



# Barr River hydro scheme

## Monthly report – October 2022

### 1 Summary

October was relatively wet and the plant has responded well. There was another grid trip which required the breaker to be reset manually. Progress has been made on gathering data on this problem and SSE support the installation of some monitoring equipment (by them) to investigate further. The servicing is complete, pending a response from MorVolts on the outstanding actions required (refer to email from John on 2/11/22).

### 2 Monthly generation & revenue

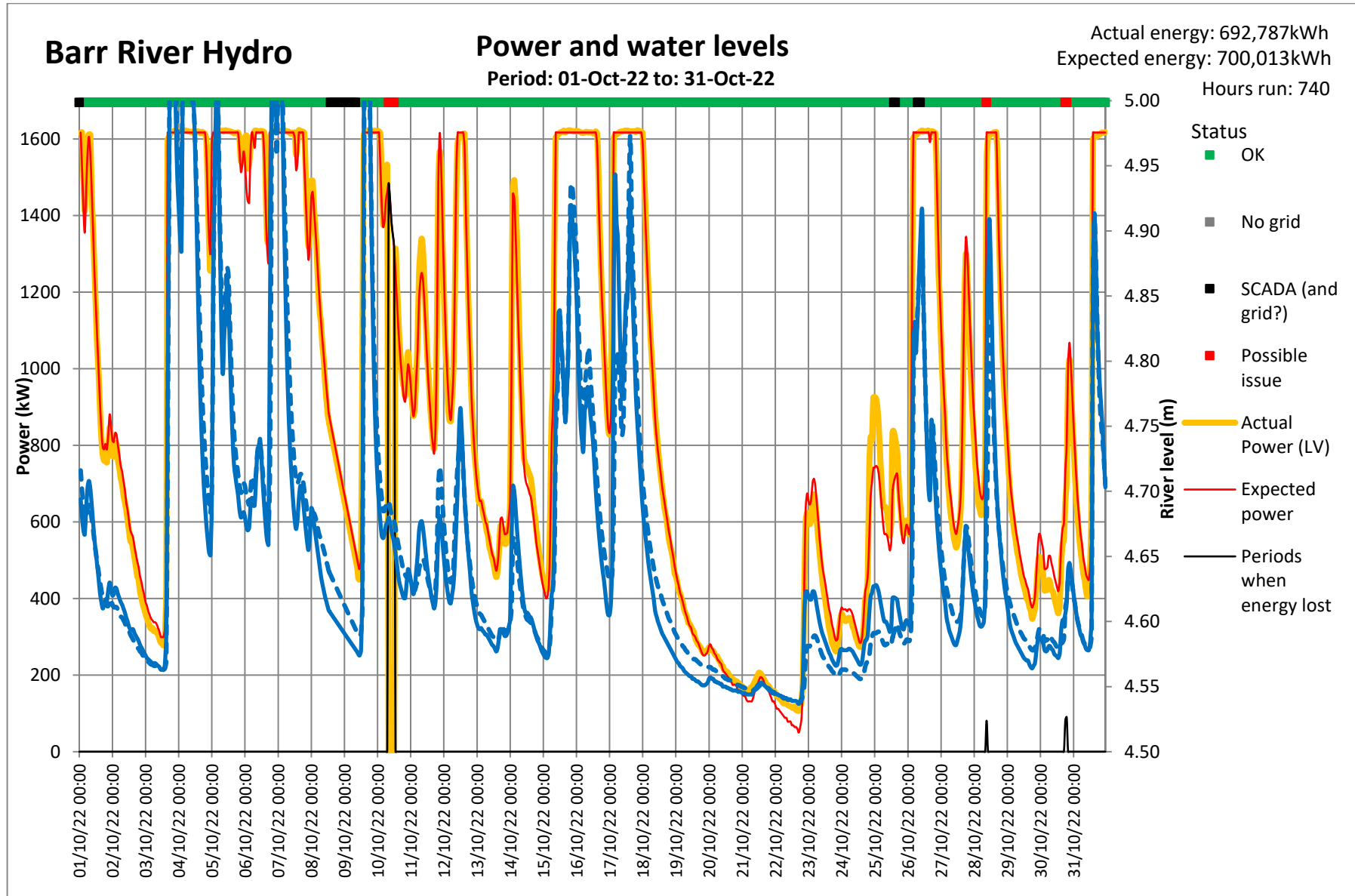
Parameter	Value
Actual generation (FIT meter), kWh	692,787
Average generation in month, kWh	672,489
Forecast generation in month (P50), kWh	582,631
Actual relative to forecast	118.9%
Rainfall relative to 1991-2020 average by month	134%
Calculated generation <sup>1</sup> kWh	700,013
Actual relative to calculated generation, kWh	-7,226
Actual relative to calculated generation, %	-1.0%
Approximate revenue in month <sup>2</sup>	£108,061

<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 reported export and estimated GDUoS charges.

Export meter	Value
Export, kWh	675,269
Variance to generation, kWh	-17,518
Variance to generation, %	-2.5%

### 3 System reporting



### 3.1 Scheme anomalies to calculated generation

Date/time	Details	Action required
10/10/2022	Grid trip, generator breaker tripped at 07:21. Remote diagnosis hampered by Teamviewer licence issue.	GHC logged into HMI directly. Douglas visited site at 12:30 and under instruction reset the breaker. GHC cleared the alarms and the machine restarted.
28/10/2022	River 2 rose faster than river 1, some spilling at intake 2.	None
30/10/2022	River 1 much higher than river 2, power prediction algorithm confused, no loss of generation.	None

### 3.2 Other system events

Date/time	Details	Action required
08/10/2022	SCADA crashed at 13:34, restarted at 08:37 the next day	None
13, 16, 20, 22/10/2022	Two periods for estimated data in HH export reporting all occurring 00:00-01:00	Await updated readings from EDF, usually received within one month.
25/10/2022 26/10/2022	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	13.72m	Slight decrease. 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	39	85	Generator winding 1	67	145
Generator NDE bearing 1	44	85	Generator winding 2	65	145
Generator NDE bearing 2	48	85	Generator winding 3	69	145
Turbine room	23	30	Power cabinet (RG1)	31	42

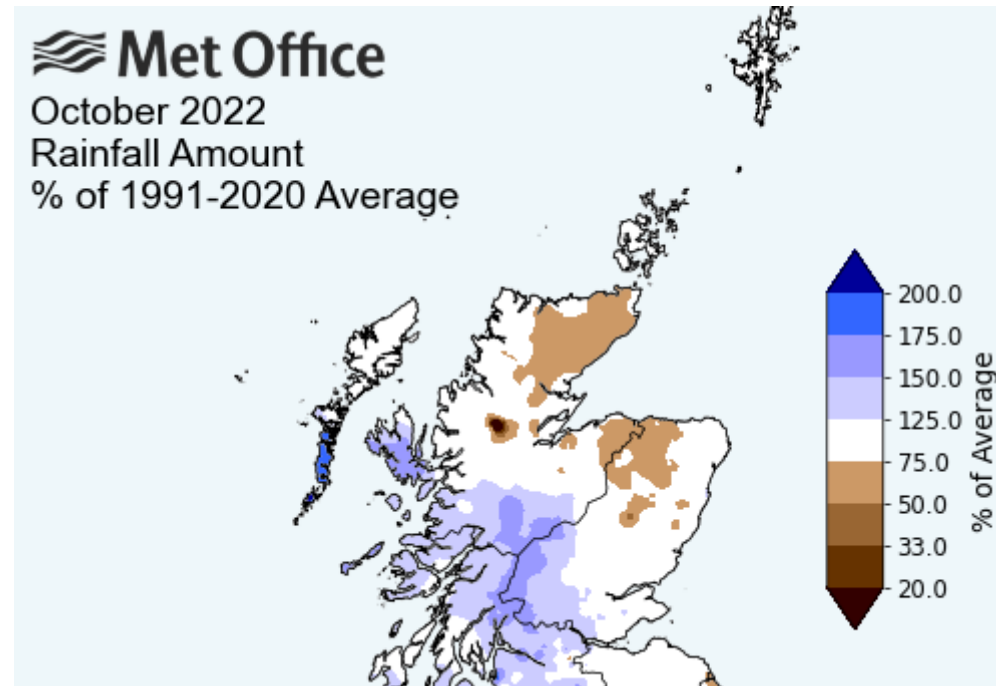
### 3.5 Vibration

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	0.42	3.0	Generator NDE	1.08	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	GHC continuing to liaise with SSE. SSE have agreed and are due to fit monitoring equipment imminently. Data gathering on trips has been improved and MorVolts are now recording reports from the breaker when it is reset.
Services to be arranged	MorVolts (refer to email from John on 2/11/22)	Transformer oil testing completed and no problems noted. PAT testing complete. Electrical checks (non-PAT) to be arranged, quotation received from Enerveo (formerly SSE Contracting), awaiting MorVolts instruction. LOLER checks to be arranged, quotation forward to MorVolts, response awaited. Proposal for comms equipment servicing still awaited from Hydrocomm, John to chase.
Fire extinguisher testing	MorVolts	To be arranged
Caretaker training (Douglas Taylor)	GHC/MorVolts	Training to be undertaken on site on 8/12/22.
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	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. Nothing heard from Engie for weeks. JH to chase.
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	Direct HMI login instructions sent to MorVolts. Alva have applied another software patch and hope that this has resolved the issue.

## 4 Rainfall



Rainfall this month (rain gauge), mm	344
Western Scotland rainfall in month with respect to 1991-2020 long term average	134%

## 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						2,476,420
Average generation since commissioning	247,605	424,386	286,501	165,261	174,610	297,736	672,489	676,213	512,649	555,764	647,905	240,688	2,268,586
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	2,230,496
Actual relative to forecast	67.0%	187.1%	151.9%	168.6%	91.8%	61.6%	118.9%						111.0%
Rainfall relative to 1991-2020 average	77%	126%	104%	74%	65%	93%	134%						96%
Calculated generation kWh	253,540	432,296	294,437	330,341	257,587	239,724	700,013						2,507,939
Variance to calculated generation kWh	-5,935	-7,910	-7,936	-1,283	-82	-1,146	-7,226	-	-	-	-	-	-31,519
Variance to calculated generation %	-2.3%	-1.8%	-2.7%	-0.4%	-0.0%	-0.5%	-1.0%						-1.3%
Approximate revenue <sup>1</sup>	£28,994	£50,244	£33,677	£38,789	£30,177	£27,894	£108,061	-£821	-£821	-£821	-£821	-£821	£308,988
Capacity factor (monthly)	20.5%	39.0%	23.8%	28.2%	21.4%	20.5%	57.5%						29.7%
Industry wide RoR capacity factor	19.4%	34.6%	18.3%	15.5%	15.5%	11.9%	55.8%						24.4%

<sup>1</sup>Export element of revenue updated to reflect actual export and rate.

