



# Barr River hydro scheme

## Monthly report – October 2021

### 1 Summary

A month of heavy rain and grid problems. The performance of the scheme has improved through the month due to optimisation of the target water levels, SCADA improvements by CINK and improved responses to issues requiring site attendance. The power was constrained by SSE early in the month, initially to 0kW and then to 1100kW. This has reduced the generation by 139MWh and revenue by approximately £17k.

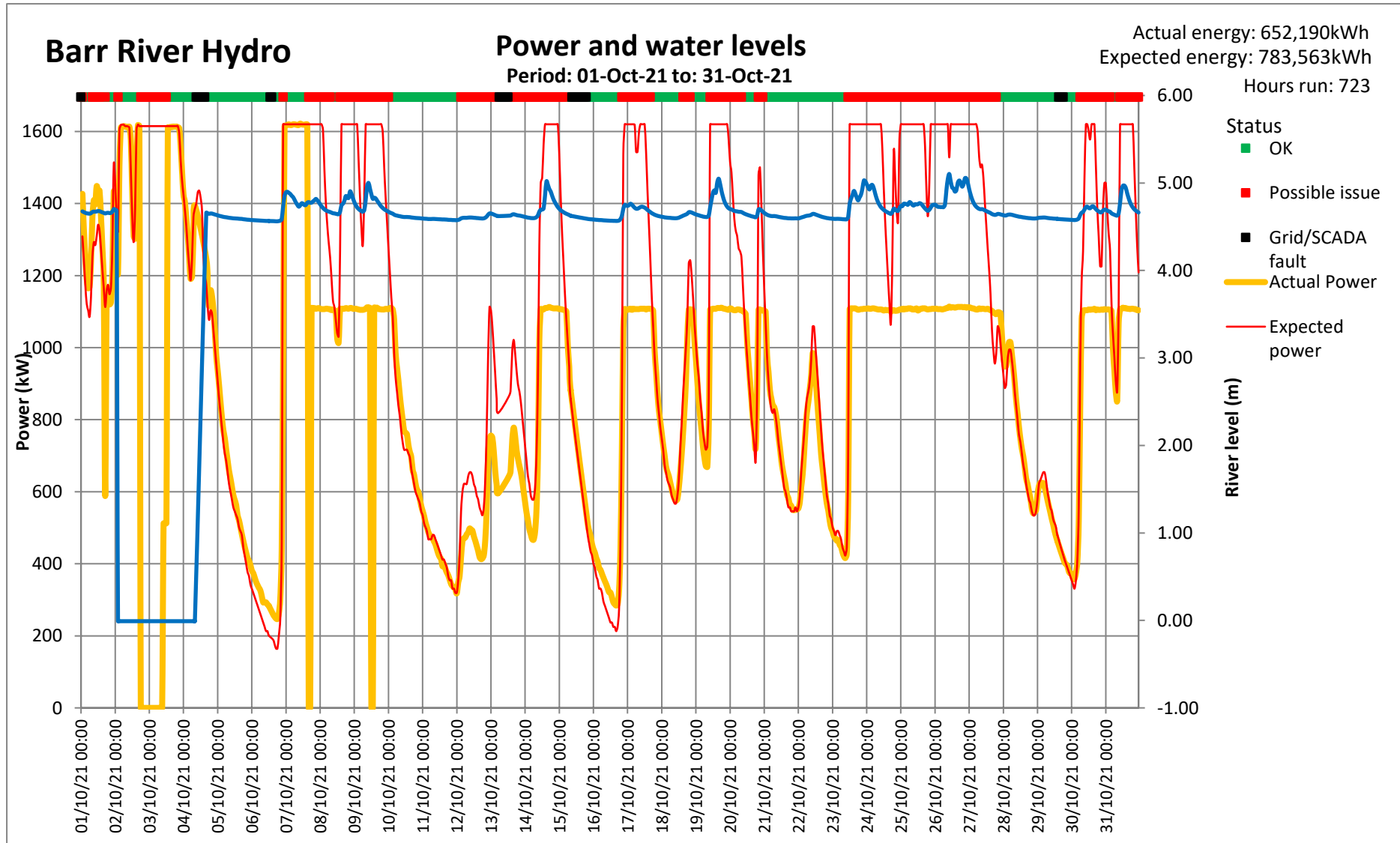
### 2 Monthly generation & revenue

Parameter	Value
Actual generation (FIT meter), kWh	652,190
Average generation in month, kWh	652,190
Forecast generation in month (P50), kWh	584,000
Actual relative to forecast	111.7%
Rainfall relative to 1981-2010 average by month	135.0%
Calculated generation <sup>1</sup> kWh	783,563
Actual relative to calculated generation, kWh	- 131,373
Actual relative to calculated generation, %	-16.8%
Approximate revenue in month	£ 80,050

<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.

Export meter	Value
Export, kWh	644,168
Variance to generation, kWh	8,022
Variance to generation, %	-1.2%

### 3 System reporting



### 3.1 Scheme anomalies to calculated generation

Date/time	Details	Action required
1/10/21	Power higher than expected.	None
2/10/21 – 4/10/21	Intake 2 sensors failed.	Control changed to intake 1. Fuses replaced.
2/10/21 – 3/10/21	Constrained to 0kW by SSE. Actual loss = plant offline from 2/10/21 17:20 to 3/10/21 09:40.	None
4/10/21	Chamber 2 level sensor fuse removed by mistake.	Replaced, plant restarted.
6/10/21	Chamber 2 spilling for 20 minutes as a result of river rising faster at intake 2 than intake 1.	Chamber 1 target reduced by 100mm on 6/10/21.
7/10/21 – 31/10/21	Site constrained to 0kW by SSE, then to 1100kW.	None
9/10/21	Generator breaker tripped.	Reset by Nick.
12/10/21 – 14/10/21	Power less than expected, due to more water available at intake 2 than intake 1.	Check chamber 2 sensor calibration to confirm spill level.
13/10/21	SCADA crashed at 06:00	SCADA restarted by Nick at 12:40.
15/10/21	SCADA crashed at 08:50	SCADA restarted by Nick at 19:50.
18/10/21	Power less than expected, due to more water available at intake 2 than intake 1.	None (no spilling).
27/10/21	Power higher than expected.	None
29/10/21	SCADA crashed at 14:45	SCADA restarted by Nick at 18:45.

### 3.2 Other system events

Date/time	Details	Action required
5/10/21	Power factor changed to 0.97 lagging to reduce HV voltage.	None
28/10/21	Flowmeter connected.	Calibrate output to SCADA.

### 3.3 Head loss

Target head loss at full power	Current head loss at full power	Status
14.5m	11.99m	Better than specified (as expected for a new pipeline).

### 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	32	85	Generator winding 1	58	145
Generator NDE bearing 1	34	85	Generator winding 2	56	145
Generator NDE bearing 2	38	85	Generator winding 3	60	145
Turbine room	14	30	Power cabinet (RG1)	30	42

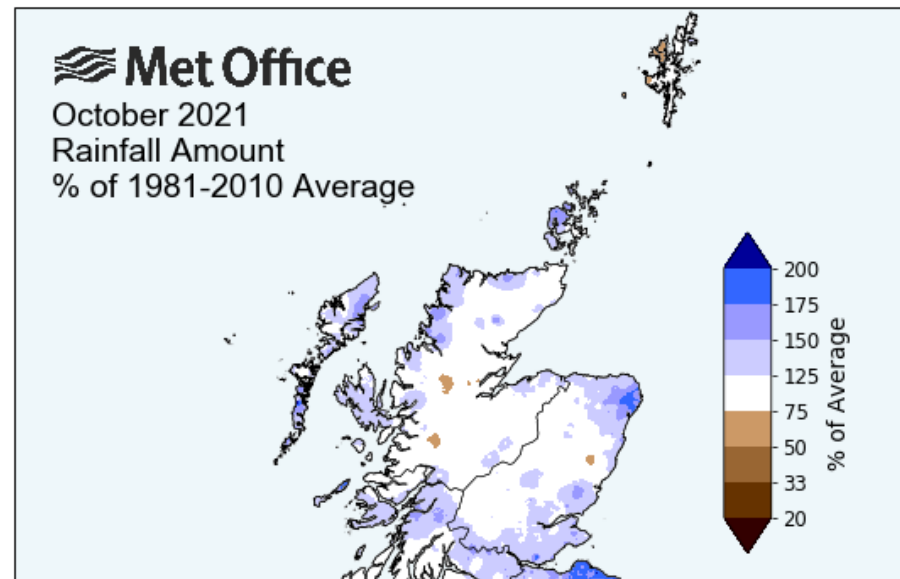
## 4 Recommended and ongoing actions

Action	Responsibility	Status
Commissioning/testing to be completed when sufficient water available	CINK	Ongoing
Check sufficient stock of spare 50mA fuses for level sensors	MorVolts	Ongoing
Investigate possible causes of fuse failures on intake 2	GHC	SSE Contracting to check earthing/bonding of signal cable on 4-5/11/21.

Fuses to be labelled clearly in X91 (signal cable junction box in powerhouse)	MorVolts	Ongoing
Check chamber 2 level sensor calibration to confirm spill level	GHC	Sensor calibration against gauge board checked on site on 28/10/21. Gauge board/spill level calibration to be checked when as built data available.

## 5 Rainfall

Rainfall this month (rain gauge), mm	330
Western Scotland rainfall in month with respect to 1981-2010 long term average	135%



## 6 Scheme annual performance summary

2021	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to date
Actual generation kWh							1,463	91,714	356,893	652,190			1,102,260
Average generation since commissioning							1,463	91,714	356,893	652,190			1,102,260
Forecast generation (P50)	783,000	655,000	592,000	318,000	186,000	176,000	174,000	237,000	358,000	584,000	634,000	659,000	1,353,000
Variance to forecast							0.8%	38.7%	99.7%	111.7%			81.5%
Rainfall relative to 1981-2010 average by month							37.0%	69.0%	79.0%	135.0%			80.0%
Calculated generation kWh								91,458	361,406	783,563			1,236,427
Variance to calculated generation kWh	-	-	-	-	-	0	0	256	-4,513	-131,373	-	-	-135,630
Variance to calculated generation %						+0.0%	+0.0%	+0.3%	-1.2%	-16.8%			-11.0%
Approximate revenue	£-	£-	£-	£-	£-	£-	£186	£12,546	£59,530	£80,050	£-	£-	£152,312
Capacity factor (monthly)							0.1%	7.6%	30.6%	54.1%			23.1%
Industry wide RoR capacity factor	30.8%	39.3%	45.0%	14.6%	20.0%	6.5%	5.6%	15.2%					22.1%

