



Barr River hydro scheme

Monthly report – September 2022

1 Summary

September was fairly dry with the exception of some heavy rain during the first week and a couple of days towards the end of the month. In general the plant responded well and availability was good. There was another breaker trip related to a grid outage at the start of the month, unfortunately this coincided with the SCADA crashing so it was not identified as soon as it could have been. Fortunately, the rivers were not full at the time so lost generation was not as bad as it could have been.

2 Monthly generation & revenue

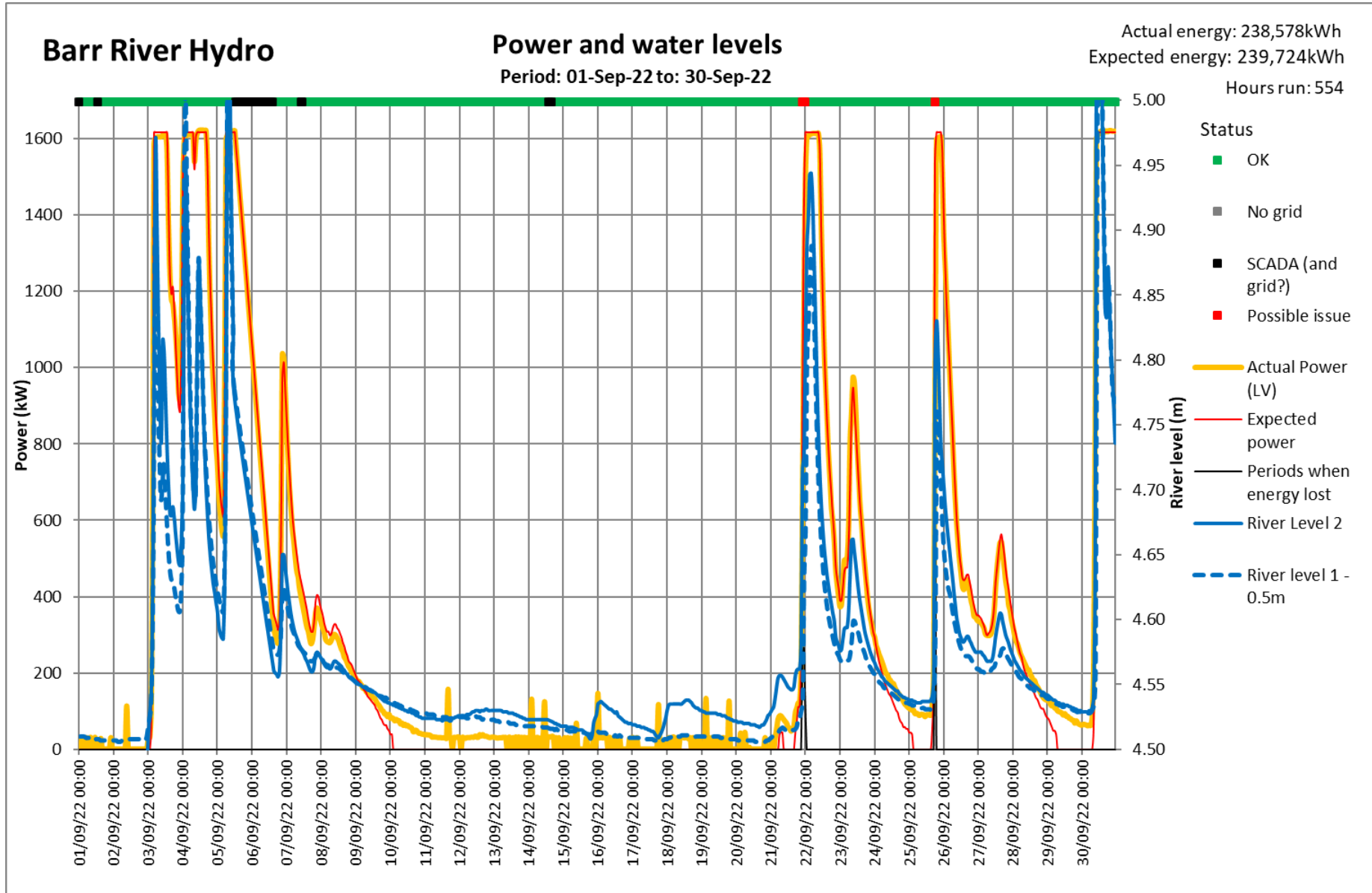
Parameter	Value
Actual generation (FIT meter), kWh	238,578
Average generation in month, kWh	297,736
Forecast generation in month (P50), kWh	387,431
Actual relative to forecast	61.6%
Rainfall relative to 1991-2020 average by month	93%
Calculated generation ¹ kWh	239,724
Actual relative to calculated generation, kWh	-1,146
Actual relative to calculated generation, %	-0.5%
Approximate revenue in month ²	£27,894

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/GDUoS charges.

Export meter	Value
Export, kWh	241,290
Variance to generation, kWh	2,712
Variance to generation, %	1.1%

3 System reporting



3.1 Scheme anomalies to calculated generation

Date/time	Details	Action required
05/09/2022	SCADA crashed at 13:00.	SCADA restarted by NT on 06/09/2022
06/09/2022	Grid trip, generator breaker tripped at 04:00.	Breaker reset by NT on 06/09/2022 at 14:02
21/09/2022 25/09/2022	River 2 rose much faster than river 1, some spilling at intake 2.	None

3.2 Other system events

Date/time	Details	Action required
01/09/2022	CINK on site for service. Chamber control changed to chamber 1.	None
01/09/2022 07/09/2022 14/09/2022	Small gaps in log file data due to inconsistent logging interval, no evidence of loss of performance.	None

3.3 Head loss

Target head loss at full power	Current head loss at full power	Status
14.5m	13.95m	Slight increase. Within target. Limited data points.

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	39	85	Generator winding 1	68	145
Generator NDE bearing 1	45	85	Generator winding 2	65	145
Generator NDE bearing 2	50	85	Generator winding 3	69	145
Turbine room	25	30	Power cabinet (RG1)	31	42

3.5 Vibration

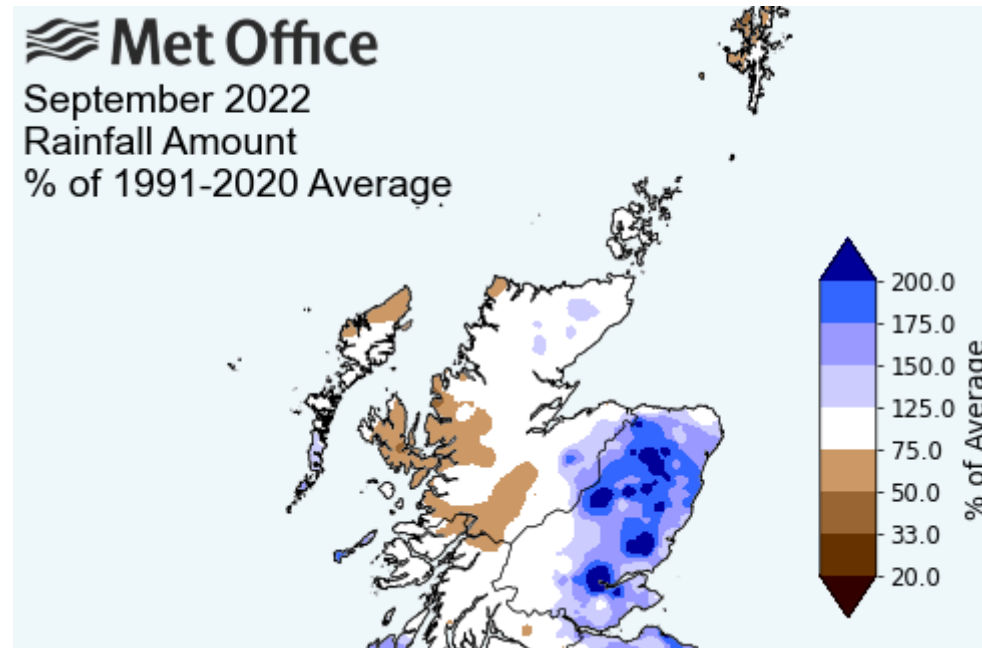
Parameter	Vibration at or near full power, mm/s	Alert level, mm/s	Parameter	Vibration at or near full power, mm/s	Alert level, mm/s
Generator DE	0.43	3.0	Generator NDE	1.15	3.0

3.6 Recommended and ongoing actions

Action	Responsibility	Status
Monitor for export readings in excess of generation readings.	GHC	Export energy exceeded FIT energy in August and September 2022. Export energy never exceeds TIC, therefore this should not pose a problem with Ofgem. Cause assumed to be meter measurement accuracy. Propose to close issue unless MorVolts would like to discuss.
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. Dialogue ongoing with SSE's protection engineer and Charlie Robb.
Service to be arranged	GHC	Transformer oil testing due in October. Electrical checks (non-PAT) to be arranged, quotation received from Enerveo (formerly SSE Contracting), negotiation underway. LOLER checks to be arranged (quotation requested).
PAT testing	MorVolts	To be arranged
Fire extinguisher testing	MorVolts	To be arranged
Caretaker training (Douglas Taylor)	GHC/MorVolts	We understand that Douglas 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.

Investigate meter reading errors and discrepancies in export billing	GHC	JH followed up with Engie. Synthesized data has been sent for gaps in February and June 2022. Engie expect this to be accepted but have not yet confirmed. Engie are chasing the data collector for an explanation of the source of the problem.
Chase SSE for details of planned outage in 2024	GHC	SSE have provided further details, JH has forwarded to NT and AR. RH will follow up with SSEN at meeting in January.
Workaround for SCADA failures	GHC	We have agreed arrangements with CINK for access to the control system HMI. This allows the plant operation to be checked even if the SCADA or TeamViewer is not running. JH to confirm satisfactory operation and share login instruction with MorVolts.

4 Rainfall



Rainfall this month (rain gauge), mm	174
Western Scotland rainfall in month with respect to 1991-2020 long term average	93%

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							1,783,633
Average generation since commissioning	247,605	424,386	286,501	165,261	174,610	297,736	652,190	676,213	512,649	555,764	647,905	240,688	1,596,098
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	1,647,865
Actual relative to forecast	67.0%	187.1%	151.9%	168.6%	91.8%	61.6%							108.2%
Rainfall relative to 1991-2020 average	77%	126%	104%	74%	65%	93%							90%
Calculated generation kWh	253,540	432,296	294,437	330,341	257,587	239,724							1,807,926
Variance to calculated generation kWh	-5,935	-7,910	-7,936	-1,283	-82	-1,146	-	-	-	-	-	-	-24,293
Variance to calculated generation %	-2.3%	-1.8%	-2.7%	-0.4%	-0.0%	-0.5%							-1.3%
Approximate revenue	£28,994	£50,244	£33,677	£38,789	£30,177	£27,894	-£821	-£821	-£821	-£821	-£821	-£821	£204,828
Capacity factor (monthly)	20.5%	39.0%	23.8%	28.2%	21.4%	20.5%							25.0%
Industry wide RoR capacity factor	19.4%	34.6%	18.3%	15.5%									22.0%

