



# Barr River hydro scheme

## Monthly report – August 2022

### 1 Summary

The scheme performed well in August with very little downtime despite a thunderstorm affecting the level sensors and causing the generator breaker to trip. The calculated generation figure for the month is not reliable as the river level sensors were not operational for several days, the plant was running normally during this period, it is only data that was lost. Glen Hydro Consulting conducted an annual inspection and CINK attended for servicing at the start of September. No major issues were identified.

### 2 Monthly generation & revenue

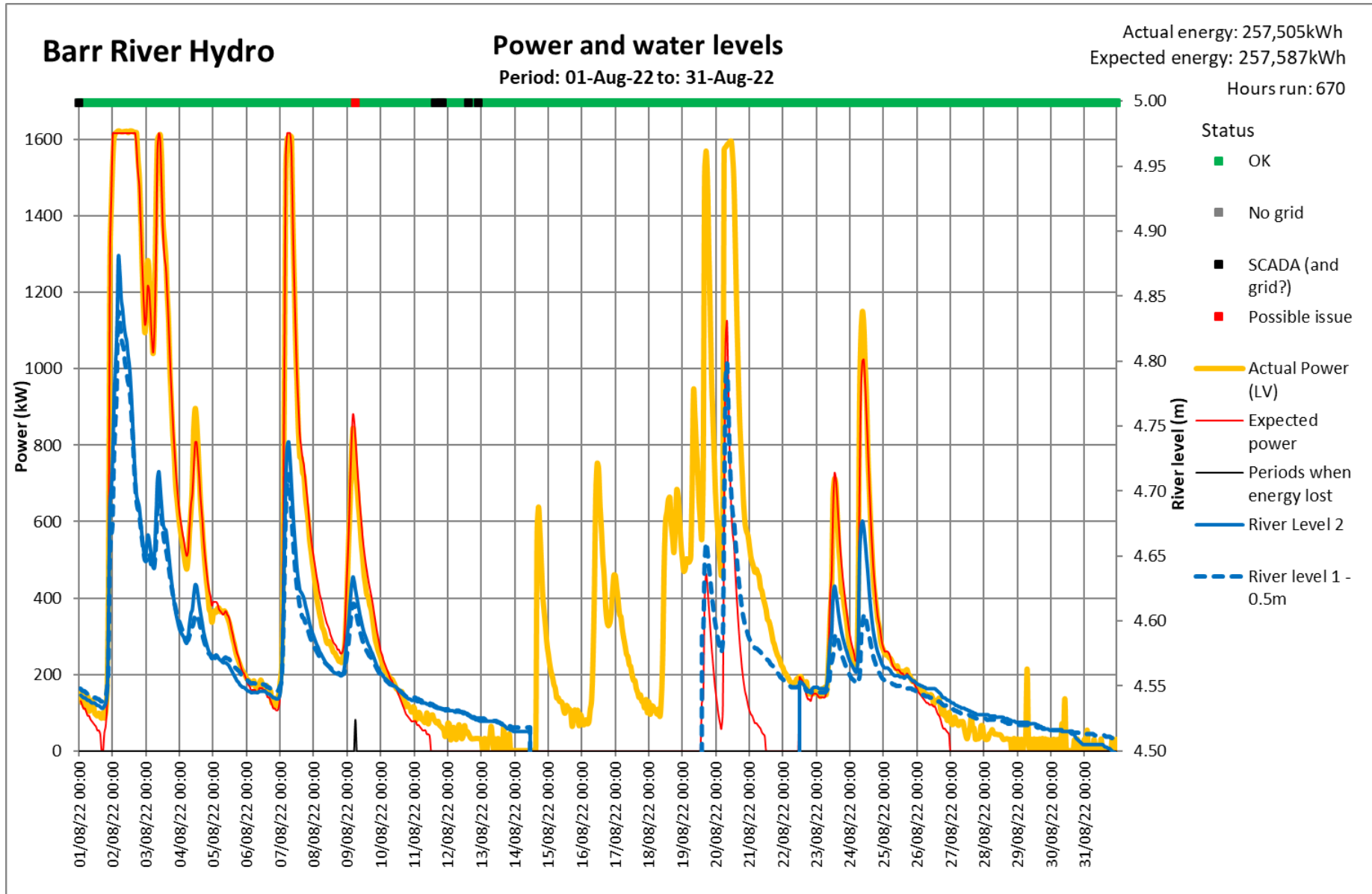
Parameter	Value
Actual generation (FIT meter), kWh	257,505
Average generation in month, kWh	174,610
Forecast generation in month (P50), kWh	280,601
Actual relative to forecast	91.8%
Rainfall relative to 1991-2020 average by month	65%
Calculated generation <sup>1</sup> kWh	257,587
Actual relative to calculated generation, kWh	-82
Actual relative to calculated generation, %	-0.0%
Approximate revenue in month <sup>2</sup>	£30,177

<sup>1</sup>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.

<sup>2</sup>Export revenue based on generated output and estimated export rate/GDUoS charges.

Export meter	Value
Export, kWh	258,848
Variance to generation, kWh	1,343
Variance to generation, %	0.5%

### 3 System reporting



### 3.1 Scheme anomalies to calculated generation

Date/time	Details	Action required
09/08/2022	Less water in river 1 than river 2.	None
14/08/2022 – 22/08/2022	River 2 sensor not operational. No effect on plant performance. Calculation of expected generation not accurate for this period.	Fuses for river sensors 1 & 2 replaced.

### 3.2 Other system events

Date/time	Details	Action required
Throughout month	Increased head loss when rivers rise quickly due to air ingestion at intake 1.	Switch back to chamber 1 control (implemented on 01/09/2022)
12/08/2022	JH on site for annual inspection. Machine turned off to allow for tailrace drain down and inspection.	None
13/08/2022	Grid trip, breaker trip @ 21:54. Water levels very low, negligible loss of generation.	Reset by AR 14/08, c. 15:00.
14/08/2022	Thunderstorm. All water level sensors stopped reading except tailrace @ 11:48. Grid trip (although plant not running) @ 12:05 and 12:09, auto recovered.	Sensor fuses for chambers 1 and 2 replaced by AR, 14/08 c. 15:00, plant restarted. Sensor fuses for rivers 1 and 3 replaced by NT, 19/08 c. 14:00. Sensor fuse for river 2 replaced by AR, 22/08 c. 12:00.

### 3.3 Head loss

Target head loss at full power	Current head loss at full power	Status
14.5m	13.75m	Stable. 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	42	85	Generator winding 1	71	145
Generator NDE bearing 1	47	85	Generator winding 2	68	145
Generator NDE bearing 2	51	85	Generator winding 3	72	145
Turbine room	27	30	Power cabinet (RG1)	33	42

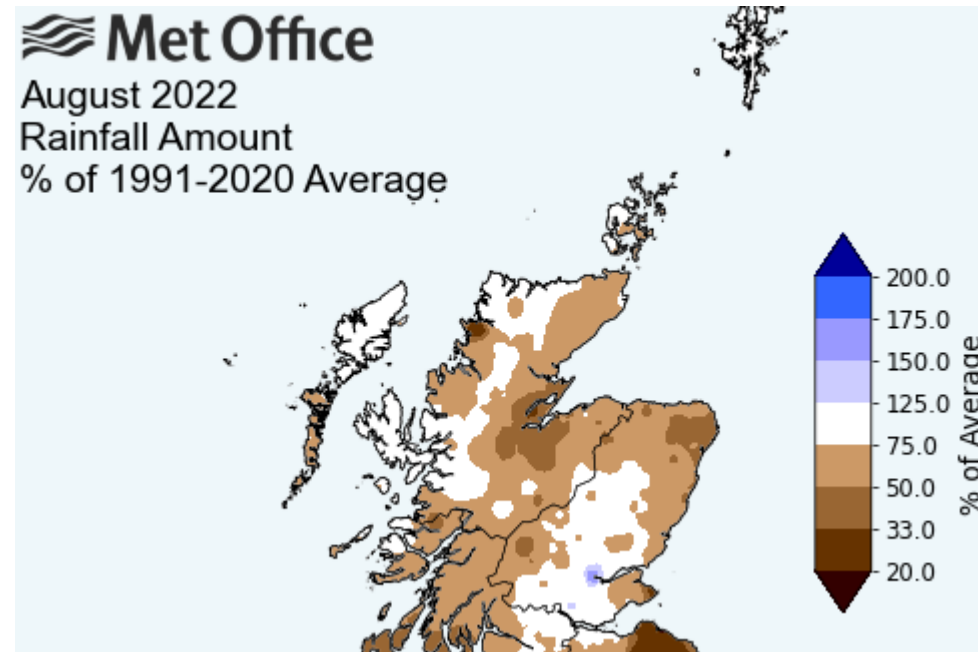
### 3.5 Vibration

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	0.40	3.0	Generator NDE	1.16	3.0

### 3.6 Recommended and ongoing actions

Action	Responsibility	Status
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	GHC continuing to liaise with SSE. SSE's protection engineer now engaged. GHC to follow up.
Service to be arranged	GHC/CINK	CINK service completed on 01/09/2022. Transformer oil testing due in October. Electrical checks (non-PAT) to be arranged. LOLER checks to be arranged.
PAT testing	MorVolts	To be arranged
Fire extinguisher testing	MorVolts	To be arranged
Caretaker training (Douglas Taylor)	GHC/MorVolts	We understand a new caretaker has been appointed and await instruction from MorVolts in relation to training/meeting.
Order replacement level sensors	MorVolts	Link to replacement sensors sent to AR.
Paint repairs required to manifold pipe	DAM	Complete
Investigate meter reading errors and discrepancies in export billing	GHC	JH to follow up with Engie.
Chase SSE for details of planned outage in 2024	GHC	SSE responded that no further details yet, GHC to chase periodically.

## 4 Rainfall



Rainfall this month (rain gauge), mm	108
Western Scotland rainfall in month with respect to 1991-2020 long term average	65%

## 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								1,545,055
Average generation since commissioning	247,605	424,386	286,501	165,261	174,610	356,893	652,190	676,213	512,649	555,764	647,905	240,688	1,298,362
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	1,260,434
Actual relative to forecast	67.0%	187.1%	151.9%	168.6%	91.8%								122.6%
Rainfall relative to 1991-2020 average	77%	126%	104%	74%	65%								89%
Calculated generation kWh	253,540	432,296	294,437	330,341	257,587								1,568,202
Variance to calculated generation kWh	-5,935	-7,910	-7,936	-1,283	-82	-	-	-	-	-	-	-	-23,147
Variance to calculated generation %	-2.3%	-1.8%	-2.7%	-0.4%	-0.0%								-1.5%
Approximate revenue	£28,994	£50,244	£33,677	£38,789	£30,177	-£816	-£816	-£816	-£816	-£816	-£816	-£816	£176,167
Capacity factor (monthly)	20.5%	39.0%	23.8%	28.2%	21.4%								26.6%
Industry wide RoR capacity factor	19.4%	34.6%	18.3%	15.5%									22.0%

