



# Barr River hydro scheme

## Monthly report – September 2024

### 1 Summary

A poor month due to very low rainfall. No significant operational issues.

### 2 Monthly generation & revenue

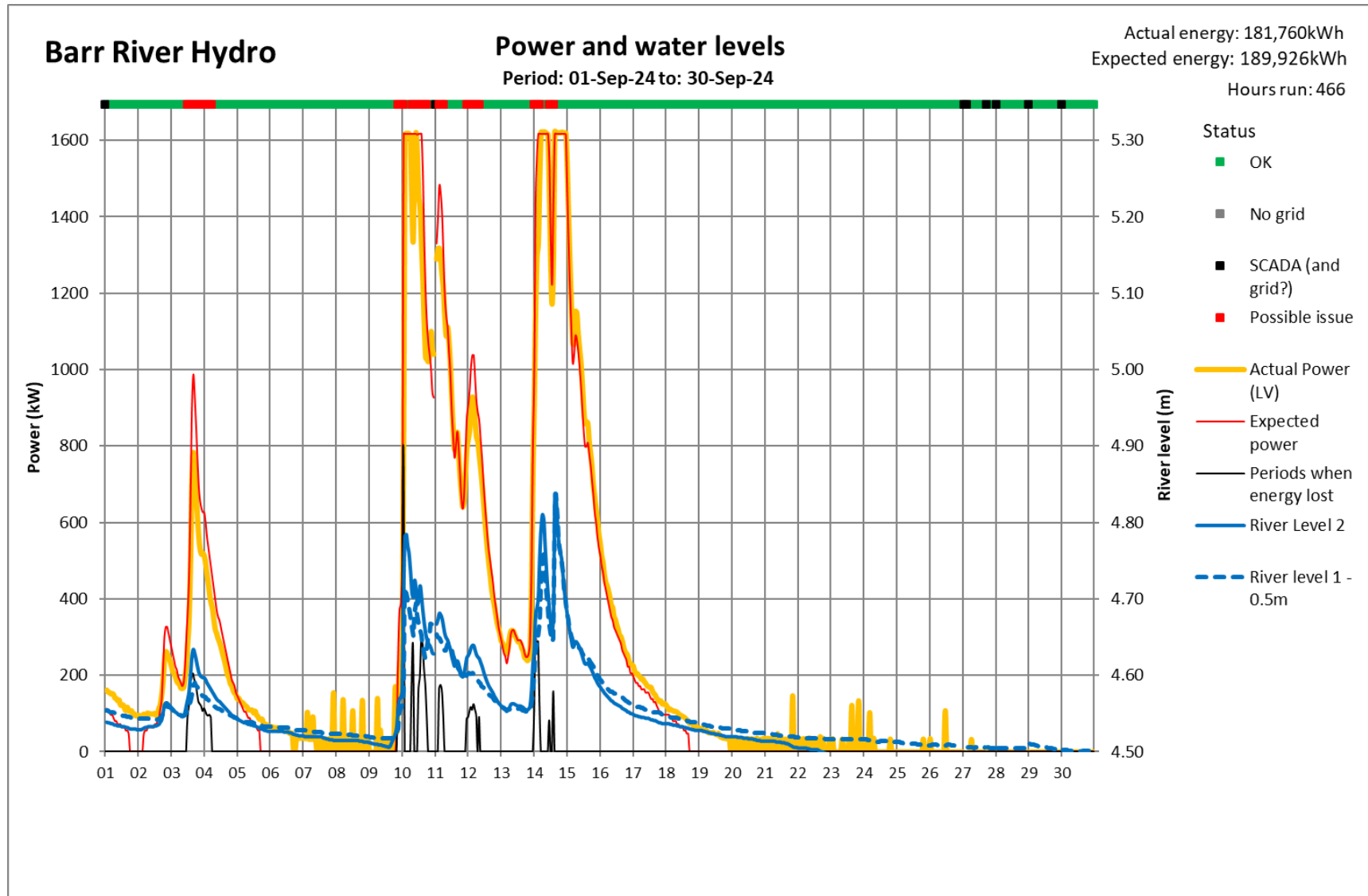
| Parameter                                       | Value   |
|-------------------------------------------------|---------|
| Actual generation (FIT meter), kWh              | 181,760 |
| Average generation in month, kWh                | 342,342 |
| Forecast generation in month (P50), kWh         | 387,431 |
| Actual relative to forecast                     | 46.9%   |
| Rainfall relative to 1991-2020 average by month | 49%     |
| Calculated generation <sup>1</sup> kWh          | 189,926 |
| Actual relative to calculated generation, kWh   | -8,166  |
| Actual relative to calculated generation, %     | -4.3%   |
| Approximate revenue in month <sup>2</sup>       | £42,525 |

<sup>1</sup> Calculated generation is based on river level data and seeks to establish the expected generation with no performance issues.

<sup>2</sup> Export revenue based on reported export and estimated GDUoS charges.

| Export meter                | Value   |
|-----------------------------|---------|
| Export, kWh                 | 179,358 |
| Variance to generation, kWh | -2,402  |
| Variance to generation, %   | -1.3%   |

### 3 System reporting



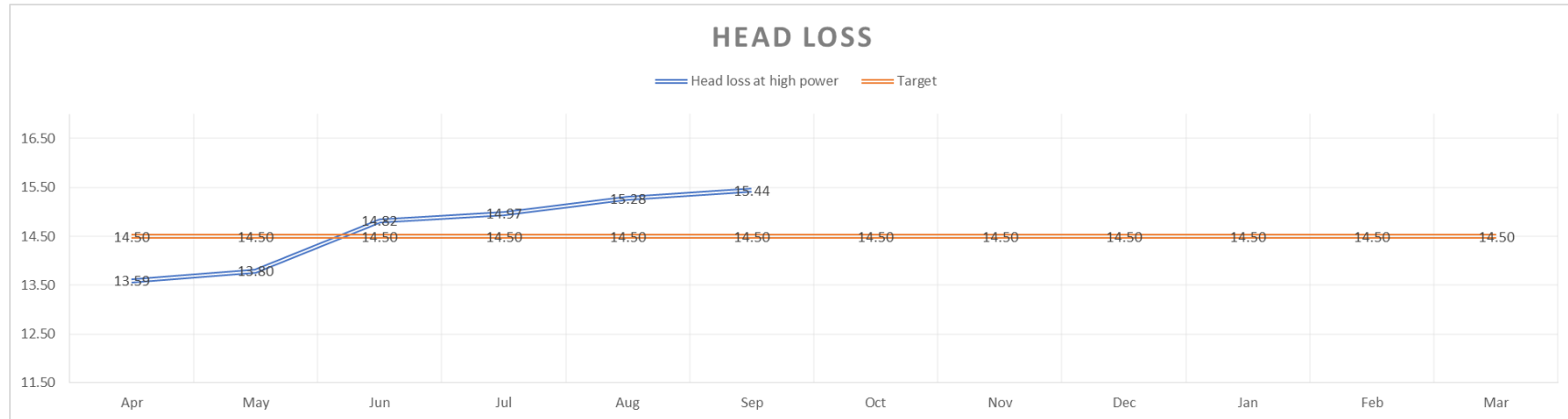
### 3.1 Scheme anomalies to calculated generation

| Date/time | Details          | Action required |
|-----------|------------------|-----------------|
|           | None significant |                 |

### 3.2 Other system events

| Date/time        | Details                                                                                                                                                                                                                                            | Action required                                                                            |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| 9/9/2027         | F155 and F156 alert emails received. These are G99 grid trips. The machine restarted itself. It is possible that these trips could have caused a generator beaker trip if we had not increased the sensitivity of the G99 relay earlier this year. | None.                                                                                      |
| 18/9/2024        | Power curve control model and updated to include river level data input from 1 & 2                                                                                                                                                                 |                                                                                            |
| 25/9/2024        | TG1: F156 Network protection (F1). G99 trip alarm. Turbine was off.                                                                                                                                                                                | GHC informed client and to ensure turbine auto restarts when level reach start level.      |
| 29/9/2024 9.30pm | Smoke alarm triggered whilst the turbine was off. None of the powerhouse temperature sensors indicated there was an issue.                                                                                                                         | GHC asked Douglas to inspect the powerhouse for smells etc. before restarting the turbine. |

**3.3 Head loss** – head loss increasing. Limited data points in September. GHC have asked DA MacDonald for a price for this. They have quoted the same price as last time. We have also approached Chris Henshaw and are awaiting his price.



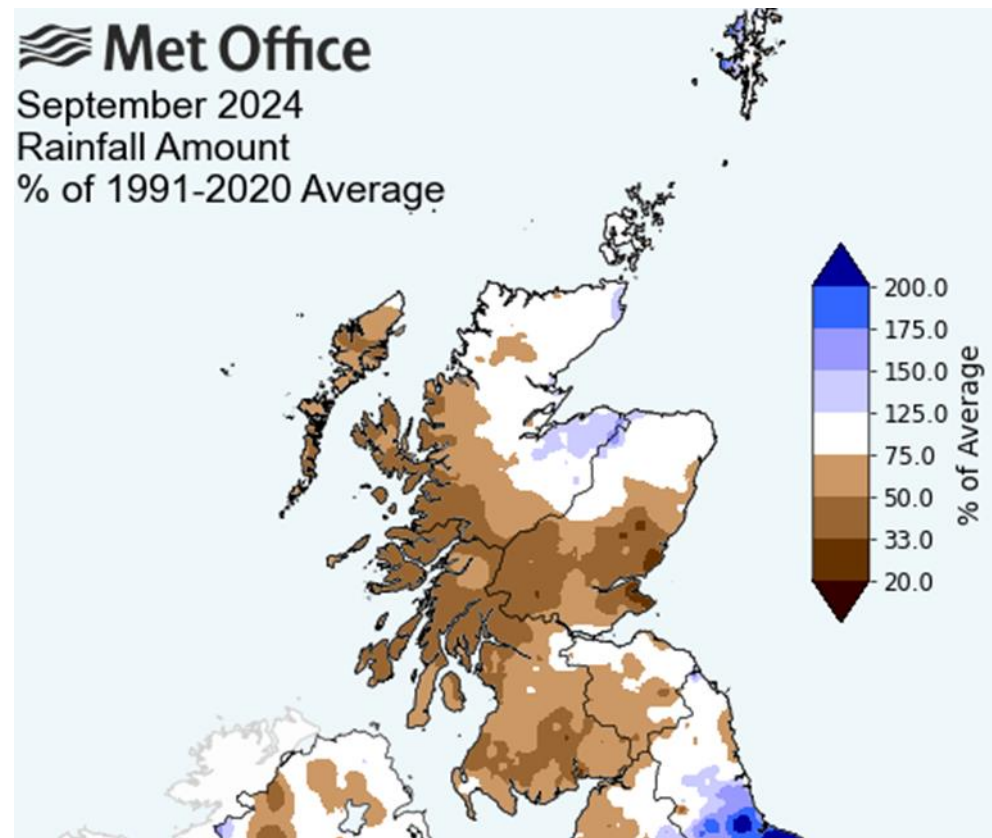
**3.4 Temperatures** – limited data points

| 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    | 41                                    | 85              | Generator winding 1 | 68                                    | 145             |
| Generator NDE bearing 1 | 44                                    | 85              | Generator winding 2 | 65                                    | 145             |
| Generator NDE bearing 2 | 47                                    | 85              | Generator winding 3 | 69                                    | 145             |
| Turbine room            | 25                                    | 30              | Power cabinet (RG1) | 32                                    | 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 | 0.45                                  | 3.0               | Generator NDE | 1.23                                  | 3.0               |

## 4 Rainfall



|                                                                                |     |
|--------------------------------------------------------------------------------|-----|
| Rainfall this month (rain gauge), mm                                           | 60  |
| Western Scotland rainfall in month with respect to 1991-2020 long term average | 49% |

## 5 Scheme annual performance summary

| FY 2024/5                                       | Apr     | May     | Jun     | Jul     | Aug      | Sep     | Oct      | Nov      | Dec      | Jan      | Feb      | Mar     | Total      |
|-------------------------------------------------|---------|---------|---------|---------|----------|---------|----------|----------|----------|----------|----------|---------|------------|
| Actual generation kWh                           | 298,851 | 170,950 | 236,233 | 302,216 | 636,431  | 181,760 |          |          |          |          |          |         | 1,008,250  |
| Average generation since commissioning          | 244,074 | 240,920 | 198,801 | 351,584 | 308,927  | 342,342 | 593,249  | 597,546  | 467,890  | 563,949  | 559,368  | 279,361 | 1,035,377  |
| 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 | 979,833    |
| Actual relative to forecast                     | 80.9%   | 75.4%   | 125.3%  | 154.9%  | 226.8%   | 46.9%   |          |          |          |          |          |         | 102.9%     |
| Rainfall relative to 1991-2020 average by month | 174%    | 102%    | 81%     | 70%     | 201%     | 49%     |          |          |          |          |          |         | 107%       |
| Calculated generation kWh                       | 301,701 | 175,752 | 236,233 | 302,398 | 728,169  | 189,926 |          |          |          |          |          |         | 1,016,084  |
| Variance to calculated generation kWh           | -2,850  | -4,802  | Nil     | -182    | -91,738  | -8,166  | -        | -        | -        | -        | -        | -       | -7,834     |
| Variance to calculated generation %             | -0.9%   | -2.7%   | Nil     | -0.1%   | -12.6%   | -4.3%   |          |          |          |          |          |         | -0.8%      |
| Approximate revenue                             | £72,485 | £40,444 | £56,850 | £73,285 | £156,069 | £42,525 |          |          |          |          |          |         | £243,063   |
| Capacity factor (monthly)                       | 25.6%   | 14.2%   | 20.3%   | 25.1%   | 52.8%    | 15.6%   |          |          |          |          |          |         | 21.3%      |
| Industry wide RoR capacity factor               | 43.5%   | 11.4%   | 20.8%   | 16.5%   | 47.0%    |         |          |          |          |          |          |         | 23.5%      |
| FY 2023/4                                       | Apr     | May     | Jun     | Jul     | Aug      | Sep     | Oct      | Nov      | Dec      | Jan      | Feb      | Mar     | Total      |
| Actual generation kWh                           | 240,542 | 57,453  | 111,100 | 374,109 | 360,348  | 431,554 | 434,771  | 406,551  | 667,311  | 502,737  | 582,749  | 241,042 | 4,410,267  |
| Average generation since commissioning          | 247,605 | 424,386 | 286,501 | 165,261 | 174,610  | 297,736 | 672,489  | 693,043  | 368,179  | 594,556  | 547,677  | 298,520 | 4,770,561  |
| 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 | 5,330,433  |
| Actual relative to forecast                     | 65.1%   | 25.3%   | 58.9%   | 191.7%  | 128.4%   | 111.4%  | 74.6%    | 65.8%    | 107.6%   | 72.2%    | 105.1%   | 39.4%   | 82.7%      |
| Rainfall relative to 1991-2020 average          | 83%     | 45%     | 81%     | 152%    | 73%      | 145%    | 83%      | 74%      | 137%     | 81%      | 106%     | 92%     | 96%        |
| Calculated generation kWh                       | 243,307 | 59,162  | 112,194 | 377,850 | 418,162  | 438,789 | 445,408  | 428,068  | 672,901  | 536,047  | 620,238  | 250,456 | 4,602,582  |
| Variance to calculated generation kWh           | -2,765  | -1,709  | -1,094  | -3,741  | -57,814  | -7,235  | -10,637  | -21,517  | -5,590   | -33,310  | -37,489  | -9,414  | -192,315   |
| Variance to calculated generation %             | -1.1%   | -2.9%   | -1.0%   | -1.0%   | -13.8%   | -1.6%   | -2.4%    | -5.0%    | -0.8%    | -6.2%    | -6.0%    | -3.8%   | -4.2%      |
| Approximate revenue                             | £18,747 | £7,087  | £14,675 | £52,099 | £50,104  | £60,181 | £148,850 | £137,974 | £227,701 | £170,888 | £205,490 | £81,339 | £1,182,212 |
| Capacity factor (monthly)                       | 20.6%   | 4.8%    | 9.5%    | 31.0%   | 29.9%    | 37.0%   | 36.1%    | 34.9%    | 55.4%    | 41.7%    | 53.5%    | 20.0%   | 31.2%      |
| Industry wide RoR capacity factor               | 20.7%   | 5.7%    | 6.0%    | 27.5%   | 25.0%    | 36.0%   | 40.0%    | 45.0%    | 46.0%    | 43.3%    | 59.8%    | 37.2%   | 32.7%      |

