

PUBLIC UTILITIES COMMISSION OF SRI LANKA



**REPORT ON ROTATIONAL LOAD SHEDDING
CARRIED OUT ON FEBRUARY 03, 2020**

2/24/2020

1. Introduction

This document reports an outcome of an analysis carried out by PUCSL on the load shedding carried out by the Transmission Licensee (TL), Ceylon Electricity Board (CEB) on February 3, 2020. The purpose of the analysis was to figure out the presence of any technical and administrative lapses that have led to this load shedding and make future recommendation to correct such lapses if there are any to avoid such undesirable situations affecting the faith of the consumers on the system reliability and competencies of the operators in addition to the causing grave inconvenience and economic losses to the consumers trivially.

2. Situation Analysis

2.1. Estimating Generation Profile without Load Shedding on February 3, 2020

As per the Daily Generation Report on February 03, 2020 (**Annex 1**), prepared by the System Control Center of Transmission Licensee (TL), Ceylon Electricity Board(CEB), Rotational Load Shedding has been conducted from 1045 Hrs to 1702 Hrs. Further, the report specifies that the load shedding was required due to lack of thermal generation as Ceylon Petroleum Corporation (CPC) had stopped the fuel supply to 300 MW Westcoast power plant in Kerawalapitiya. As per the Daily Generation Report on February 02, 2020 (**Annex 2**), this power plant had been treated as unavailable from 0600Hrs on February 03, 2020 due to the unavailability of fuel as CPC has stopped releasing fuel.

The following figure shows a comparison between the generation profiles on Monday February 03, 2020(**Annex 3**) and the previous Monday January 27, 2020 (**Annex 4**).

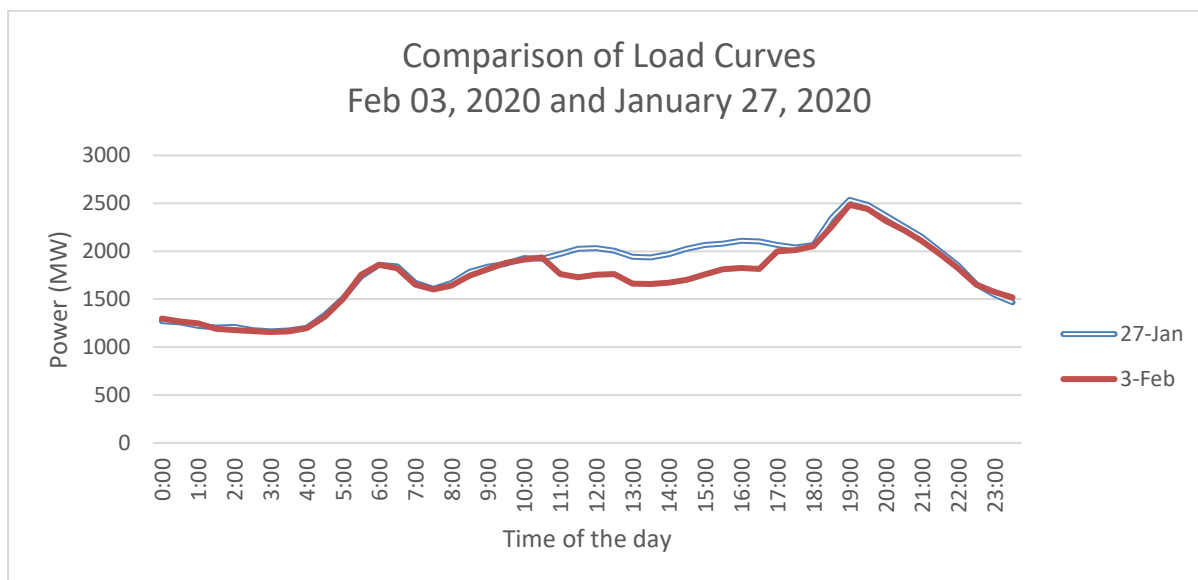


Figure 1: Daily Generation profiles of Monday February 03, 2020 and Monday January 27, 2020(Source: Actual System Dispatch reports of January 27, 2020 and February 03, 2020, prepared by System Control Center of Transmission Licensee (TL), Ceylon Electricity Board

Due to the close similarity as revealed by Fig.1, in the variations in the generation demand on Monday January 27, 2020 and Monday February 03, 2020, it is reasonable to assume that the generation demand including the shed load for the period from 1045 Hrs to 1700 Hrs of February 03, 2020 is same as the generation demand during the same period on January 27, 2020.

2.2. Comparison of Generation and Energy Availability and Demand on Feb 03, 2020

2.2.1 Availability of Thermal Power Generation

Availability of thermal plants at 0600 Hrs on February 24, 2020 is 1,135 MW (Source: **Annex 2**). As Daily Generation Report on February 02, 2020, out of the this total 865 MW was expected from CEB thermal plants and 270 MW was expected from IPP thermal plants.

2.2.1 Availability of Hydro Power Generation

As per the Minutes of Weekly operational meeting held on Jan 31, 2020 of Water Management Secretariat- Mahaweli Authority of Sri Lanka (**Annex 5**), certain restrictions emerging from irrigation needs had been attached to the operation of several hydro reservoirs in Mahaweli Complex for the week starting from February 03, 2020. Therefore, hydro plants available can be classified as

- a. Plants without operational restrictions; and
- b. Plants with operational restrictions imposed by irrigation needs

(a) Power Plants Without Operational Restrictions

The firm capacities offered on February 3, 2020, by hydro power plants without restrictions attached to their operation are summarised in Table 2. Also, Table 3 shows the storage available at 0600Hrs on February 04, 2020, in the respective main reservoirs that feed these power plants. Daily Generation Report on February 03, 2020, prepared by the System control Center (**Annex 1**) indicates that reservoirs had total storage equivalent to 691.4 GWh of energy. Hence, for this set of plants no restrictions to dispatch as required and up to their respective maximum capacities, were present on the day of loads were shed rotationally.

Below in this report we refer to this set of plants as **Type A** hydro plants

Table 1: Availability of Type A (Plants without operational restrictions) Hydro Plants

Hydro Plant	Availability (MW)
Wimalasurendra	50
Old Laxapana	55
Canyon	60
New Laxapana	107
Polpitiya	90
Victoria	240

Hydro Plant	Availability (MW)
Upper Kotmale	150
Nilambe	3.2
Samanalawewa	100
Kukule	75
Inginiyagala	11.3
Udawalawe	4
Total	945

Table 2: Reservoir levels of Major Reservoirs feeding Type A Power Plants at 6 am on the next day February, 04, 2020 (Source: Daily Generation Report on February 03, 2020, prepared by the System control Center of Transmission Licensee (TL), Ceylon Electricity Board)

Major Reservoirs feeding Type A Power Plants	Storage in GWh
Castlereigh	55.1 GWh
Maussakalle	192.7 GWh
Victoria	351.0 GWh
Samanala Wewa	92.6 GWh
Total	691.4 GWh

Accordingly, the total available capacity of thermal plants and **Type A** Hydro power plants (with no dispatch restrictions) is (1135+945) 2080 MW.

(b) Power Plants with Restrictions Imposed by Irrigation Needs

As a result of constrained imposed by Mahaweli Authority, the operation of the following hydro plants had to be operated with restrictions

Table 3: Power plants with Restrictions Imposed due to irrigation needs

No	Plant	Plant Availability (MW)	Reservoir	Restriction
1	Kotmale	201	Gamini Disanayake reservoir	Balance water requirement to Polgolla is released
2	Ukuwela	36	Pologolla	Balance water requirement to Bowatenna is released
3	Bowatenna	40	Bowatenna pond	Water restricted to 100 cfs (2 hrs at 11 MW)
4	Randenigala	114	Randenigala reservoir	Rantambe water requirement
5	Rantambe	50	Rabtambe pond	Water restricted to 57 cms (15 Hrs at 20 MW+ Peaking)

Below in this report we refer to this set of plants as **Type B** hydro plants

The Day-ahead dispatch forecast report for February 03, 2020 (**Annex 6**), prepared by the System Control Center of TL (CEB) on February 02, 2020 has identified dispatch plans for these **Type B** power plants. Hence, it is assumed that the day-ahead dispatch forecast of **Type B** hydro plants has considered the instructions issued by the Water Management Secretariat on January 31, 2020.

Meanwhile, the Mahawali Authority has confirmed that other than the instructions issued on January 31, 2020, it has not issued any special instructions to CEB on power plant dispatch on February 03, 2020.

Hence, it can be considered that the Kotmale, Randenigala, Rantambe, Ukuwela and Bowatenna power plants are available for dispatch as per the Day-ahead dispatch forecast provided by TL.

Figure 2 shows the intended dispatch patterns of Kotmale, Randenigala, Rantambe, Ukuwela and Bowatenna power plants as proposed in the day-ahead dispatch forecast, super imposed on generation from plants NCRE, CEB and IPP thermal and **Type A** hydro (plants with no restrictions from irrigation needs attached to the operation).

2.2.3 Availability of Westcoast Power Plant on February 3, 2020

The Westcoast power plant is treated as unavailable at 0600 Hrs on February 03, 2020 had resumed generation from 1500Hrs on February 03, 2020.

Figure 2 also indicates the actual availability of Westcoast power plant.

3. Observations

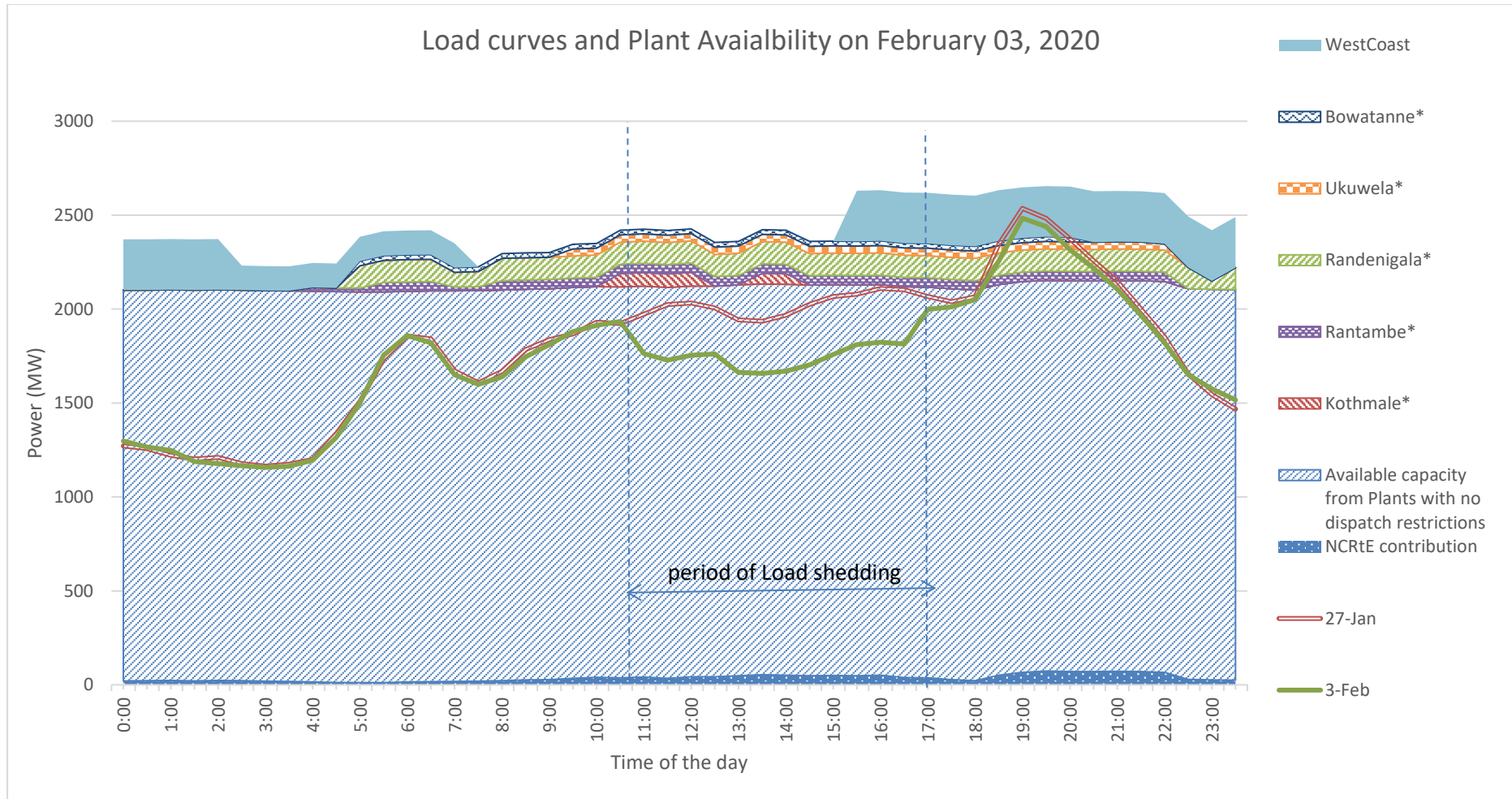
Figure 2 summarises the approximate actual scenario present on the day of rotational load shedding carried out. The key points that can be extracted from the figure are:

- Apparently the system had enough capacity to supply the full demand during the period of load shedding.
- West coast power plant was required to supply the night peak demand. With the Westcoast resuming generation after 1500 Hrs, the total demand during the day could have been fully met.
- In the worst case scenario, i.e. the under the absence of the West Coast power plant, demand could have been met with limited shedding (approximately 105 MW maximum for a period less than 2 hours during the night peak.
- The need to shed load during night peak due to the absence of West Coast power plant may have been avoided or lessen by shifting Kotmale operation to the night peak period.
- Even under the shifting of Kotmale operation to the night peak period did not have any apparent impact on supplying the actual demand(Without shedding load) during the period from 1045 hrs to 1702 hrs, since adequate generation was present to meet the demand during this period
- The unavailability of Westcoast power plant was identified in the Day-ahead forecast prepared by the CEB on February 02, 2020. Hence, if the availability of Westcoast power plant was uncertain, the Transmission Licensee had sufficient time to obtain the approval of the Commission under Condition 30 (10) of the Transmission Licence, prior to the load shedding required during night peak.

4. Concluding Remarks

According to the analysis, the load shedding programme carried out from 1045 Hrs to 1702 Hrs on February 03, 2020 could have been avoided.

However, if the analysis has not considered any salient reasons the Transmission Licensee had that justify the load shedding carried out on February 3, 2020, the transmission licensee is expected to provide such reasons to the Commission.



*Plant Dispatch, as per the Day-ahead forecast

Figure 2: Load Curves of Feb 03, 2020 and January 27, 2020 and the Plant availability on February 03, 2020