Water Supply Network Integrated Energy Recovery to Replace Energy Wasting Pressure Regulation Valves for Improving Operational Efficiency and Reducing Operational Carbon Emissions

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Hydro Nation Scholars Programme

Introduction

- The water network loses an estimated 8.8GWh/year of potential hydrokinetic energy through using Pressure Reduction Valves to regulate pressure.

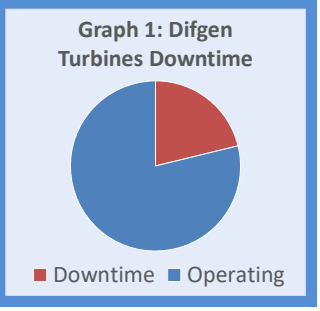
That could power 3250 UK homes [1]

Or drive an electric car 50,000,000km[2]

- This project is dedicated to harnessing that energy by replacing pressure reduction valves with turbines.

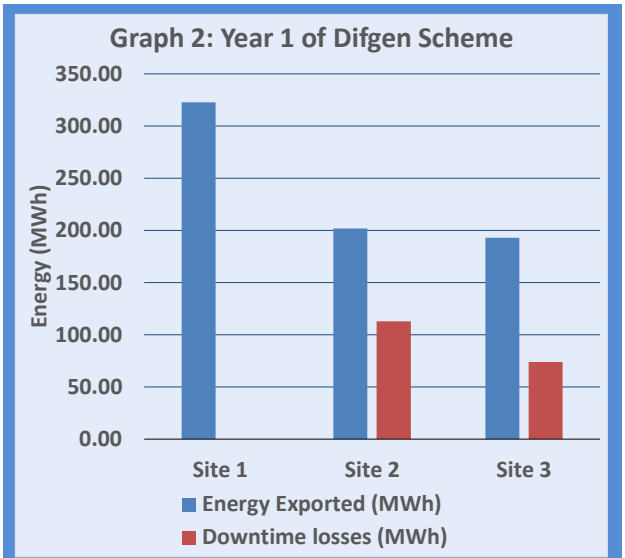
Existing technology

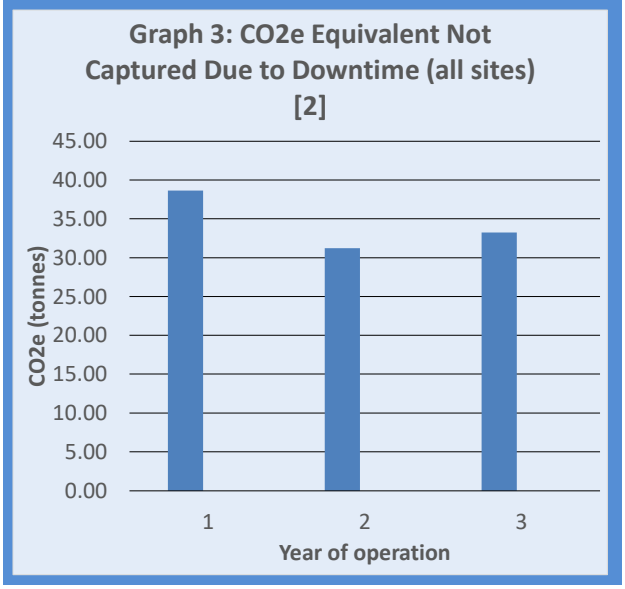
- Scottish Water currently have 3 sites which use Difgen turbine technology.
- These proved not as reliable as hoped.
- By prioritising robustness and reliability, energy recovery can be increased.
- To demonstrate the impact of this.



Methodology

- Collected generation data from the 3 sites.
- Calculated average daily generation over 3 1-year periods.
- Calculated average energy that wasn't captured due to downtime.
- Calculated equivalent CO2e that could have been saved had there been no down time.





References

[1] *Average gas and electricity usage* (no date) *Ofgem*. Available at: https://www.ofgem.gov.uk/information-consumers/energy-advice-households/average-gas-and-electricity-use-explained#:~:text=We%20estimate%20the%20typical%20household,of%20gas%20in%20a%20year. (Accessed: 07 March 2024).

[2] Model X (no date) Tesla. Available at: https://www.tesla.com/en_gb/modelx (Accessed: 07 March 2024).

[3] Department for Energy Security and Net Zero (2023) Greenhouse gas reporting: Conversion factors 2023, GOV.UK. Available at: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023 (Accessed: 07 March 2024).

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Scottish Water Horizons

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