

Meeting Date: 25 February 2021

# REVIEW OF FEBRUARY 2021 NEW ZEALAND GENERATION BALANCE REPORT

SECURITY  
AND  
RELIABILITY  
COUNCIL

This paper comments on the latest New Zealand Generation Balance report issued by the system operator, which covers the next six months. The report illustrates the resilience of the generation fleet and transmission network to perturbations in supply and demand.

**Note:** This paper has been prepared for the purpose of the Security and Reliability Council (SRC). Content should not be interpreted as representing the views or policy of the Electricity Authority.

## 1. The New Zealand Generation Balance report

- 1.1. As part of its role of providing advice on reliability of supply, the SRC regularly receives the New Zealand Generation Balance (NZGB) report at its first meeting every calendar year.<sup>1</sup> NZGB report forecasts capacity security over the next six months, which means that reviewing it at this time of year provides an opportunity to identify risks associated with the coming winter.
- 1.2. The NZGB report quantifies the security risk by calculating the MW capacity difference between daily peak demand and available generation for a range of scenarios. The risk for each scenario is tested by accounting for planned outages, and then assuming certain other large transmission and generation assets are not available.
- 1.3. The default tests shown in the NZGB report are “N-1” and “N-1-G”. N-1 is a test in which the largest asset (transmission or generation) is unavailable. N-1-G is a test in which the two largest assets are unavailable.
- 1.4. If either of these tests shows a negative value, it indicates normal security levels cannot be maintained. This does not indicate that there will be interruption to supply, but rather (for the N-1 test) that if a large asset is unavailable for some reason, the system will operate with a reduced level of instantaneous reserves cover. However, if large deficits were to occur, then it would require forced demand cuts (i.e. emergency load shedding).
- 1.5. The report includes additional analysis to illustrate how sensitive the power system is to perturbations of supply and demand. While the system operator has succeeded in choosing scenarios that are grounded in reality, readers should be careful not to interpret them as predictions.
- 1.6. The system operator has adjusted NZGB so that it uses 2019 load data for all forecasts in the 2021 calendar year. This is instead of using 2020 data and will remove the impact of Covid-19 from the load profile.
- 1.7. The grid owner is also currently consulting on its Annual Outage Plan (AOP), before finalising it in May 2021. As a result, outages commencing after 1 July 2021 may change and impact the generation balance.
- 1.8. The February 2021 NZGB report (attached as Appendix A) highlights that:
  - a) the power system is presently quite resilient to large outages—it could meet demand and reserve requirements even with the loss of the two largest assets under the base assumptions (normal gas supply and normal wind outputs)
  - b) using the low gas supply assumption shows less system resilience with a few days showing shortfalls with all shortfalls very low with only four days in late July over 200 MW. When the scenario is further constrained with the assumption of zero wind output, there are a considerable number of days with shortfalls, mainly from mid-May onwards. Most shortfalls are reasonably low with only four days forecast over 300 MW (all in late July)

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<sup>1</sup> The previous NZGB report to SRC was in March 2020 and is available [here](#). It is item 09 in the agenda list.

- c) despite a number of significant asset outages in the energy sector, asset owners have generally scheduled outages in a way that tends to minimise and smooth out the impact on the security of generation and transmission capacity.

Asset owners continue to refine their outage timing until much closer to the forecast shortfall dates and the system operator continues to work with asset owners to encourage generator availability. If there is still a shortfall on the day when the available generation is assessed against actual demand, the system operator will issue appropriate notices to the generators to encourage availability and as a last resort, can require demand reductions.

- d) the periods of least security occur in mid-April and late-May, with various periods in June, July, and August.

## 2. Questions for the SRC to consider

2.1 The SRC may wish to consider the following questions.

- Q1. What further information, if any, does the SRC wish to have provided to it by the secretariat?**
- Q2. What advice, if any, does the SRC wish to provide to the Authority?**

## Appendix A: February 2021 NZGB report

# NEW ZEALAND GENERATION BALANCE

## FEBRUARY REPORT

### EXECUTIVE SUMMARY

This month's New Zealand Generation Balance Report forecasts no N-1-G generation shortfalls for the next six months. Applying low gas assumptions, N-1-G shortfalls are forecast in mid-April, late May and for various periods in June, July and August. The shortfalls in April 2021 coincide with the Huntly Unit 5 outage and several other smaller North Island hydro generation outages, with the June, July and August shortfall reflecting the higher winter loads.

The Grid Owner published its draft Annual Outage Plan (AOP) for 2021-22 on 28 January 2021. These outages appear in POCP as 'Tentative' and are therefore reflected in NZGB. Consultation on the AOP continues, before a final version is published by 19 May 2021. As a result, there may be changes to the outages in the AOP (those commencing after 01 July 2021) and changes to the AOP may impact the generation balance.

The system operator has adjusted NZGB so that it uses 2019 load data for all forecasts in the 2021 calendar year (instead of 2020 load data). This is to remove the impact of COVID-19 from the load profile.

The February NZGB report has been based on data taken from POCP on 05 February 2021.

### WHAT IS NZGB?

NZGB is a tool operated by the System Operator to predict, up to six months in advance, whether New Zealand will have enough generation capacity to meet its daily peaks. The tool provides Asset Owners guidance for their outage scheduling.

There are two generation balance figures given: N-1 and N-1-G. The N-1 balance is the system's capacity to cover, over the peak, the loss of the largest risk-setter (a large generator or a HVDC pole). Likewise, the N-1-G balance is the system's capacity to cover, over the peak, the loss of the largest risk-setter if the next largest risk setter were also to become unavailable.

The analysis considers two different scenarios; a 'base scenario' where load is determined based upon load from the same period last year and a 'winter scenario', where the highest recorded winter loads from last year are applied across all winter months. Under each scenario, three different generation assumptions are made; a base assumption of generator outages as per POCP; a low gas assumption where North Island gas generation is decreased (a 542MW reduction in capacity); but the standard assumptions about wind are applied; and a low gas assumption where all wind generation is assumed to be at zero output.

The System Operator will issue a CAN highlighting potential shortfalls for instances where the base scenario with base load assumptions indicates an N-1-G shortfall.

For more information, please refer to the [website](#) or the [user guide](#).

### BASE SCENARIO RESULTS

There are no N-1 generation balance shortfalls forecast for the base scenario irrespective of generation assumptions (Figure 1). There are no forecast N-1-G generation shortfalls for the base assumption, but N-1-G shortfalls are forecasted for both low gas assumptions in mid-April 2021 (Figure 2) and for various periods in June, July and August. A low gas, no wind assumption sees a minor shortfall on several days in late May 2021.

The shortfalls in April 2021 coincide with a Huntly Unit 5 outage and several other smaller North Island hydro generation outages. The shortfalls in May coincide with an increase in North Island generation



outages and increased load as winter approaches. The low gas scenario shortfall over June, July and August are reflective of the combination of generation outages and higher winter loads.

There are three significant grid owner outages during the six-month period this report covers;

1. [CUWLP NSY\\_ROX\\_1 Duplexing Works](#) (12 January 2021 – 28 May 2021)
2. [2021 HVDC Outages](#) (18 – 23 February 2021)
3. [CUWLP NSY\\_ROX\\_1 Duplexing Works](#) (07 September 2021 – 17 December 2021)

There are no generation shortfalls (under any scenarios) forecast during any of these outages (except for the shortfalls discussed above). The system operator will continue to monitor NZGB during the period of these outages and will highlight any shortfalls.

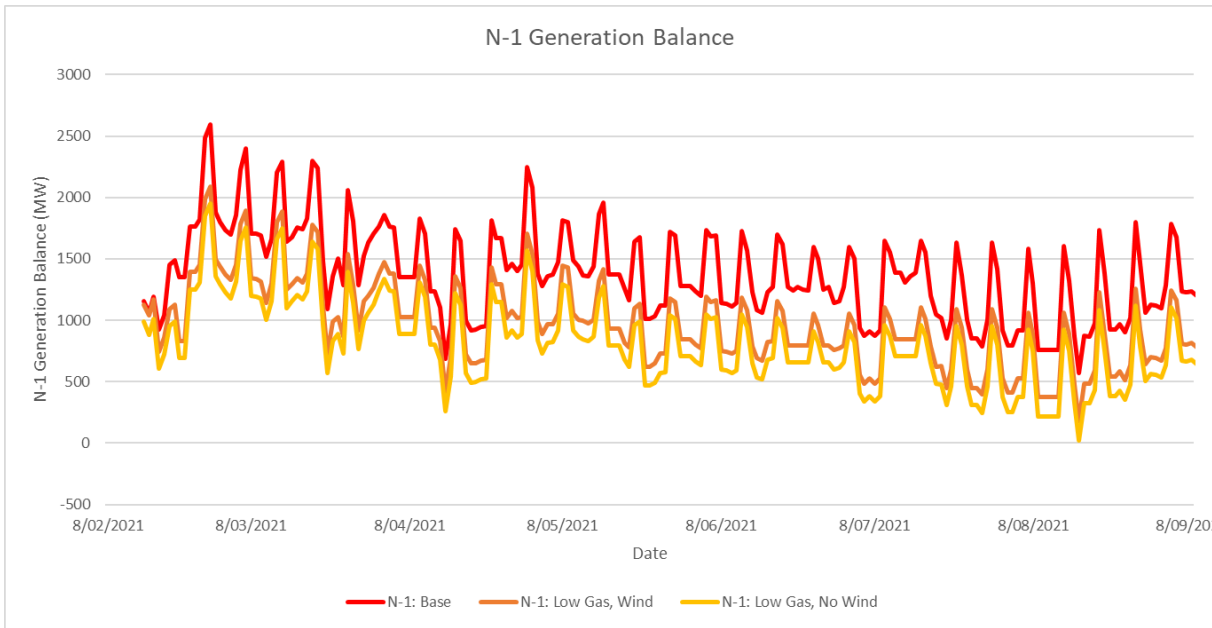


Figure 1: NZGB N-1 Balance – Base Scenario

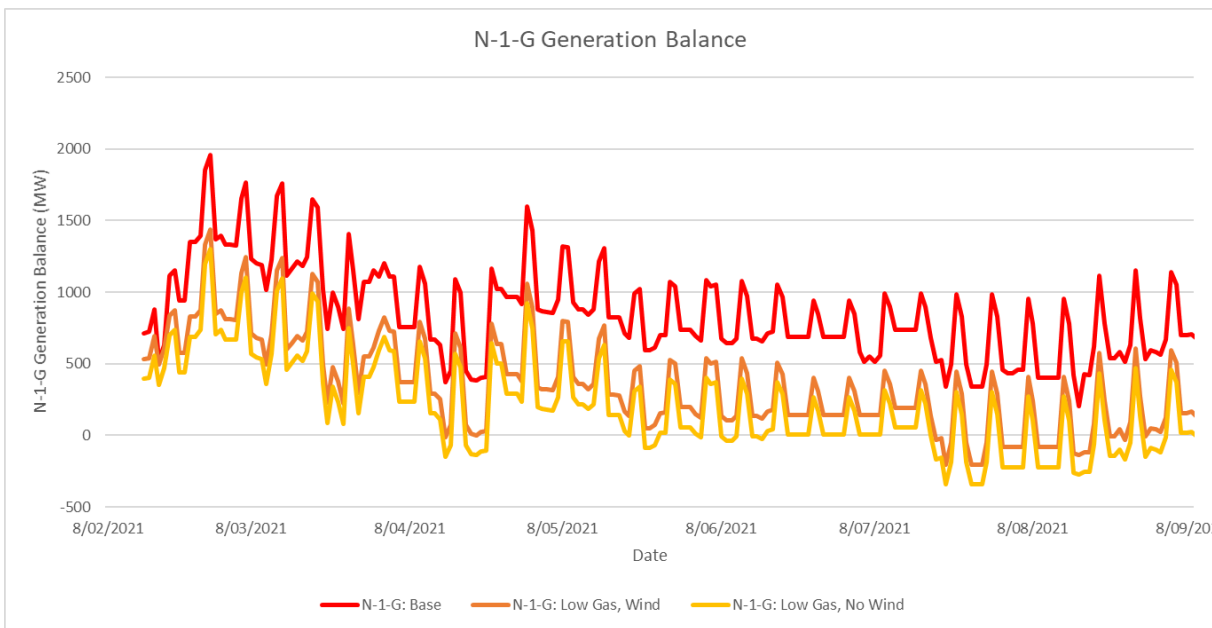


Figure 2: NZGB N-1-G Balance – Base Scenario

Further details of the predicted shortfalls are details below in Table 1.



Table 1: Forecast base scenario shortfalls for the next six months

	Base Scenario		Low Gas, Wind Scenario		Low Gas, No Wind Scenario		Outages				
	N-1 Margin	N-1-G Margin	N-1 Margin	N-1-G Margin	N-1 Margin	N-1-G Margin	Generation		Transmission		HVDC
							NI	SI	NI	SI	
Thu, 15/04/2021	686	369	416	-11	259	-149	950	550	0	0	0
Fri, 16/04/2021	970	451	700	71	543	-67	800	400	0	0	0
Mon, 19/04/2021	997	451	721	71	570	-67	800	400	0	0	0
Tue, 20/04/2021	919	389	649	9	492	-129	800	400	100	0	50
Wed, 21/04/2021	927	382	652	2	500	-136	800	400	100	0	50
Thu, 22/04/2021	950	405	675	25	523	-114	800	400	100	0	50
Fri, 23/04/2021	956	411	681	31	529	-108	700	400	150	0	0
Mon, 24/05/2021	1011	593	624	51	468	-88	350	350	0	0	0
Tue, 25/05/2021	1011	593	624	51	468	-88	350	350	0	0	0
Wed, 26/05/2021	1033	615	646	73	490	-66	350	350	0	0	0
Fri, 04/06/2021	1202	665	773	123	634	-16	200	250	0	0	0
Tue, 08/06/2021	1140	677	753	135	596	-4	200	300	0	0	0
Wed, 09/06/2021	1133	645	746	103	590	-36	250	300	0	0	0
Thu, 10/06/2021	1114	645	727	103	571	-36	250	300	0	0	0
Fri, 11/06/2021	1139	677	752	135	596	-4	200	300	0	0	0
Mon, 14/06/2021	1227	677	785	135	646	-4	200	250	0	0	0
Tue, 15/06/2021	1081	677	694	135	538	-4	200	350	0	0	0
Wed, 16/06/2021	1060	658	673	116	516	-23	200	350	0	0	0
Mon, 19/07/2021	1203	679	787	137	648	-2	100	250	0	0	0
Tue, 20/07/2021	1045	511	619	-31	481	-169	200	250	150	0	0
Wed, 21/07/2021	1018	525	631	-17	474	-156	100	300	150	0	0
Thu, 22/07/2021	852	340	448	-202	308	-341	100	250	150	0	0
Fri, 23/07/2021	1006	494	602	-48	462	-187	100	250	0	0	0
Mon, 26/07/2021	1006	494	602	-48	462	-187	100	250	0	0	0
Tue, 27/07/2021	852	340	448	-202	308	-341	100	250	150	0	0
Wed, 28/07/2021	852	340	448	-202	308	-341	100	250	150	0	0
Thu, 29/07/2021	786	340	399	-202	242	-341	100	350	150	0	0
Fri, 30/07/2021	1006	494	602	-48	462	-187	100	250	0	0	0
Mon, 02/08/2021	917	459	530	-83	373	-221	150	300	0	0	0
Tue, 03/08/2021	795	435	408	-83	251	-221	150	450	0	0	0
Wed, 04/08/2021	795	435	408	-83	251	-221	150	450	0	0	0
Thu, 05/08/2021	917	459	530	-83	373	-221	150	300	0	0	0
Fri, 06/08/2021	917	459	530	-83	373	-221	150	300	0	0	0
Mon, 09/08/2021	761	401	374	-83	217	-221	150	450	0	0	0
Tue, 10/08/2021	761	401	374	-83	217	-221	150	450	0	0	0
Wed, 11/08/2021	761	401	374	-83	217	-221	150	450	0	0	0
Thu, 12/08/2021	761	401	374	-83	217	-221	150	450	0	0	0
Fri, 13/08/2021	761	401	374	-83	217	-221	150	450	0	0	0
Mon, 16/08/2021	866	419	479	-123	322	-261	150	350	0	0	0
Tue, 17/08/2021	567	207	180	-136	23	-274	200	650	0	0	0
Wed, 18/08/2021	871	424	484	-118	327	-256	150	350	0	0	0
Thu, 19/08/2021	870	423	483	-119	326	-257	150	350	0	0	0
Fri, 20/08/2021	978	618	591	78	434	-61	150	400	0	0	0
Mon, 23/08/2021	925	537	538	-5	382	-143	200	350	0	0	0
Tue, 24/08/2021	926	538	539	-4	382	-143	200	350	0	0	0
Wed, 25/08/2021	971	583	584	41	427	-98	150	350	0	0	0
Thu, 26/08/2021	900	512	513	-30	356	-169	250	350	0	0	0
Fri, 27/08/2021	1020	632	633	90	477	-49	100	350	0	0	0
Mon, 30/08/2021	1065	533	641	-9	502	-148	200	200	0	0	0
Tue, 31/08/2021	1126	594	702	52	563	-87	150	200	0	0	0
Wed, 01/09/2021	1116	584	692	42	553	-97	150	200	0	0	0
Thu, 02/09/2021	1097	565	673	23	534	-116	200	200	0	0	0
Fri, 03/09/2021	1287	666	774	124	636	-14	150	200	0	0	0



To mitigate the risk of a shortfall on the dates with low or negative generation balance forecast, market participants should:

1. avoid scheduling additional outages which may remove or constrain generation; and
2. adjust demand and generation offers to minimise any risk of shortfall.

### WINTER SCENARIO RESULTS

There are no N-1 generation balance shortfalls forecast for the winter scenario irrespective of gas generation assumptions (Figure 3). There are no forecast N-1-G generation shortfalls for the base assumption, but N-1-G shortfalls are forecasted for both low gas assumptions from late May to late August (Figure 4). This is a longer period of forecast shortfalls than the base case, although the worst shortfalls seen in the base case are not any worse in the Winter Scenario. Beyond August the winter and base scenario loads are identical.

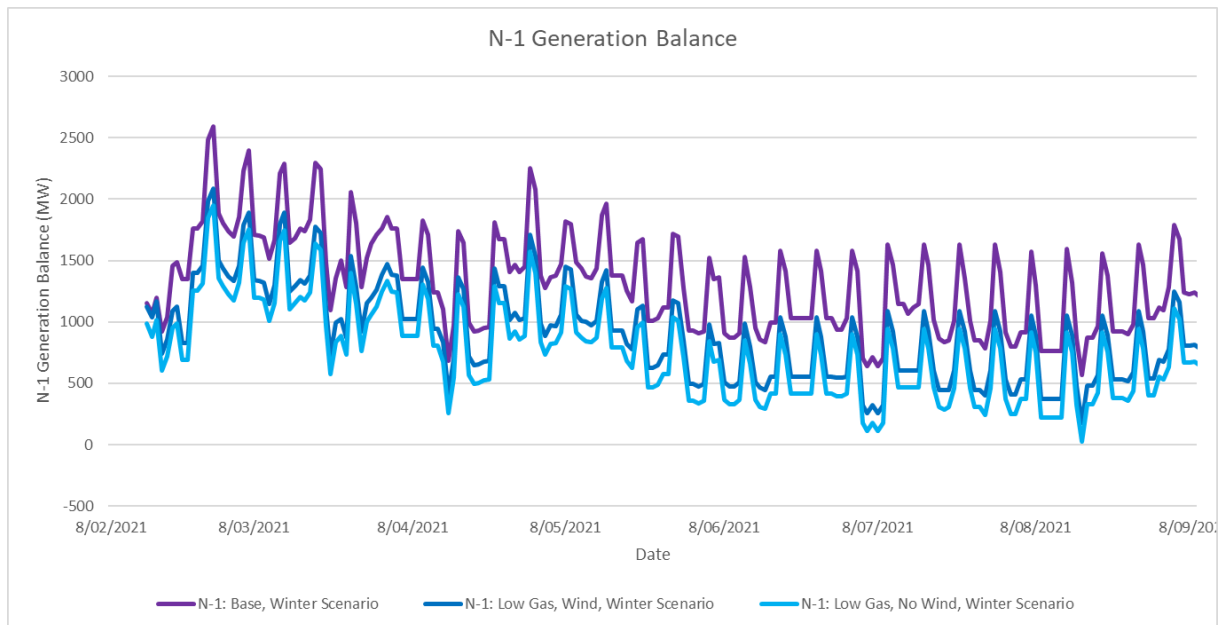


Figure 3: NZGB N-1 Balance – Winter Scenario

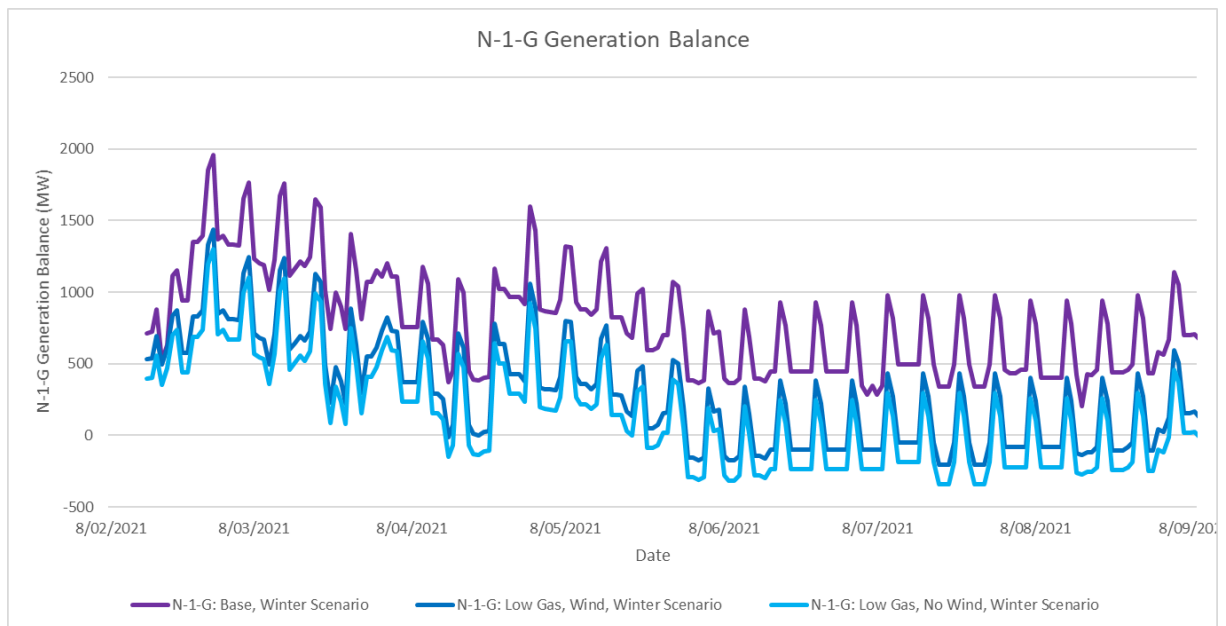


Figure 4: NZGB N-1-G Balance – Winter Scenario





## CHANGES SINCE THE DECEMBER 2020 REPORT

There have been two changes to the NZGB modelling since the December 2020 Report.

1. Ngawha A (NGA) Generation has been modelled in NZGB (25MW)
2. Ngawha B (NGB) Generation has been modelled in NZGB (31MW)

The system operator is aware of upcoming generator commissionings and will be working with the relevant asset owners to ensure these are correctly included in NZGB.

To provide feedback on the changes to either the NZGB modelling or monthly report, please contact Christian Jensen ([christian.jensen@transpower.co.nz](mailto:christian.jensen@transpower.co.nz)). For more details on the NZGB modelling, please refer to the [User Guide](#).

## NOTABLE GENERATOR OUTAGES

The accumulative MW loss of generator outages that impact the generation balance for the period studied are shown in Figure 3. Note that this does not capture the impact of transmission outages. For more information please visit [POCP](#).

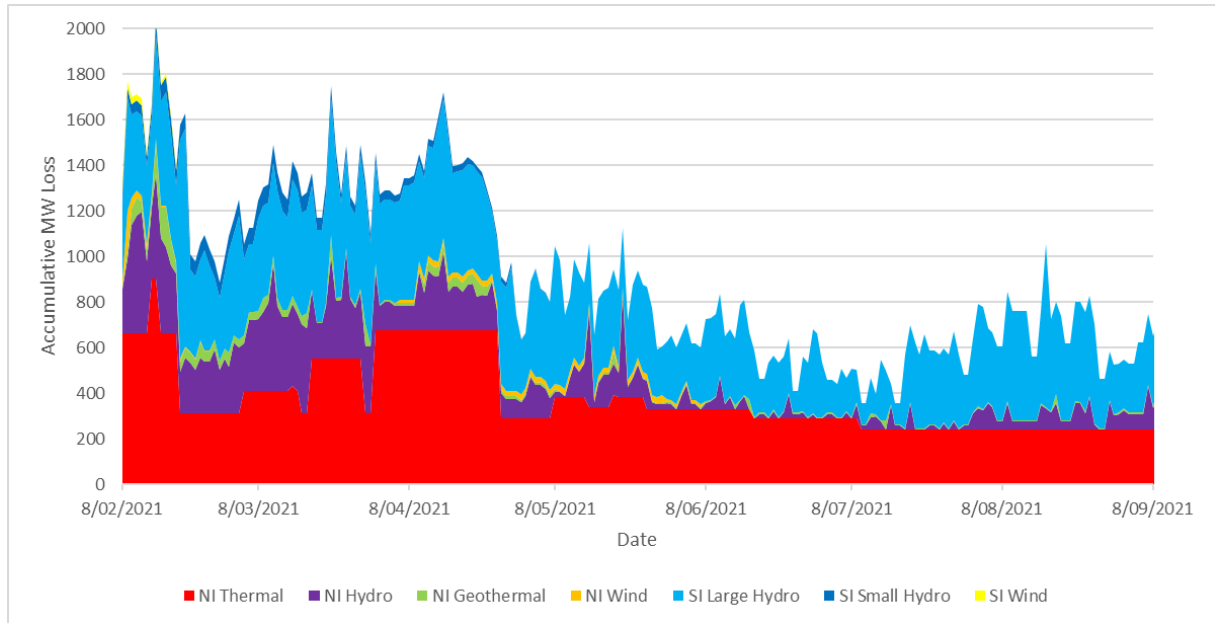


Figure 5: Accumulative generation outages.

