the design of incentive mechanisms should have been contracted to advise the Commission on the appropriate incentive mechanism to use.[32] BREA's justification for this proposal, is that a heat rate target may not be the best solution to minimise fuel cost, which in its view, is the intended objective of the Commission's Decision[33]. BREA reasoned that other relevant factors besides heat rates – such as fuel mix, fuel cost, calorific value and energy production need to be considered in order to establish a feasible solution.[34]

Determination on Ground 1 – Error of Fact - lack of Consultation on Methodology

4.32 A public authority's duty to consult before taking a decision can arise in a variety of ways. Most commonly, as here, the duty is generated by statute. The Commission's statutory duty to consult is established by Section 4(4) of the FTCA, which states:

> '*The Commission shall, in performing its functions under subsection (3)(a), (b), (d) and (f) consult with the service providers, representatives of consumer interest groups and other parties that have an interest in the matter before it*.'

4.33 Section 4(3)(a) of the FTCA states that the Commission shall, in the performance of its functions and in pursuance of the objectives set out in subsections (1) and (2), establish principles for arriving at the rates to be

[30] Anthony Gibbs, Affidavit of Anthony Gibbs, 16 October, 2018, paragraph 44, page 10.
[31] Ibid, paragraph 61- 63, page 13.
[32] Fair Trading Commission, Transcript, Session 2, 20 December, 2018, line 173-1777, page 6.
[33] Ibid, line 110-111, page 4.
[34] Ibid, line 121-151, page 4.

charged by service providers. Section 2 of the FTCA defines "principles" as the formula, methodology or framework for determining a rate for a utility service. In keeping with this definition, the Fuel Clause Adjustment is deemed a formula for the purposes of the Utilities Regulation Act (URA).

4.34 Both Section 2 of the FTCA and Section 2 of the URA set out that the term "rates" includes every rate, fare, toll, charge, rental or other payment to a service provider; a rule, practice, measurement, classification or contract of a service provider relating to a rate; and a schedule or tariff respecting a rate. Notably, the Application by the BL&P for approval to recover the costs associated with the commissioning of the ESD via the FCA resulted in the alteration of the FCA formula. As such, the Commission was bound by the statutory duty, as set out above, to consult on the formula and methodology through which it proposed to alter the FCA, before reaching its decision.

4.35 Not infrequently, the duty to consult arises as a result of the duty cast by the common law upon a public authority to act fairly (**R (on application of Moseley (in substitution of Stirling, Deceased) v London Borough of Haringey [2014] 1 WLR 3947)**. In addition, the common law imposes a general duty of procedural fairness upon public authorities exercising a wide range of functions which affect the interests of individuals, but the content of that duty varies almost infinitely depending upon the circumstances. A duty of consultation will however exist in circumstances where there is a legitimate expectation of such consultation, usually arising from an interest which is held to be sufficient to found such an expectation, or from some promise or practice of consultation.

4.36 In the case of **R (Osborn)** v **Parole Board [2013] UKSC 61, [2013] 3 WLR 1020**, the court addressed the common law duty of procedural fairness in the determination of a person's legal rights. It identified two purposes of procedural fairness, first, the requirement for consultation is liable to result in better decisions, by ensuring that the decision-maker receives all relevant information and that it is properly tested; second, it avoids the sense of

injustice which the person who is the subject of the decision will otherwise feel. The fundamental requirement of procedural fairness is to give the opportunity to a person whose legally protected interests may be affected by a public authority's decision to make representations to that authority before the decision is taken.

4.37 In its Motion to Review, the BL&P has asserted that consultation by the Commission on the methodology is customary in matters such as this and therefore implies that the BL&P had a legitimate expectation of being consulted on the methodology utilised to determine the heat rate targets based on the Commission's practice of consultation. The BL&P has not pleaded that the Commission breached its statutory duty.

4.38 The Commission accepts that the BL&P has a statutory right to be consulted on the methodology used by the Commission in altering the FCA formula as well as a legitimate expectation to be consulted, since this has been the practice of the Commission. As previously noted, the BL&P has not premised its argument on the Commission's statutory duty to consult but on the BL&P's legitimate expectation that it would be consulted on the methodology used to determine the heat rate targets, i.e. Historical Averages or Trend Line Analysis. In ***Leacock v AG of Barbados H Ct Barbados, Suit No 1712 of 2005,*** the BL&P's legitimate expectation was premised on a historical factual practice of permitting policemen who had attained Bachelor of Laws degrees to be granted study leave to pursue the next stage of the legal education process, the Legal Education Certificate. As such, it was determined that the failure to grant him that leave constituted a breach of his legitimate expectation that he would be treated similarly. The Commission accepts that legitimate expectation does not arise in the absence of either an implied duty to consult or a historical practice of consultation in similar circumstances.

4.39 In this regard, the Commission notes that the Motion does not refer to prior instances where the Commission consulted on the statistical methodology employed in calculating a target, efficiency measure, or other component of

the FCA or other formula. Further, the Commission is aware that in the previous Commission decision, **FTCUR/REVFCA 2013-01 In the Matter of the Fuel Clause Adjustment,** the BL&P was not consulted on the methodology for calculating any component element of the FCA, but merely on the (overall) FCA formula itself. The current BL&P Motion does not establish how the legitimate expectation it asserts arises. As such, the claim that the Commission should have consulted on Trend Line Analysis on the basis of legitimate expectation is unsubstantiated within the Motion or by prior experience.

4.40 The Commission, therefore, then considered whether the consultation actually undertaken by the Commission was adequate in all the circumstances.

4.41 The legal principles which govern the conduct of a public consultation process were developed in the seminal case of ***R v Brent LBC ex parte Gunning*** **(1985) 84 LGR 168** and are generally referred to as the Sedley principles or the Gunning principles on consultation. These principles were subsequently approved by the Court of Appeal in the cases of: ***R v Devon County Council ex p Baker*** **[1995] 1 All ER 73** and ***R v North and East Devon Health Authority ex p Coughlan*** **[2001] QB 213**.

4.42 The Sedley principles essentially provide that, in order for a consultation process to be fair, the following conditions must be satisfied:

(i) *Consultation at formative stage of process* - The consultation must occur at a time when proposals are still at a formative stage;

(ii) *Reasons for options consulted on* - The decision-maker must give sufficient information for any proposal to permit intelligent consideration by and response from those being consulted;

(iii) *Adequate time for consultation* - Adequate time must be given for consideration and response by those consulted; and

(iv) *Product of consultation must be taken into account* - The product of consultation must be conscientiously taken into account when finalising the decision. (**R v Brent London Borough Council, Ex p Gunning (1985) 84 LGR 168**)

4.43 Whether or not a consultation process is fair is a matter of fact. As stated by Justice Sullivan in **R (Greenpeace Limited) v Secretary of State for Trade and Industry [2007] EWHC 311 (Admin**):

> "*Judgments are not to be construed as though they were enactments of general application, and the extent to which judicial dicta are a response to the particular factual matrix of the case under consideration must always be borne in mind*."

4.44 Recent cases suggest that the Courts will consider a nullity a decision arrived at in breach of a legal duty to consult, only where the breach is of a substantial nature. In the Jamaican Case of ***The Northern Jamaica Conservation Association et al v. The Natural Resources Conservation Authority [Unreported] (2006) (SC) (Jamaica)*** ('Northern Jamaica Case') Justice Sykes asserted (at paragraph 40) that:

> '*It does not follow from this that flaws in the consultation process will necessarily mean that the decision should be quashed. It would seem to me that it depends upon the seriousness of the flaw and the impact that it had or might have had on the consultation process. Consultation is the process by which the decision maker receives concerns, fears and anxieties from the persons who might or will be affected by his decision … the courts will examine what took place and make a judgement on whether the flaws were serious enough to deprive the consultation process of efficacy*.'

4.45 In that case, where a marine ecology report was not provided as part of an Environmental Impact Assessment ('EIA') during a consultation process undertaken by The Natural Resources Conservation Authority of Jamaica (NRCA), the Court determined that:

(i) the failure to provide the EIA to the parties to the consultation was a significant omission,

(ii) the time afforded the persons consulted to submit their comments was too short, and

(iii) the NRCA was unable to prove that it had consulted with the relevant parties on the report.

4.46 The Court found that the NRCA had acted unfairly and abused their power in the circumstances of the case as the Northern Jamaica Conservation Association Case and members of the public needed to have the EIA in order to make an informed and intelligent response. The Court, in granting the remedies sought on judicial review, determined that the consultation process was flawed because all of the information related to the EIA which should have been provided to the public, had not been provided. The case demonstrates that significant flaws in a consultation process will still nullify any resulting decision.

4.47 The BL&P alleged that the consultation which was undertaken by the Commission was inadequate because when the Commission consulted on the implementation of heat rate targets, it did so on the basis that these targets would be calculated using a methodology of simple Historical Averages. When the Decision was issued, heat rate targets were included but had been calculated on the basis of Trend Line Analysis and the BL&P submits that it was denied the opportunity to be consulted on this method of calculating the heat rate targets.

4.48 The Commission finds that it was required to consult on the introduction of heat rate targets as a component within the FCA, but was not required to consult on all statistical methods it might have considered in determining what the heat rate targets would be. The Commission is further of the view that the Trend Line Analysis approach to the determination of heat rate targets, and the Historical Averages approach to setting heat rate targets are sufficiently analogous, that further consultation was unnecessary. The development of a historical trend allows the observation and analysis of past performance in order to validate present results and predict future performance. The use of Historical Averages achieves the same result albeit in a less precise manner. Therefore, since the two approaches facilitated the same goal, using the same data set, the change from one to the other was not significant and as such further consultation was not necessary.

4.49 The Commission is satisfied that it was not required to provide all the possible statistical options which it could employ to determine heat rate targets in order for the consultation process to be fair, and the fact that the Commission did not provide alternative options for calculation of the heat rate targets does not in and of itself render the consultation process flawed or inadequate. In this regard, the Commission is persuaded by the reasoning in the English High Court case of **The Vale of Glamorgan Council** v. **The Lord Chancellor and Secretary of State for Justice [2011] EWHC 1532.** In that case, the Vale of Glamorgan sought to challenge a decision of the Lord Chancellor to close a number of county courts and magistrates' courts and in particular, his decision to close the Barry Magistrates' Court. One of the grounds of challenge was that, during the consultation process, the Lord Chancellor had failed to consider alternative means of achieving the increased utilisation of the courts at Cardiff and as a related ground of challenge, that he failed to consult about any such alternative means. Lord Justice Elias stated as follows:

> *"We do not accept this submission, essentially for the reasons advanced by Mr. Grodzinski QC, counsel for the Lord Chancellor. First, there is no general principle that a Minister entering into consultation must consult on all the possible alternative ways in which a specific objective might arguably be capable of being achieved. It would make the process of consultation inordinately complex and time consuming if that were so…Consultation is not negotiation. It is a process within which a decision maker at a formative stage in the decision making process invites representations on one or more possible courses of action. In the words of Lord Woolf MR in Ex parte Coughlan [2001] QB 23 at para 112*[35]*, the decision maker's obligation "is to let those who have potential interest in the subject matter know in clear terms what the proposal is and why exactly it is under positive consideration, telling them enough (which may be a good deal) to enable them to make an intelligent response. The obligation, although it may be quite onerous, goes no further than this.*"

4.50 The Commission is of the view that this legal principle is applicable here – the course of action which required consultation was the implementation of heat rate targets and the resultant (change in) methodology for calculation of the FCA. The Commission was not duty bound to consult on the statistical method by which the targets were determined. Even if the Commission was so obliged, it was also entitled to narrow that methodology so that the consultation it undertook reflected its preferred option in setting the heat rate targets at the time of consultation. This approach was favourably considered in the English Court of Appeal case of **R (On the Application of Royal Brompton and Harefield NHS Foundation Trust)** v. **Joint Committee on Primary Care Trusts & ANR [2012] EWCA Civ. 472**.

4.51 In order to assess the strength of the BL&P position that the consultation process was flawed, it is therefore necessary to examine the facts of the instant consultation process as against the Sedley legal principles. It is also necessary

[35] R v. North and East Devon Health Authority ex parte Coughlan [2001] QB 213 is considered a leading English case on the common law duty of fairness and its satisfaction during a public consultation.

to determine whether any identified flaws in the consultation process were of such a significant nature that they would reasonably place the decision at risk, as held in the Northern Jamaica Case.

4.52 In line with the decision in the Greenpeace case that each case must be determined with reference to the facts of the consultation, the Commission notes the facts of the consultation process with specific reference to the Sedley principles as follows:

(i) *Consultation at formative stage of process* - The BL&P application was received on 4 August, 2017. The Commission's consultation process started on 10 January 2018 when the option to include heat rate targets as a measure of efficiency in the FCA was still at a formative stage;

(ii) *Reasons for options consulted on* - The Commission gave sufficient reasons for its consideration of the option to include heat rate targets as a measurement of efficiency so that the parties consulted were able to respond intelligently. Indeed, if we refer to the Commission's letter of 10 January, 2018, it states:

> '*..Since fuel cost savings benefits will be contingent on the operation of the ESD, the efficient production of electricity should supplement the benefits to be realized. As a consequence, the Commission is considering instituting heat rate targets for the different types of generating plant…*'[36]

The letter continued:

> '*The proposed heat rate targets for the respective generating plants are based on the reported average of the prior five (5) years heat rate performance …*

[36] Paragraph 1, Letter dated 10 January, 2018 under reference 4/12/35 and addressed to Mr. Adrian Carter, Senior Analyst BL&P

Additionally, a review period for the targets of two (2) to three (3) years is suggested and will be based on the historical performance of each generating plant….'[37]

That the information provided to those consulted was adequate in this regard, is borne out by the fact that the persons consulted were able to respond cogently not only on the option presented by the Commission to include heat rate targets as a measurement of efficiency, but also to suggest alternative options for calculation of efficiencies in general and the heat rate targets in particular;

(iii) *Adequate time for consultation* – The facts of the instant case demonstrate that the parties consulted were not given a timeline to revert to the Commission on the initial proposal as contained in the 10 January letter. The BL&P responded on 30 January, 2018 to indicate its disagreement that the use of heat rate targets solely as the efficiency target was appropriate.

There was a subsequent meeting with the BL&P on 2 February, 2018 and further correspondence from the BL&P. The Commission issued an interrogatory to all parties to the hearing on 21 February, 2018 which outlined its proposal and sought the parties' views on the application of heat rate targets for the individual generation plants as proposed and the Commission's proposed metrics for regulatory monitoring. The consultation process went further, in that the BL&P, specifically, was again approached by the Commission for the BL&P's input at later stages of the process;

[37] Paragraph 2, Letter dated 10 January, 2018 under reference 4/12/35 and addressed to Mr. Adrian Carter, Senior Analyst BL&P

(iv) *Product of consultation must be taken into account* – The Commission duly considered the input received as part of the consultation process in arriving at its decision and this is reflected by the cogent discussion of the matters raised by all parties consulted, in the eventual Decision.

4.53 Much has been made of the fact that during the consultation the Commission provided the BL&P and others with a single option for the calculation of heat rate targets to be used to measure efficiency, i.e. the use of Historical Averages. The BL&P has used this fact to assert that the consultation process was flawed and argues that the Commission should have consulted on the option to calculate heat rate targets using the Trend Line approach[38]. The Commission was under no statutory or other duty to consult with the parties on the statistical technique which would be employed to determine the heat rate targets. However, even if it could be argued that the methodology for calculating heat rate targets should have been consulted on, then the Commission's failure to consult on this methodology was not so substantial as to be fatal to its final decision.

4.54 On the basis of the legal principles set out in the Northern Jamaica Case, the Commission does not accept that the failure to advise the parties consulted that the Commission could use Trend Line Analysis instead of Historical Averages to determine the heat rate targets, was so substantial as to vitiate the entire Decision. Indeed, the facts demonstrate that other parties to the hearing felt sufficiently informed by the Commission's proposal of use of Historical Averages, to suggest the use of other statistical methods as alternatives to Historical Averages. The absence of a specific query about using this statistical method did not preclude the ability of any party to participate in the process, to suggest alternative statistical methods or to comment on the use of heat rate targets as a measure of efficiency in the FCA in general. The omission of Trend Line Analysis as a statistical method to determine heat rates was therefore not

[38] See paragraphs 39 (I) (a) – (c) of the BL&P Motion to Review

a serious enough flaw as to justify the review of the entire decision. Further, the consultation process which the Commission actually undertook met the requirements of the Sedley principles and was adequate in all the circumstances.

4.55 On the matter of the Commission's failure to engage an independent consultant to assist with setting heat rate targets or otherwise in arriving at the Decision, BREA, in its intervention, agreed that the process could benefit from the use of an independent consultant who would assist in determining an appropriate incentive mechanism for achieving efficiency gains. Further, BREA suggested that the consultant also be employed with the task of recommending an alternative to using the FCA as a cost recovery method for the ESD.

4.56 Mr. Anthony Gibbs indicated that any consideration of engaging a consultant must be within the context of the associated terms of reference. Mr. Gibbs asserted that the BL&P's most fundamental issue is out of merit generation, which in turn leads to inefficient thermal performance, largely due to the advanced age of some of the plant. This tends to drive up heat rates. He further stated that in addition to heat rate targets, the consultant ought to be tasked with setting capacity factor benchmarks for generating plant to ensure the viability of any proposed incentive program. The Commission is satisfied that there is no statutory or other duty which required that an external consultant be appointed prior to the making of the Decision. The Commission is satisfied that during the initial analysis and formulation of the Decision, there was no need to consider the engagement of a consultant and it was well within its express and implied statutory powers to make that determination. There is no legal basis on which the Decision may be overturned for the Commission's failure to engage a consultant.

4.57 **The Commission has therefore determined that:**

(i) a failure to consult, where there is a legal duty on the Commission to do so, is an error of law on the part of the Commission, and not an error of fact as alleged by the BL&P;

(ii) the Commission was under a statutory duty to consult on the matter of the implementation of heat rate targets before reaching its Decision. While the BL&P has premised its arguments about the inadequacy of the consultation process on its legitimate expectation of consultation, it has failed to assert and establish the Commission's implied duty to consult on the statistical method for calculation of the heat rates. The BL&P has similarly failed to establish any customary practice by the Commission of consulting on the statistical methods used to calculate component elements of the FCA. Further, a review of at least one previous Decision on the FCA demonstrates that no consultation was undertaken on the process of calculation of a component element of the FCA, without objection by the BL&P;

(iii) the Commission's duty to consult did not require it to consult on the statistical method it should employ to determine the heat rate targets to be implemented;

(iv) the Commission was entitled to present its preferred option for calculation of the heat rate targets at the time of consultation, and to adjust its position thereafter based on meaningful consultation. Moreover, the submissions made by Intervenors during the consultation process demonstrated that the information given was adequate in that it allowed considered

responses (including alternative statistical methods by which the heat rate targets could be calculated) and therefore did not, in fact, negatively impact the ability of the parties to contribute to the process; and

(v) the consultation process which was actually undertaken prior to the Decision was adequate in all the circumstances when reviewed in the context of the applicable legal principles for consultation.

As such, the Commission declines to review and vary or rescind the Decision on this ground.

Ground 2 – Important Matter of Principle - Cost Optimisation

The BL&P's Submissions on Ground 2 – Important Matter of Principle - Cost Optimisation

4.58 The BL&P contends that:

> "*the Commission's Decision raises an important matter of principle as the heat rate maintenance/improvement programme, as presently construed, causes the Applicant in the dispatch of its generation fleet to make decisions that require a trade-off between cost optimisation, which would benefit customers, or meeting the Commission's ascribed heat rate targets. If the Decision remains unchanged, this important principle will be further exacerbated when higher penetration of renewables are incorporated into the generation mix, as planned in accordance with the National Energy Policy and the Applicant's aligned 100/100 vision. With higher penetration of renewables, the average heat rates of the plants are anticipated to degrade due to lower dispatch loads in order to minimise overall system costs, but with resulting penalties to the Applicant*"[39].

[39] Para 48-49, Application.

4.59 Further:

> *"the Applicant provided comments to the Commission on the heat rate targets in correspondence dated 30 January, 2018. The Applicant expressed its concerns that the implementation of heat rate targets as proposed by the Commission would not be in the interest of customers, as this approach would not necessarily be consistent with cost minimisation. The use of heat rates solely as the efficiency target could encourage the substitution of lower heat rate/high fuel cost generation units for higher heat rate/lower fuel cost generation units in an effort to achieve the targets. The use of heat rate targets in insolation would only be effective in minimising costs in scenarios where generation units utilise the same fuel type. The Applicant however, has a mix of generation, that utilises a combination of Heavy Fuel Oil, Diesel and Av Jet fuels. These comments were reiterated in the Applicant's 23 February, 2018 response to the Commission's heat rate interrogatories of 21 February, 2018"*[40].

4.60 Furthermore, the BL&P acknowledges "the prescribed penalty or reward in a performance incentive mechanism must be such that it sufficiently incentivizes efficiency"[41].

4.61 The BL&P continues to maintain that the application of heat rate targets as proposed and prescribed by the Commission is inconsistent with the concept of cost minimisation and consequently, is not in the interest of consumers. In the Application, the BL&P contends, "The pursuit of heat rate targets in isolation does not allow for fuel cost optimisation given the different plant and fuel types in use". Essentially, the argument is that the imposition of targets would force a switch of focus from cost minimisation to heat rate optimisation and this will drive higher fuel costs for customers.

[40] Para 19, Seale Affidavit.
[41] Para 50, Application.

4.62 The BL&P propositioned that in consideration of the "Commission's Findings Report of April 19, 2013" which concluded that "the heat rates of the BL&P's generating plant were broadly within acceptable international levels for plant of similar technological type and age.", and that "An incentive mechanism to meet targeted heat rates was therefore not considered necessary."[42], presupposes that its thermal fleet heat rates currently retains the same level as the international standard.

4.63 The BL&P also illustrated its claim, that its utilisation of gas turbines to serve intermediate and peaking load requirements in its dispatch of plant, is an effective cost minimisation strategy, compared to pursuing heat rate targets.[43] In particular, the BL&P holds the view that the efficient dispatch of peaking units cannot be solely based on the comparison of heat rates and heat rate targets given their unique role[44]. Additionally, the BL&P claimed that the integration of its ESD could ameliorate the heat rates of its thermal plant in addition to meeting ancillary service obligations.

4.64 The BL&P also opined that the heat rate targets determined in the Commission's Decision were not appropriate[45] and therefore not achievable[46]. Based on the targets cited in the Decision and the supporting exhibit to the Affidavit of Rohan Seale (Exhibit "RS1"), the BL&P claimed that achieving the targets was unlikely, particularly, the heat rate targets determined for peaking plant[47,48]. As a result, the BL&P states that in order to comply with the heat rate targets, peaking plant would have to carry a larger share of the system load as depicted by Exhibit "RS2" of the Affidavit of Rohan Seale[49,50]. This, the

[42] The BL&P, Application for a Motion for Review and Variation, Barbados, 2018, Paragraph 52 (i).
[43] FTC Transcript Session 1; Notice of Motion to Review and Vary the Fair Trading Commission's Decision dated April 13, 2018 on the Application to Recover the Costs Associated with the Commissioning of a 5 MW Energy Storage Device via the Fuel Clause Adjustment, Thursday, 20 December, 2018, line 313 – 406, page 10 – 13.
[44] The BL&P, Application for Motion for Review and Variation, paragraph 52, item (iii).
[45] The BL&P, Application, paragraph 39, (I)i.
[46] The BL&P, Affidavit of Rohan Seale, page 10, paragraph 38.
[47] Ibid, (1.f).
[48] The BL&P, Affidavit, 18-20.
[49] Ibid, 22.
[50] The BL&P, Application for a Motion to Review and Variation Decision Dated April 13, 2018 – 5MW Energy Storage Device, (39, 1.h).

BL&P anticipated, would increase the FCA charged to customers. The BL&P also mentioned that heat rate targeting is an outdated methodology, used when fossil fuel was the principle energy source and not suitable for the current energy mix, which comprises RE and conventional plant.

4.65 Additionally, in stating the grounds of the Application, the BL&P alleged that the heat rate maintenance/improvement programme in its present form would influence the operational choices of its generation fleet towards either cost optimisation, to the satisfaction of ratepayers, or meeting the ascribed targets, i.e. heat rate optimisation. The BL&P also emphasised that as it stands, the heat rates would worsen, as expected RE penetration increases in concert with the BNEP and its own 100/100 vision objectives.

4.66 The Brattle Group, a consulting firm retained by the BL&P, stated that if heat rate targets are implemented on systems with integrated battery storage, the target would work against the incentive for their use[51]. However, the Brattle Group pointed out that heat rate targets were ideally placed on baseload plant, given their high frequency of operation[52].

4.67 The BL&P acknowledged that while the ESD will enhance plant heat rates, the extent of this improvement would be on an incremental basis, considering the ESD's size relative to the entire electricity system.[53]

4.68 Additionally, in response to the Commission's question about the BL&P's monitoring of individual heat rates of its thermal fleet, the BL&P commented that it submits heat rate information to the Commission on a quarterly basis. The BL&P however, informed that it monitors the heat rates of each generating unit. The BL&P also remarked that the heat rates of individual units in a plant would approximate to the average heat rate for that plant.[54]

[51] FTC Transcript, Session 1: Notice of Motion to Review and Vary the Fair Trading Commission's Decision dated April 13, 2018 on the Application to Recover the Costs Associated with the Commissioning of a 5 MW Energy Storage Device via the Fuel Clause Adjustment, Thursday, 20 December, 2018, page 24, line 764-776.
[52] Ibid.
[53] Ibid, page 25, line 782 -786.
[54] Ibid, page 30, line 971 – 975.

4.69 The BL&P sought to explain that maintenance of other units in the plant also impacts heat rates and asserted that this is a major challenge with respect to heat rate targets, recognising that the operating environment is very dynamic[55].

Intervenors' Submissions on Ground 2 – Important Matter of Principle - Cost Optimisation

4.70 In an affidavit from February 2018, Mr. Anthony Gibbs asserted that the BL&P's claim that using heat rates in isolation as an efficiency target may provide incentive for the use of higher cost fuel on generating units that are more likely to meet the proposed targets is theoretically plausible if the regulator pays little or no attention to least-cost principles. However, he contended that given the least-cost principles that comprise Barbados' integrated resource plan, as well as the principles of economic efficiency mandated by the URA, this argument lacks merit.

4.71 Mr. Gibbs charged that in order to the optimise cost associated with electricity production, this necessitates the use of an optimum heat rate which satisfies the principles of economic dispatch of plant.[56] He cautioned that cost optimisation is neither the minimisation of cost nor heat rates.[57] Considering the rapid energy transformation expected, he acknowledged heat rates as the foundation to performance incentives.[58] In his view, performance based regulation creates the dynamic balance between utility interest, rate payers' needs and policy objectives. He charged that contrary to the BL&P's claim, heat rates will support the 100% RE vision.[59]

4.72 With regard to the BL&P's submission on the financial impact of heat rates targets, Mr. Gibbs insisted that the BL&P contradicted itself when it utilised a simulation to illustrate this. This argument, claimed Mr. Gibbs, is substantially weakened by the BL&P's own assertion that the ESD, which is

[55] Ibid, page 20, line 622 – 624.
[56] FTC Transcript, Session 2, page 19, line 555 – 559.
[57] Anthony Gibbs, Affidavit of Anthony Gibbs, 16 October, 2018, page 4, paragraph 17.
[58] FTC Transcript, Session 2, page 17, line 542.
[59] FTC Transcript, Session 2, page 19, line 599 - 601.

indeed the subject of this entire issue, is to be used to increase overall plant dispatch efficiency. The ESD is said to be useful in providing spinning reserve, frequency regulation and frequency response, thereby reducing the need for the use of more expensive peaking units. He continued by stating that the application of present heat rate targets retroactively is a flawed approach, given the expected increases in dispatch efficiency attributable to the use of the ESD.

4.73 Mr. Gibbs asserted that the BL&P must be made to bear a portion of the risk and that without a risk sharing mechanism, the BL&P will have little incentive to depart from its status quo with respect to its fossil fuel usage. He also contended that the Commission should consider a dead band to account for "random events due to measurement and process variables"[60], as well as capacity factor benchmarks that would determine plant utilisation levels to support observed heat rates.

4.74 Mr. Gibbs challenged the view that heat rate targets would conflict with the achievement of 100% RE by 2030 and further deteriorate thermal plant heat rates. Additionally, he decried the view that heat rate targets would influence how plant is dispatched. He referenced the purpose of the battery storage device, as claimed by the BL&P was that it could improve the heat rates of baseload and peaking plant. Mr. Gibbs took issue with the out of merit electricity production relative to gas turbine operations. He argued that these units contribute 15% of the load but "disproportionately" occupy 25% of the production cost, as a result of excessive out of merit operation of these units. In his view baseload units should operate at the highest possible capacity, while peaking units perform peaking roles. Mr. Gibbs charged that the BL&P's approach was akin to "gaming the system" – the use of peaking units in "roles that they are not ideally suited for at the expense of baseload production"[61] in order to achieve a specific outcome.

[60] Affidavit of Anthony Gibbs, October 2018, page 13.
[61] Ibid, page 21, line 661- 665

4.75 Mr. Brian Haynes, in his affidavit dated October 31, 2018, stated that heat rate targets are used internationally to ensure an efficient level of electricity production. He also noted that individual heat rate targets are suitable where generating plants use a single fuel source, while a singular plant heat rate may be more appropriate in the case of a heterogeneous plant, which uses a more varied fuel mix[62].

4.76 BREA was not in favour of the use of heat rate targets as set out in the Commission's Decision. BREA opined that while the need to monitor the BL&P's efficiency is clear, heat rates in isolation are not the only significant measure of efficiency and impact on fuel costs that are passed through to the consumer. Further, BREA stated that RE resources can negatively affect plant heat rates, while at the same time reduce overall fuel costs.

4.77 BREA's view, based on its interpretation of the Commission's Decision, was that the optimum solution to electricity production would be "lower fuel cost"[63]. BREA remarked that the BL&P's presentations seemed to suggest that a heat rate target may not be the best option to achieve low fuel cost. BREA also mentioned the impact of **force majeure** events on the BL&P's ability to maintain an efficient service and stressed that theses need to be considered.[64]

Commission's Determination on Ground 2 – Important Matter of Principle - Cost Optimisation

4.78 The BL&P's assertion that the set heat rate targets would lead it to switch to plants/units which use more expensive fuel but have greater chance of meeting said targets, suggests that at present it is pursuing a true cost minimisation strategy. Based on the generation share of the peaking units over 2013-2017, this is not consistently reflected in the received operational reports.

4.79 The Commission accepts the view raised by Mr. Gibbs with regard to the economic dispatch of plant and notes that the merit order dispatch of plant

[62] Ministry of Energy and Water Resources, Affidavit of Brian Haynes, paragraph 31, page 13.
[63] FTC Transcript, Session 1, page 26, line 812
[64] FTC Transcript, Session 2, page 10, line 309 – 313.

plays a critical role in this regard, where the most efficient plants are deployed first subject to availability. However, the operating statistics of the BL&P's generating fleet suggested that faster acting assets with higher operational flexibility are required to mitigate against sudden and unexpected grid conditions, thereby reducing electricity cost. The installation of the 5MW ESD should improve this condition, by freeing up some of the peak load obligations from peaking units. Additionally, grid stability is expected to improve from the use of energy storage; this can smooth out internal and external shocks impacting the equilibrium of the electricity supply. Such a programme will incentivise the BL&P to minimise fuel consumption while providing a safe, sustainable and affordable service to customers, which is a basic regulatory objective.

4.80 Economic dispatch of plant ensures that optimum fuel cost is achieved. Heat rate targeting tracks this process and ensures that customers are charged appropriately for fuel consumed. Monitoring, evaluating and targeting of heat rate performances allows the Commission to determine whether the utility's service is "adequate and efficient"[65]. As recent as 2017, the National Renewable Energy Laboratory (NREL) reported that modified fuel clauses[66] attained 9% more electricity per input compared to utilities with 100% pass-through mechanism of all fuel costs[67]. As plant ages, more fuel is consumed and hence a heat rate factor will act as a stimulus for robust mechanical maintenance, ensure reliability of service and thus minimise fuel cost.

4.81 The Commission insists that the assignment of heat rate targets to the BL&P's thermal fleet is an intrinsic feature of a heat rate maintenance/improvement programme. This plant performance monitoring framework will allow the

[65] URA, CAP.282, Sections 20 (a)

[66] A modified fuel clause consists of an incentive type mechanism which shares the risk associated with volatile fossil fuel consumption. The incentive mechanism can take the form of a thermal factor to determine the cost of fuel consumed in the plant to be recovered.

[67] National Renewable Energy Laboratory, Next-Generation Performance-Based Regulation: *Volume 3 (Innovative Examples from Around the World)*, Performance-Based Regulation Options, July 2017, page 35, assessed January 11, 2019 , https://www.raponline.org/knowledge-center/next-generation-performance-based-regulation-volume-3-innovative-examples-from-around-the-world/

Commission to effectively appraise the efficiency of the BL&P's plant, considering the current rapid dynamic operating environment, which is characterised by fossil fuel and RE generation. This programme requirement will also incentivise the BL&P to be more attentive and responsive to the impacts of heat rates on fuel consumption, which directly relates to the FCA charge which is pass-through to the BL&P's customers. The Commission also maintains that a heat rate improvement programme will continue to be a critical evaluation tool as more variable energy resources gradually displaces fossil fuel generation.

4.82 The Commission emphasises that in its determination of the heat rate targets, degradation of the BL&P's thermal plant, associated controllable losses and the impact of economic dispatch were taken into account. The heat rate targets determined were based on the fact that the plant had obtained a sustained level of performance in the past and that the desired future level should generally approximate to the plant's current level of performance. Additionally, the Commission recognised that it would be reasonable to incorporate an additional 2% margin in the targets to address the issue of aging plant and other externalities. This heat rate margin actually represents a positive variance of 2% above the baseline model heat rate. Furthermore, the Commission considers that a 1% heat rate improvement is achievable based on the plant's ability to replicate the level of performance. The Commission affirms that the heat rate target values are reasonable and achievable given the plant's historic performance.

4.83 The Commission is also cognisant of the challenges imposed on the operation of fossil fuel plant when RE variable resources are utilised. The BL&P claims that in order to meet the stability needs of the grid, thermal plant is scheduled to operate outside the typical merit order to facilitate RE resources online. The Commission understands that in the context of RE, baseload plant operates in load following roles and peaking units also provide intermediate load functions as operational flexibility strategies, hence reducing the cost of electricity production. The Commission also considers that the capacity of the

BL&P's energy storage system is small and may be inadequate to fully mitigate against the increasing effects of RE penetration and meet other ancillary roles of the grid simultaneously. Another factor considered is that the BL&P's fleet is aging and availability of plant also impacts the cost of energy.

4.84 The Commission notes that the BNEP 2017 – 2037[68], which stipulated a RE goal of 75% by 2037 guided its initial Decision. Given the more recent national vision of 100% RE target by 2030, the Commission has considered the potential impact of this new policy. The Commission anticipates that given this articulated policy target, the potential increase in variable RE based generation, could significantly impact the heat rates of peaking units, specifically, given their inherent operational requirements to meet peak demand and respond to grid stability events.

4.85 In response to concerns raised about the effect of force majeure events, the Commission clarified that, its Decision made provision for their occurrence. This required the BL&P to apply for exemptions in those circumstances.

4.86 With regard to the BL&P's submission and the supporting Affidavit of Rohan Seale, which stated that the "Commission's Findings Report of April 19, 2013 concluded the heat rates of the BL&P's generating plant were broadly within acceptable international levels for plant of similar technological type and age"[69], the Commission acknowledges this assertion to be accurate at that time. The Commission has previously considered the implementation of heat rate targets. In its FCA Findings Report 2013 and Review of the FCA, also in 2013, the Commission found that the efficient dispatch of the BL&P's generation plant is impacted, due to age and reliability concerns. It was also found that

[68] Government of Barbados. 2017. "National Energy Policy for Barbados 2017 - 2037 ." *Division of Energy and Telecommunications.* December. Accessed April 8, 2019. http://www.energy.gov.bb/web/barbados-national-energy-policy-2017-2037.

[69] The BL&P, Application for Motion for Review and Variation, paragraph 52 (i)

the BL&P's plant heat rates prior to 2013 were broadly within acceptable international levels for plant of similar technological type and age. At that time, the Commission contemplated the setting of heat rate targets but determined that it should first gather data over a period of time before setting the targets. In view of this, the Commission required the BL&P to submit heat rates as part of its regulatory reporting. The overall heat rates received were subsequently deconstructed to reflect individual plant heat rates. In 2013, the report indicated that the age of the steam plant was a concern. Even though heat rates were found to be broadly within acceptable levels, a significant period has elapsed and further degradation is likely. This serves as additional justification for the implementation of a heat rate improvement programme driven by suitable heat rate targets.

4.87 The BL&P's assertion that a heat rate maintenance/improvement programme is not required, based on the notion that its thermal fleet heat rates continue to be acceptable, justifies the importance and requirement for a heat rate monitoring framework. The evaluation of heat rate performance will confirm whether the BL&P's plant heat rates are acceptable. The Commission therefore maintains that a heat rate maintenance/improvement programme is an essential and critical tool, utilised in the appraisal of thermal plant efficient performance; such a programme will further supplement the efficiency gains anticipated by the operation of the ESD. Additionally, heat rate maintenance will remain a relevant measure, especially as greater emphasis is placed on the transition from fossil fuel generation to higher levels of RE.

4.88 In an effort to ensure heat rate targets will be aligned to operating circumstances, the Commission will require the BL&P to provide results of heat rate tests for all plant every six (6) months, approved by the BL&P's senior management or the certified contracting party that conducted the test. This requirement will support effective monitoring and assessment of the BL&P's targeted performance against the realised test results. These provisions would ultimately assist in amending the heat rate targets as needed. Additionally, the benefit of having this provision in place would be

to determine the level of heat rate degradation or improvement of the BL&P's thermal fleet, and by extension, the effectiveness of the heat rate maintenance/improvement programme. The Commission notes that the BL&P has not substantiated its claim that its thermal fleet heat rates are currently within reasonable levels.

4.89 Additionally, the Commission affirms that the BL&P did not provide any empirical evidence to confirm that increasing RE footprint, either by simulation forecast, or otherwise, has deteriorated or will potentially degenerate plant heat rates in the future.

4.90 **The Commission is satisfied that the BL&P has failed to cogently demonstrate and articulate that the heat rate targets, as implemented, will cause higher fuel costs to customers. This ground of the Motion has therefore been rejected**.

4.91 **The Commission expects the BL&P in its electricity production, will be guided by the principles of economic dispatch and in doing so, endeavour to strike the balance between cost optimisation and heat rate optimisation.**

4.92 **The Commission duly considered its responses to consultation and determined that heat rate targets were necessary, reasonable and consistent with its exercise of its functions and powers under the legislation it administers. Given the views raised by the BL&P, Intervenors and the Commission's own further consideration in relation to RE and the anticipated clean energy vision for Barbados (100% RE by 2030), the Commission has decided to remove the heat rate targets from peaking units. This is in acknowledgement that heat rates, particularly for peaking units, will first be impacted as variable RE penetration increases. The Commission duly considered its responses to consultation and determined, on a reasonable basis, that heat rate targets were necessary, reasonable and consistent with its exercise of its functions and powers under the legislation it administers.**

4.93 **The Commission is also of the view that there is merit in retaining heat rate targets for baseload plants as it provides an opportunity for the Commission to monitor the heat rate performance of these plants, which at this time are not affected by the increased variable RE in the generation mix. The rationale behind heat rate targeting is to primarily supplement the fuel saving benefits which the BL&P anticipates will be delivered by battery storage. The Commission noted that the BL&P initially indicated that the battery storage can improve the efficiency of its plants[70]. The Commission also notes that the BL&P was previously required to submit overall plant heat rate data in fulfilment of its regulatory reporting. The Commission's assessment of this information revealed that individual plant heat rates would provide a more accurate representation of the efficient operation of the BL&P's thermal fleet. The Commission also determined that it would be necessary to review heat rate targets annually as part of its monitoring and evaluation of heat rates.**

[70] Barbados Light and Power Company Limited, *Utility Energy Storage Application*, August 4, 2017, page 6, paragraph 18.

SECTION 5 DETERMINATION

5.0 The Commission has considered the following grounds of the BL&P's Application:

(i) Ground 1 – Error of Fact – Misapplication of Information provided by the BL&P

(ii) Ground 1 – Error of Fact – Failure to consult on methodology used to set heat rate targets, i.e. Trend Line Analysis and Regression Analysis

(iii) Ground 2 – Important Matter of Principle – Trade-off between Cost Optimisation and meeting heat rate targets

5.1 The Commission notes that in the determination of heat rates, the methodology utilised was appropriate to achieve its regulatory objective in setting targets. Furthermore, the Commission is satisfied that consultation on heat rates was adequate. The Commission is of the view that the implementation of a heat rate maintenance/improvement programme will incentivise efficient production of electricity. The Commission also understands that it is more difficult to identify optimal heat rate targets for gas turbine units (peaking plants), given the multiple roles they serve, particularly given the imminent clean energy transition.

5.2 The Commission has therefore determined that item (iii) of its Decision is varied as follows:

(i) A heat rate maintenance/improvement programme shall be implemented for all baseload plant. Heat rate targets shall be based on the prior five (5) years' heat rate performance. The application of Trend Line Analysis and CUSUM shall be utilised in the determination of heat rate targets. The gross generation shall be used in the computation of heat rates. Targets shall be subject to review annually or as deemed necessary by the Commission.

The BL&P is required to submit to the Commission, the results of standard heat rate tests for all plant/units every six (6) months and no later than 30 days after 30 June and 31 December of each year. Tests conducted shall comply with international performance standards and guidelines. The

results of heat rate tests must be signed by the BL&P's senior management or the contracting party performing the heat rate tests.

The BL&P may apply to the Commission for applicable exemptions, where its operations are considered to be subject to force majeure events. Such requests shall describe the nature of the event, the cause, resolution plan and future mitigation strategies.

The heat rate targets are as follows:

- **(Low Speed Diesel 1) LSD1 – 9,067.28 BTU/kWh;**
- **(Low Speed Diesel 2) LSD2 – 7,980.52 BTU/kWh; and**
- **(Steam plant) S1 and S2 – 15,370.20 BTU/kWh.**

(ii) Gas turbine units (peaking units) are not assigned heat rate targets.

(iii) The Commission requires the BL&P to submit the heat rate performance of all plant/unit on a quarterly basis as part of its onging regulatory reporting.

5.3 All other elements of the 13 April, 2018 Decision shall remain the same. The Decision, as varied, shall now read:

Decision

(i) The decision of the BL&P to invest in Energy Storage is prudent and is therefore recoverable.

(ii) The BL&P can recover the cost of the ESD through the FCA. Recovery of the ESD's costs is approved for a period of three (3) years, commencing from September 1, 2018. Six (6) months prior to the expiration date, a review shall be conducted to assess the continued appropriateness and applicability of the recovery mechanism.

(iii) The BL&P shall pursue a heat rate monitoring/management programme for all baseload plant. Under this programme, each baseload plant shall be assigned a heat rate target based on the Trend Line and Cumulative Sum CUSUM Analysis of the prior five (5) years' heat rate performance. Targets

to be verified by Regression Analysis. The gross generation shall be used in the computation of heat rates. Heat rate targets shall be reviewed annually, or as deemed necessary by the Commission and the determination of the revised values shall consider existing plant conditions. The BL&P shall submit to the Commission, the results of standard heat rate tests for all plant/units every six (6) months and no later than 30 days after 30 June and 31 December of each year. Tests conducted shall comply with international performance standards and guidelines. The results of heat rate tests must be signed by the BL&P's senior management or the contracting party performing the heat rate tests.

The BL&P may apply to the Commission for applicable exemptions, where its operations are considered to be subject to force majeure events. Such requests shall detail the nature of the event, the cause, resolution plan and future mitigation.

The heat rate targets shall be as follows:

- **(Low Speed Diesel 1) LSD1 - 9,067.28 BTU/kWh;**
- **(Low Speed Diesel 2) LSD2 - 7,980.52 BTU/kWh; and**
- **(Steam plant) S1 and S2 - 15,370.20 BTU/kWh.**

Where the BL&P's actual heat rate for a plant is the same or lower than the ascribed heat rate target, the BL&P shall be permitted to retain the resulting efficiency gains and recover the full fuel costs. However, where actual heat rates exceed the ascribed heat rate targets, fuel cost recovery shall be limited to that associated with the ascribed heat rate targets. Heat rate targets shall also apply to the modelling of existing plant conditions without the ESD. Additionally, the heat rate targets shall apply to the monthly determination of the fuel inputs into the FCA. The adjustment in the FCA shall continue to be computed on a monthly basis.

Gas turbine units (peaking units) are not assigned heat rate targets.

(iv) The Commission requires the BL&P to submit the heat rate performance of all plant/unit on a quarterly basis as part of its continuous regulatory reporting.

(v) All financial inputs of the FCA related to the recovery of ESD costs shall be audited by a representative of the Commission to ensure its value is correctly determined.

(vi) The formula for the determination of the FCA in February shall now be:

$$FCA_{feb} = \frac{\sum_i (Fuel\ Cost_{n-1} . \frac{THR^i_{n-1}}{AHR^i_{n-1}}) + Purchased\ Power_{n-1} + ESD\ Recovery_{yt}}{Energy\ Generation_{n-1} . (1 - Aux_{n-1}) . (1 - losses)} [BD\$/kWh]$$

As it relates to peaking units, the fuel cost shall be fully recovered via the FCA.

(vii) The formula for the determination of the FCA for all months, excluding February, shall now be:

$$FCA_n = \frac{\sum_i (Fuel\ Cost_{n-1} . \frac{THR^i_{n-1}}{AHR^i_{n-1}}) + Purchased\ Power_{n-1}}{Energy\ Generation_{n-1} . (1 - Aux_{n-1}) . (1 - losses)} [BD\$/kWh]$$

The fuel cost associated with peaking units shall be fully recovered.

(viii) The BL&P shall include in its quarterly regulatory reporting, monthly information on the following metrics:

a) Cycle life;
b) Energy Charged (kWh);
c) Energy Displaced (kWh);
d) Energy Charged Costs ($/kWh);
e) Energy Displaced Costs ($/kWh);
f) Round Trip Efficiency (%); and
g) Net Fuel Savings ($)

(ix) Ad-hoc reporting on any emergency events associated with the ESD, shall be submitted to the Commission within seven (7) working days of occurrence of the event; and

(x) A WACC of 10% is approved.

Dated this 17th day of April, 2019

Original signed by
……..……..
Tammy Bryan
Chairman

Original signed by
……
Brian Francis
Commissioner

Original signed by
……..……
John Griffith
Commissioner

Original signed by
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Ruan Martinez
Commissioner

Original signed by
……..……
Samuel Wallerson
Commissioner