



Barr River hydro scheme

Monthly report – January 2023

1 Summary

The scheme performed well in January with the only significant loss of generation associated with Enerveo attendance for servicing. Further progress has been made in relation to other servicing arrangements recently.

2 Monthly generation & revenue

Parameter	Value
Actual generation (FIT meter), kWh	633,347
Average generation in month, kWh	594,556
Forecast generation in month (P50), kWh	695,941
Actual relative to forecast	91.0%
Rainfall relative to 1991-2020 average by month	104%
Calculated generation ¹ kWh	639,670
Actual relative to calculated generation, kWh	-6,323
Actual relative to calculated generation, %	-1.0%
Approximate revenue in month ²	£91,372

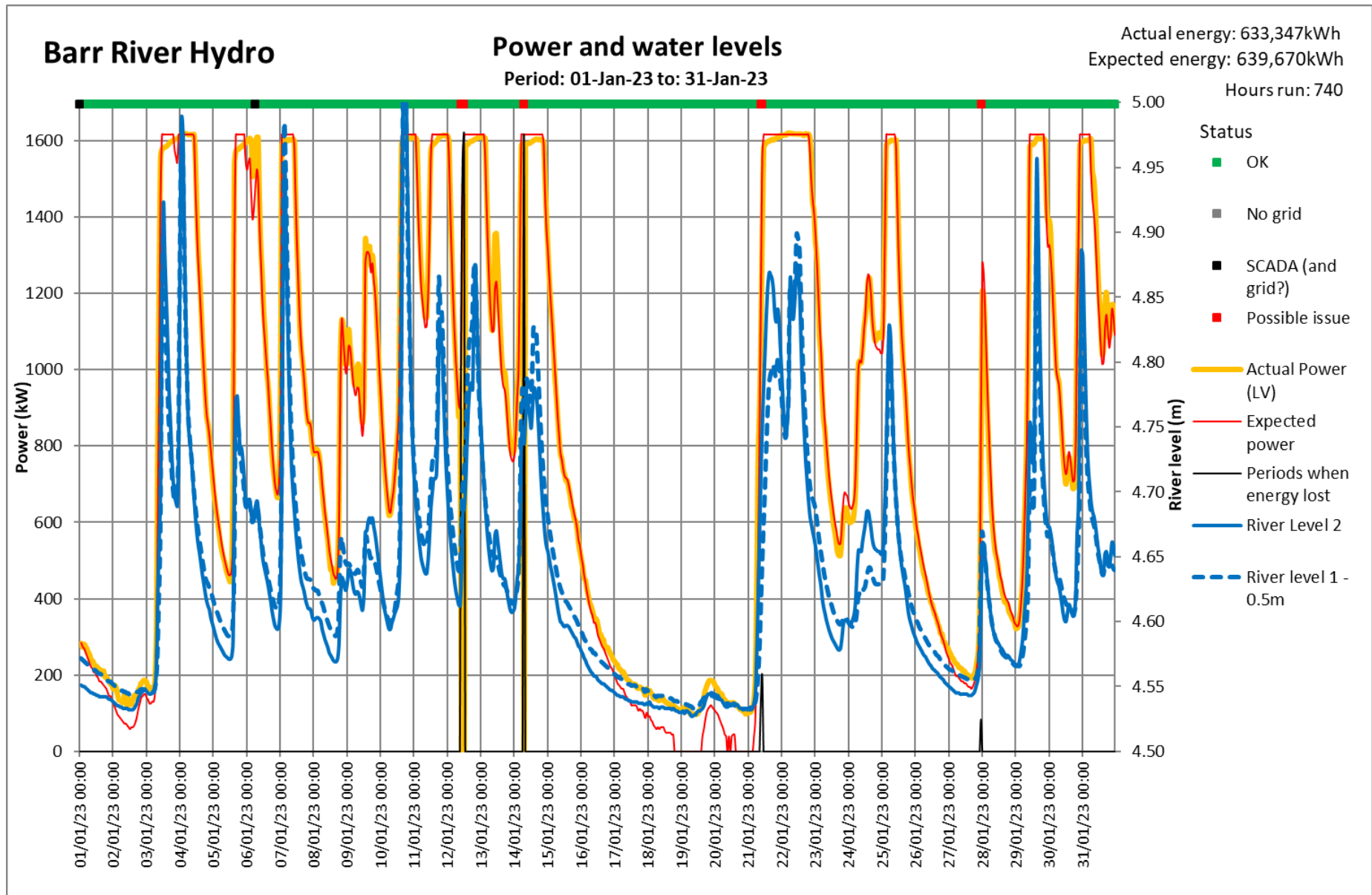
¹Calculated generation is based on river level data and seeks to establish the expected generation with no performance issues. The expected power and energy calculations are being calibrated and will be refined over the coming months as more data is gathered.

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

Export meter	Value
Export, kWh	533,563
Variance to generation, kWh	-99,784
Variance to generation, %	-15.8%

EDF export statement shows no missing data but reports no export from 01:30 on 28/1/2023 to the end of the month. Recorded generation during that period was 94,719kWh.

3 System reporting



3.1 Scheme anomalies to calculated generation

Date/time	Details	Action required
12/01/2023	SSE Contracting on site, turbine shut down during servicing.	None
14/01/2023	High reactive energy trip.	None, plant automatically reconnected.
21/01/2023 28/01/2023	River 2 rose faster than river 1, some spilling at intake 2.	None

3.2 Other system events

Date/time	Details	Action required
07/01/2023	Emergency stop pressed - Douglas on site	Plant restarted fine when emergency stop reset (by Douglas). MorVolts to stop machine by 'Automat off' in preference to emergency stop.
09/01/2023	R070 alarm suspected to be in response to emergency stop - pressure drop and HPU pump doesn't run after emergency stop. Running fine recently.	None
21 & 22/01/2023	Grid issues related to grid voltage on 21/1 and 22/1. Alarms but no trip.	None
25/01/2023	Loss of Mains but no trip	None
31/01/2023	Loss of Mains but no trip	None

3.3 Head loss

Target head loss at full power	Current head loss at full power	Status
14.5m	14.27m	Slight increase. Within target, pigging likely to be necessary soon.

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	33	85	Generator winding 1	61	145
Generator NDE bearing 1	37	85	Generator winding 2	58	145
Generator NDE bearing 2	40	85	Generator winding 3	62	145
Turbine room	16	30	Power cabinet (RG1)	29	42

3.5 Vibration

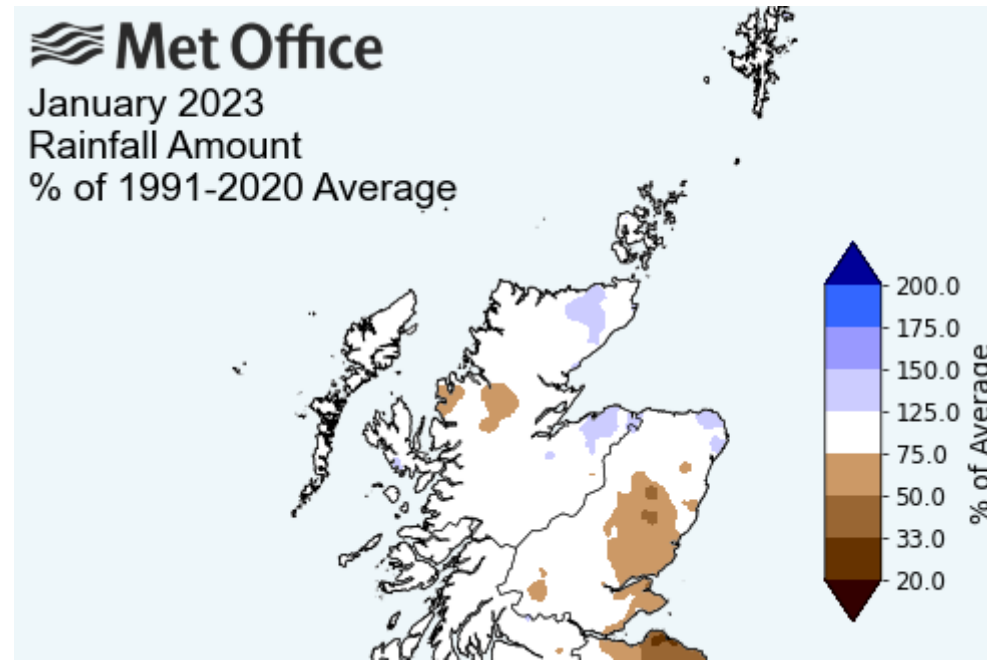
Parameter	Vibration at or near full power, mm/s	Alert level, mm/s	Parameter	Vibration at or near full power, mm/s	Alert level, mm/s
Generator DE	0.42	3.0	Generator NDE	1.16	3.0

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 6 th February. The logger will record 4 weeks' data, SSEN will then recover it and analyse that data.
Services to be arranged	MorVolts	Scotia Handling appointed to do LOLER checks in late February.
Fire extinguisher testing	MorVolts	To be arranged
Order replacement level sensors	MorVolts	Link to replacement sensors sent to AR. AR to confirm if these have been ordered.
Investigate meter reading errors and discrepancies in export billing	GHC	JH continuing to chase Engie. Engie has advised that the synthesized data that was provided has been accepted. We have asked for them to summarise the situation regarding billing so that we can compare that with our records and close this out.
Chase SSE for details of planned outage in 2024	GHC	SSE have provided further details, JH has forwarded to NT and AR. RH to provide update following SSEN meeting in January.
Housekeeping in turbine house	MorVolts	Cupboard to be purchased and spares stored in there. Tools to be arranged.
Teamviewer licence issues	MorVolts	Licence issues prevented access to SCADA by Glen Hydro (John can connect ok, but others receive a licence error) and Douglas. Nick to check licence situation and advise.
Powerhouse temperature dropped to 1C on 8/12/22 and 14/12/22	MorVolts	MorVolts to check frost setting of heaters and adjust if necessary. MorVolts to advise if this has been addressed.
Spares stock to be reviewed	GHC	CINK asked to review spares list and advise if any other spares recommended. RB Switchgear provided spares proposal for generator breaker, MorVolts to confirm that these have been ordered. RB Switchgear to provide spares proposal for transformer breaker (JH chasing Enerveo for breaker details so they can do this).

ACB servicing to be implemented	GHC	Quotation from RB Switchgear accepted by MorVolts. RB Switchgear informed. Charlie Robb informed that RB Switchgear will now do transformer oil sampling. Service schedule updated.
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.
Plans to be put in place for pigging	GHC/DAM	JH to request proposal from DA Macdonald for pigging.

4 Rainfall



Rainfall this month (rain gauge), mm	168
Western Scotland rainfall in month with respect to 1991-2020 long term average	104%

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			4,043,349
Average generation since commissioning	247,605	424,386	286,501	165,261	174,610	297,736	672,489	693,043	368,179	594,556	647,905	240,688	3,924,364
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	4,164,708
Actual relative to forecast	67.0%	187.1%	151.9%	168.6%	91.8%	61.6%	118.9%	114.8%	36.1%	91.0%			97.1%
Rainfall relative to 1991-2020 average	77%	126%	104%	74%	65%	93%	134%	112%	89%	104%			98%
Calculated generation kWh	253,540	432,296	294,437	330,341	257,587	239,724	700,013	748,966	295,507	639,670			4,192,082
Variance to calculated generation kWh	-5,935	-7,910	-7,936	-1,283	-82	-1,146	-7,226	-39,093	-71,798	-6,323	-	-	-148,733
Variance to calculated generation %	-2.3%	-1.8%	-2.7%	-0.4%	-0.0%	-0.5%	-1.0%	-5.2%	-24.3%	-1.0%			-3.5%
Approximate revenue ¹	£28,994	£50,244	£33,677	£38,789	£30,177	£27,894	£108,061	£111,476	£34,832	£44,660	-£821	-£821	£502,403
Capacity factor (monthly)	20.5%	39.0%	23.8%	28.2%	21.4%	20.5%	57.5%	60.9%	18.6%	52.5%			34.0%
Industry wide RoR capacity factor	19.4%	34.6%	18.3%	15.5%	15.5%	11.9%	55.8%	59.0%	32.6%				29.2%

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

