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Reverse Osmosis Waste Water Recycling

By: Countess of Chester Hospital NHS Foundation Trust

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Positive outcome(s) of project:

Water saving: 1,460,000 litres / year

Savings per year:

£3,144 (Estimated)

CO2 savings per year:

116.48kg CO2e (Estimated)

Description:

The Chester Green Nephrology Local Representative has led the development of a business case to enable the haemodialysis unit to recycle its 'grey' reject water produced by the reverse osmosis plant, which provides the purified water for dialysate. The plant runs for 123 hours per week, producing between 8.7-14.2 litres litres waste water per minute, just under a quarter of the annual water consumption within the Trust. If the project is implemented, the water will be stored and used for a regeneration of the carbon filters within the treatment plant, number of toilets, a sluice area, and a laundry area located in the renal outpatients department.

The project has been inspired by a previous Green Nephrology case study which was presented at the British Renal Society conference in 2010. Following this, the Chester Green Nephrology Local Representative, Elizabeth

Critchley, proposed the introduction of waste water recycling to the carbon reduction team in Chester, who showed a keen interest. The calculations for water savings have been made in conjunction with a local water company, which has also given a quote for the works.

Other people who have been approached within the Trust include the Renal Unit Manager, the EBME manager (responsible for RO plant maintenance), and the Estates department. The business case has now been submitted to the Trust carbon reduction team, who are supportive and will present it to the Board.

The water company undertaking the future works will be responsible for fitting the water tank, piping and connections to the plant room, roof space, toilets, sluice and laundry area. This work will be performed overnight and on Sundays when the plant is not being used, to eliminate any risk to the water pressures during operational times as this could pose unnecessary risk to patients on dialysis.

Benefits to environmental sustainability

The forecasted water saving is 4,000 litres per day 1,460 cubic metres per annum. Daily saving usage:



Water Reused by Carbon Filters - 1 backwash/day = 900 litres/day

Water Reused by Softeners - 2 regenerations/3 days = 500 litres/day

Available water for washing machines and toilet flushing = 2,600 litres/day

This amount equates to an approximate reduction in carbon emissions of 0.11648 tonnes CO₂e per annum*.

Conversion factors used:

Water supply: 0.39 kgCO₂/m³ - figure supplied by Welsh Water the Trust current water supplier

Sewerage: 0.17 kgCO₂/m³ - figure supplied by the Environmental Agency

Financial benefits

The Trust will also make a financial saving of

Tap Water: £1370.79 per annum (£0.9389 per m³ of water)

Sewerage Services: £1773.17 per annum (£1.2145 per m³)

Total Annual saving = £3143.96

The Trust will be making a financial investment of £11,030, therefore the retrofit will have paid for itself within 3 years 6 months.

Partner:

Wychwood Water Systems Ltd

Status:

planned

Implementation costs:

£11,030

Barriers in project implementation:

Barriers have been encountered, which are inevitable in a project of this size. The sewerage company could not give the total carbon emissions for removing and treating 1 cubic metre of water therefore his calculation was taken from the Environmental Agency. The number of people and departments involved has been a challenge, since all areas that will be affected by the disruption, equipment and planning must be informed and consulted. The responsible person being on maternity leave has also contributed to delays in completion of the business case for consideration by the Trust board.

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[Green nephrology](#)

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