



Barr River hydro scheme

Monthly report – April 2022

1 Summary

A relatively dry April with much of the rain that fell being concentrated into intense rain in the first few days of the month. The plant generally ran well with the exception of a grid trip and a level sensor issue that prevented operation for short periods. The SCADA crashed twice. Windows was subsequently updated by Alva.

2 Monthly generation & revenue

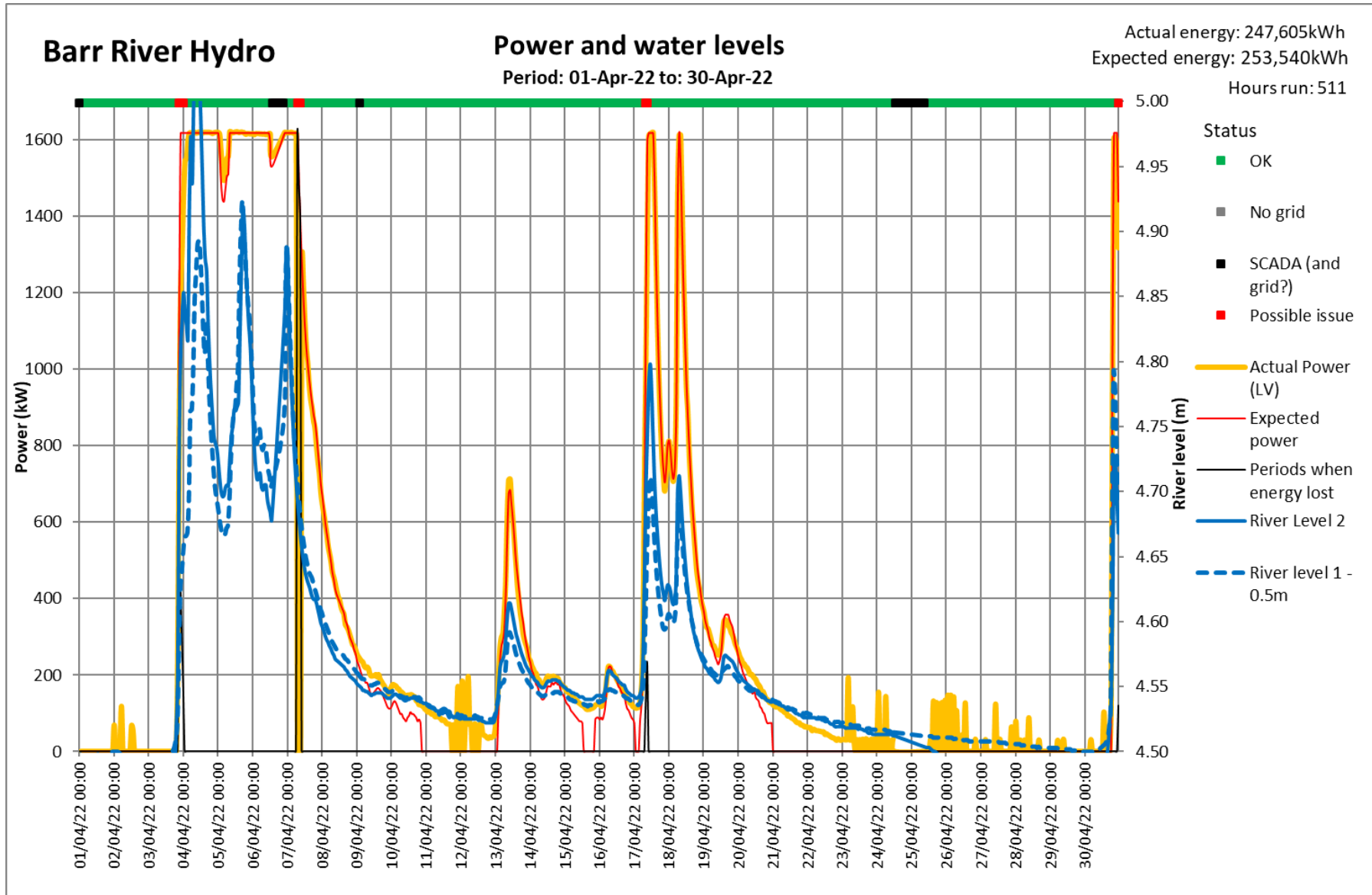
Parameter	Value
Actual generation (FIT meter), kWh	247,605
Average generation in month, kWh	247,605
Forecast generation in month (P50), kWh	369,360
Actual relative to forecast	67.0%
Rainfall relative to 1991-2020 average by month	77%
Calculated generation ¹ kWh	253,540
Actual relative to calculated generation, kWh	-5,935
Actual relative to calculated generation, %	-2.3%
Approximate revenue in month ²	£29,616

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 generated output and estimated export rate.

Export meter	Value
Export, kWh	249,175
Variance to generation, kWh	1,570
Variance to generation, %	0.6%

3 System reporting



3.1 Scheme anomalies to calculated generation

Date/time	Details	Action required
03/04/2022	Issue with chamber 1 sensor reading on 2/4 lead to pipe draining. When refilled, did not automatically restart.	AR had to reset errors on 3/4 to restart plant. JH monitored subsequently and observed that chamber 1 sensor reading does not drop to 'zero'. JH tried adjusting chamber stop level so that plant stops on chamber empty, not low pipe pressure, did not resolve problem. JH contacted CINK to explore problem. CINK checked and problem now resolved.
07/04/2022	Grid outage at 06:45ish, grid returned quickly but generator breaker tripped.	NT attended to reset.
17/04/2022	River 2 rose much faster than river 1, some spilling at intake 2 until river 1 'caught up'.	None
30/04/2022	River 1 significantly higher than river 2, very little spilling when not at full power and therefore very little lost generation but rating equation inaccurate with such large discrepancies in river level.	None

3.2 Other system events

Date/time	Details	Action required
01/04/2022	'Fasing too long' alarms. This actually means that the plant failed to synchronise to the grid after 10 minutes.	JH consulted CINK. Not clear what the problem was but the plant synchronised fine later in the day.
06/04/2022	SCADA crashed at 13:20, plant still running.	NT restarted SCADA in evening.
19/04/2022	Plant turned off and on @ 02:00. No alarms and plant automatically restarted.	None
24/04/2022	SCADA crashed at 12:40ish. Plant continued to operate during this period, data not logged.	JH restarted SCADA pm 25/4. JH escalated to CINK/Alva. Alva checked updated Windows.

3.3 Head loss

Target head loss at full power	Current head loss at full power	Status
14.5m	13.05m	Stable and within target

3.4 Temperatures

Parameter	Temperature at or near full power, °C	Alert level, °C	Parameter	Temperature at or near full power, °C	Alert level, °C
Generator DE bearing	35	85	Generator winding 1	64	145
Generator NDE bearing 1	41	85	Generator winding 2	61	145
Generator NDE bearing 2	45	85	Generator winding 3	65	145
Turbine room	20	30	Power cabinet (RG1)	28	42

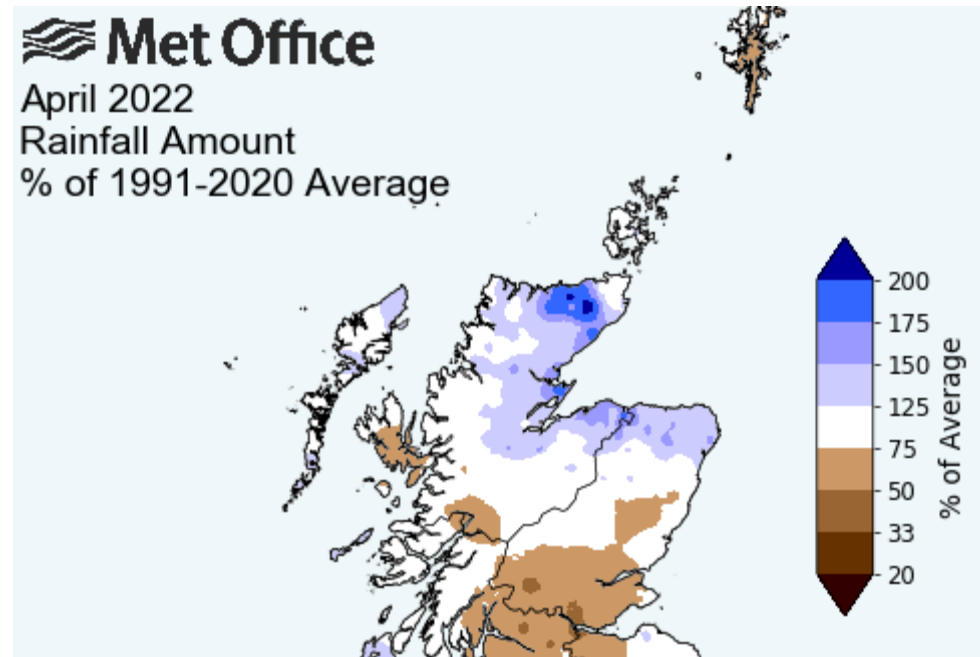
3.5 Vibration

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	0.41	3.0	Generator NDE	1.11	3.0

4 Recommended and ongoing actions

Action	Responsibility	Status
Fuses to be labelled clearly in X91 (signal cable junction box in powerhouse)	MorVolts	Ongoing
More fuses to be ordered	MorVolts	Ongoing
Monitor for export readings in excess of generation readings.	GHC	Ongoing
Install power quality monitoring equipment at grid connection to address grid trips affecting the generator breaker and requiring a site visit.	GHC	SSE contacted and have agreed to provide equipment when available (expected to be mid May). GHC to chase up.

5 Rainfall



Rainfall this month (rain gauge), mm	137
Western Scotland rainfall in month with respect to 1991-2020 long term average	77%

6 Scheme annual performance summary

2022	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD
Actual generation kWh	555,764	647,905	240,688	247,605									555,764
Average generation since commissioning	555,764	647,905	240,688	247,605			1,463	91,714	356,893	652,190	676,213	514,099	555,764
Forecast generation (P50)	695,941	554,678	611,047	369,360	226,766	188,561	195,146	280,601	387,431	582,631	618,214	620,057	695,941
Actual relative to forecast	79.9%	116.8%	39.4%	67.0%									79.9%
Rainfall relative to 1991-2020 average	58.0%	163%	51%	77%									8.3%
Calculated generation kWh	494,286	664,527	241,159	253,540									494,286
Variance to calculated generation kWh	61,478	-16,622	-471	-5,935	-	-	-	-	-	-	-	-	61,478
Variance to calculated generation %	+12.4%	-2.5%	-0.2%	-2.3%									+12.4%
Approximate revenue	£72,273	£84,255	£31,299	£29,616									£72,273
Capacity factor (monthly)	46.1%	59.5%	20.0%	21.2%									46.1%
Industry wide RoR capacity factor	52.2%												#DIV/0!

