Barr River hydro scheme
Monthly report – March 2023

1   Summary

A reasonable month above the long term average on the back of decent rainfall. Missing export data issues are being chased up with EDF.

2   Monthly generation & revenue

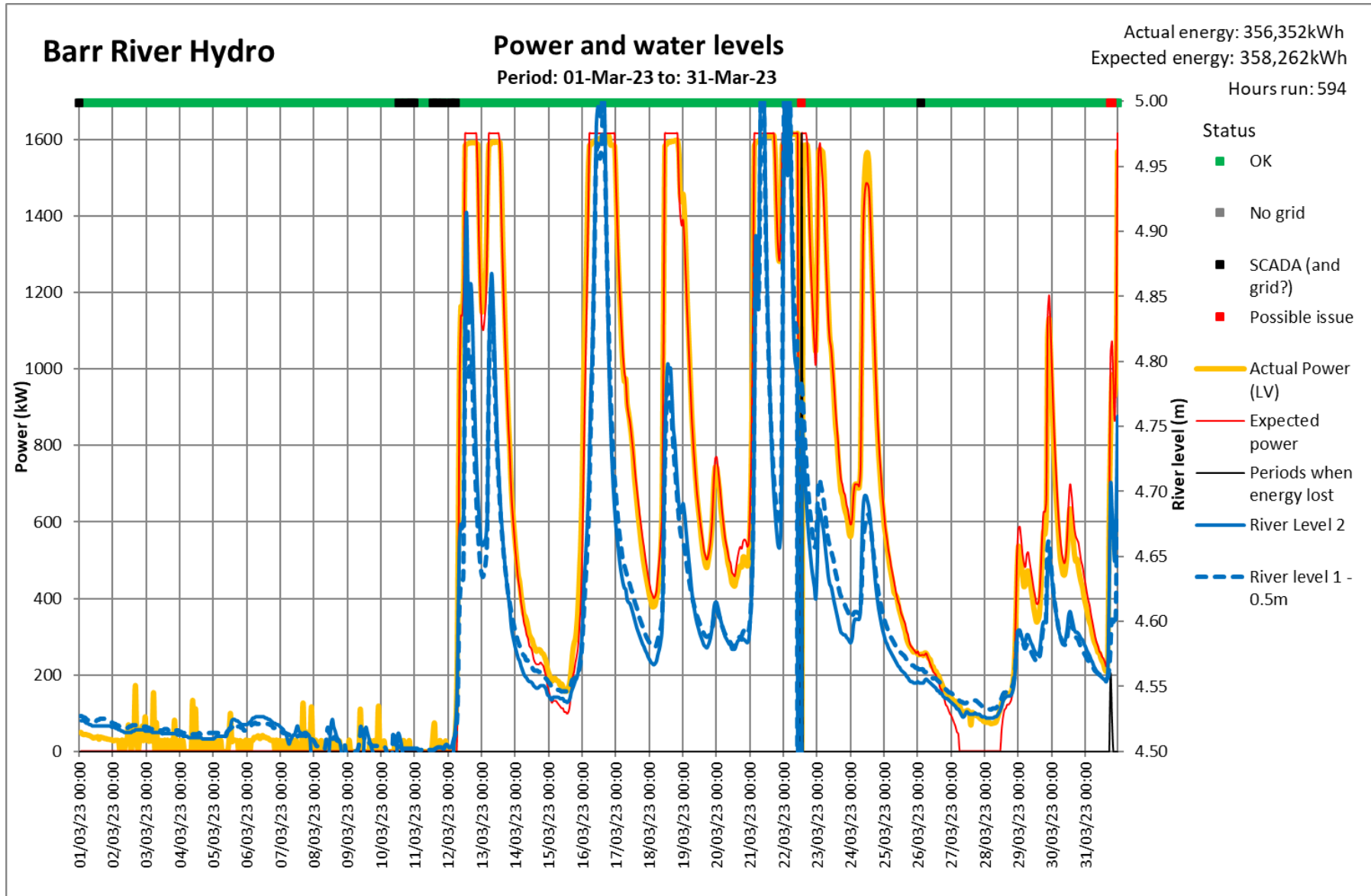| Parameter	Value
Actual generation (FIT meter), kWh	356,352
Average generation in month, kWh	298,520
Forecast generation in month (P50), kWh	611,047
Actual relative to forecast	58.3%
Rainfall relative to 1991-2020 average by month	118%
Calculated generation[1] kWh	358,262
Actual relative to calculated generation, kWh	-1,910
Actual relative to calculated generation, %	-0.5%
Approximate revenue in month[2]	£24,756

[1] Calculated generation is based on river level data and seeks to establish the expected generation with no performance issues. The expected power and energy calculations are being calibrated and will be refined over the coming months as more data is gathered.

[2] Export revenue based on reported export and estimated GDUoS charges.

Export meter	Value
Export, kWh	320,285
Variance to generation, kWh	-36,067
Variance to generation, %	-10.1%

The March export statement has missing data for 48 periods (24 hours) on 21 March. Recorded generation on that day was 35,748kWh.

3 System reporting

3.1 Scheme anomalies to calculated generation

Date/time	Details	Action required
22/03/2023	Most sensors not available due to lightning at 11:00. On restart we saw common issue in reaching max power. Alva have been working on the spear opening issue and it now appears that they have been successful in getting the plant to achieve full power in a more timely manner.	NT replaced fuses and restarted plant at 12:45. Continued monitoring.

3.2 Other system events

Date/time	Details	Action required
09/03/2023	Two G99 trips, but plant was off waiting for water.	None.
20/03/2023	Tripped off on 16/3 due to high reactive power but restarted automatically.	None.

3.3 Head loss

Target head loss at full power	Current head loss at full power	Status
14.5m	14.66m	Further increase but limited data points. Over target. Pigging recommended. Quotation received from Stuart Stankey. Morvolts to advise as to whether this has been commissioned.

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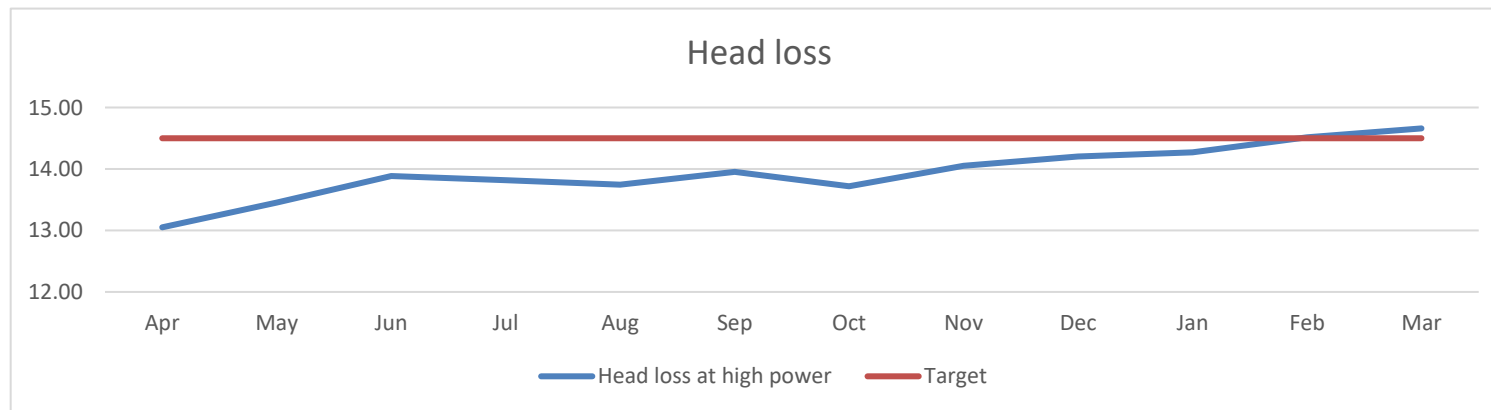
3.4 Temperatures

| Parameter	Temperature at or near full power, ^{0}C	Alert level, ^{0}C	Parameter	Temperature at or near full power, ^{0}C	Alert level, ^{0}C
Generator DE bearing	35	85	Generator winding 1	63	145
Generator NDE bearing 1	42	85	Generator winding 2	61	145
Generator NDE bearing 2	46	85	Generator winding 3	65	145
Turbine room	18	30	Power cabinet (RG1)	28	42

3.5 Vibration

Parameter	Vibration at or near full power, mm/s	Alert level, mm/s	Parameter	Vibration at or near full power, mm/s	Alert level, mm/s
Generator DE	0.38	3.0	Generator NDE	1.12	3.0

3.6 Recommended and ongoing actions

Action	Responsibility	Status
Install power quality monitoring equipment at grid connection to address grid trips affecting the generator breaker and requiring a site visit.	GHC	SSEN fitted the monitoring equipment on 6th February. The logger will record 4 weeks' data, SSEN will then recover it and analyse that data. A trip occurred on the 17th February, so this should have been captured by the logger. SSEN have confirmed that the logging period has concluded. SSEN to collect data logger. GHC to follow up with SSEN as to the results of this logging.
Services to be arranged	MorVolts	LOLER checks complete. MorVolts to send inspection report.
Fire extinguisher testing	MorVolts	To be arranged (awaiting MCDC fire extinguisher service contract for existing CO2 extinguisher only)
Order replacement level sensors	MorVolts	Three ordered and expected on site w/c 6/3/2023. MorVolts to confirm receipt

Chase SSE for details of planned outage in 2024	GHC	RH has met with senior SSEN folk regarding this and reported updates to AR. RH will keep up the pressure on SSEN to try to reduce this outage.
Housekeeping in turbine house	MorVolts	Spares to be arranged on shelves/in cupboard. Underway.
Spares stock to be reviewed	GHC	CINK asked to review spares list and advise if any other spares recommended – CINK chased, no response yet Transformer breaker spares requirement to be checked by RB Switchgear on next attendance (note – will require HV isolation and therefore AP attendance).
Maintenance schedule and training to be reviewed	GHC	CINK to check maintenance schedule including inconsistencies relative to alarm messages. CINK to confirm scope of caretaker tasks and training/documentation required. MorVolts to review and advise whether further training/documentation required. JH to chase CINK.
Arrangements to be established with Colin Thwaites for HV switching/isolation	GHC	CV awaited from Colin for GHC records. Colin has visited site. MorVolts to confirm that Colin has been appointed as AP.
Chase up export payment for late January and early February when scheme was generating but no export recorded.	Morvolts	Raised with EDF and SCADA data provided. Chased by GHC 20/4/23.
Missing data from March export statement	GHC	Should be automatically updated but raised with EDF and SCADA data offered.

4   Rainfall

Met Office
March 2023
Rainfall Amount
% of 1991-2020 Average
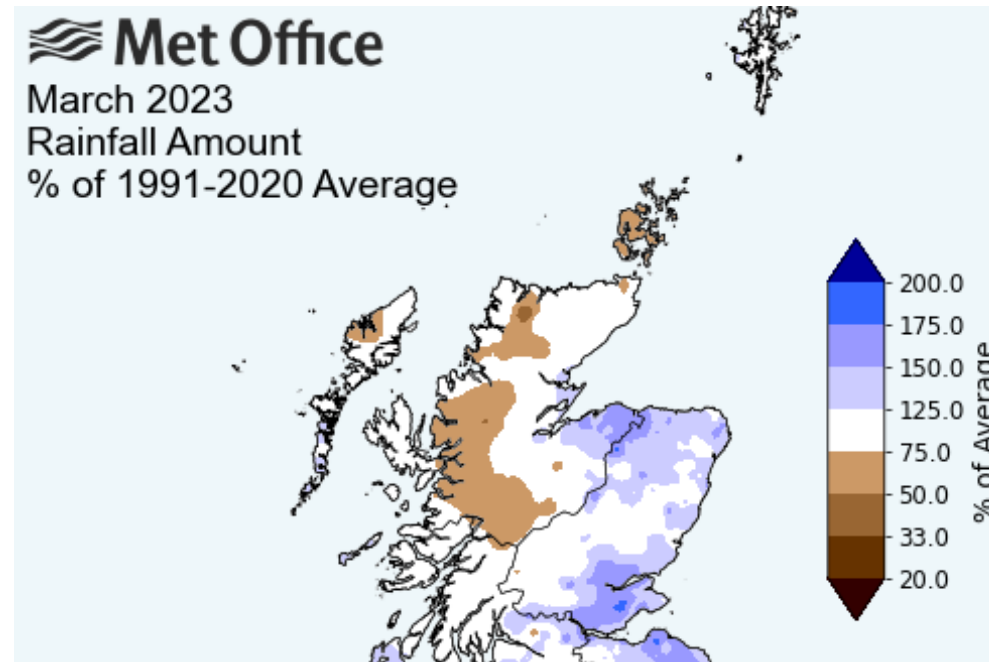
Rainfall this month (rain gauge), mm	182
Western Scotland rainfall in month with respect to 1991-2020 long term average	118%

5   Scheme annual performance summary

FY 2022/3	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	YTD
Actual generation kWh	247,605	424,386	286,501	329,058	257,505	238,578	692,787	709,873	223,709	633,347	447,449	356,352	4,847,150
Average generation since commissioning	247,605	424,386	286,501	165,261	174,610	297,736	672,489	693,043	368,179	594,556	547,677	298,520	4,770,561
Forecast generation (P50)	369,360	226,766	188,561	195,146	280,601	387,431	582,631	618,214	620,057	695,941	554,678	611,047	5,330,433
Actual relative to forecast	67.0%	187.1%	151.9%	168.6%	91.8%	61.6%	118.9%	114.8%	36.1%	91.0%	80.7%	58.3%	90.9%
Rainfall relative to 1991-2020 average	77%	126%	104%	74%	65%	93%	134%	112%	89%	104%	56%	118%	96%
Calculated generation kWh	253,540	432,296	294,437	330,341	257,587	239,724	700,013	748,966	295,507	639,670	459,640	358,262	5,009,984
Variance to calculated generation kWh	-5,935	-7,910	-7,936	-1,283	-82	-1,146	-7,226	-39,093	-71,798	-6,323	-12,191	-1,910	-162,834
Variance to calculated generation %	-2.3%	-1.8%	-2.7%	-0.4%	-0.0%	-0.5%	-1.0%	-5.2%	-24.3%	-1.0%	-2.7%	-0.5%	-3.3%
Approximate revenue[1]	£28,994	£50,244	£33,677	£38,789	£30,177	£27,894	£108,061	£111,476	£34,832	£44,660	£31,298	£52,804	£669,447
Capacity factor (monthly)	20.5%	39.0%	23.8%	28.2%	21.4%	20.5%	57.5%	60.9%	18.6%	52.5%	41.1%	29.6%	34.2%
Industry wide RoR capacity factor	19.4%	34.6%	18.3%	15.5%	15.5%	11.9%	55.8%	59.0%	32.6%	58.8%	50.2%	30.9%	33.5%

[1]Export element of revenue updated to reflect actual export and rate.