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Exemption applied: None

Review date for release N/A

Decarbonising our housing stock and providing affordable warmth for our tenants

Report summary:

We have been working with local business Remit Zero on a proposal to install their cylo product in ten council homes as a way of decarbonising council homes and providing tenants with affordable warmth. Cylo is an alternative technology to provide heating and hot water.

The proposed project will have a duration of 24 months and can commence on during the summer 2023.

The total project costs are circa. £687,392. If our funding bid is successful Innovate UK will cover up to 70% of the costs and will therefore fund £481,174. The remaining 30% £206,218 is the match funding required. Remit Zero can contribute to some of the match funding with reduced labour costs. This would require approximately £125,000 match contribution from EDDC to cover the costs of solar installation on the roofs and the associated works.

The deadline to submit the expression of interest was Wednesday the 18th of January and a further bid application needs to be submitted by 26th April. If successful we will be asked to sign a funding agreement (after the initial application is successful and then subsequently passing Innovate UK's due diligence procedure). This provides time to clarify the minutiae such as the selection process of the properties that will take part in the trial. We have been requested to be a collaboration partner as part of the application process.

If the funding application is unsuccessful I would like to continue discussions with Remit Zero to find a way of installing their product in a sample of our properties because it appears to offer a serious alternative to gas boilers and ground/air source heat pumps, and does not necessitate extensive building fabric upgrades.

We have seen cylo installed in a facility at the Exeter Science Park and Remit Zero have installations in MOD properties where testing has been completed.

I would propose funding the programme from our existing HRA budgets for heating upgrades.

Is the proposed decision in accordance with:

Budget Yes No

Policy Framework Yes No

Recommendation:

The Housing Review Board are requested to recommend to the Cabinet:

- (1) Support for the Innovate UK funding bid and our role as a collaboration partner;
- (2) Funding of the Council's contribution to the bid of £125,000;
- (3) Should the funding bid not be successful to authorise the Director of Housing, Health & Environment in liaison with the Portfolio Holder for Homes & Communities to identify an alternative project that can be implemented to install cylo in an initial pilot of ten council homes.

Reason for recommendation:

The project will advance our commitment to decarbonise the council's housing stock and provide tenants with affordable warmth.

Officer: John Golding Director Housing, Health & Environment.

Portfolio(s) (check which apply):

- Climate Action and Emergency Response
- Coast, Country and Environment
- Council and Corporate Co-ordination
- Democracy, Transparency and Communications
- Economy and Assets
- Finance
- Strategic Planning
- Sustainable Homes and Communities
- Tourism, Sports, Leisure and Culture

Equalities impact Low Impact

Climate change High Impact

Risk: Medium Risk; This is new technology with inherent risks which is why we are proposing to pilot and test installations.

Links to background information .

Link to [Council Plan](#)

Priorities (check which apply)

- Better homes and communities for all
 - A greener East Devon
 - A resilient economy
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1. Decarbonisation of our housing stock with cylo installations

- 1.1 For some months we have been in conversation with an innovative local business based on the Exeter Science Park. Remit Zero have a product that is new to the market and potentially revolutionary as it will be an alternative to boilers, air source and ground source heat pumps, providing homes with hot water and heating.
- 1.2 We have bid for government funding through Innovate UK to install the new product in ten Council homes as a pilot to test effectiveness and efficiency, customer acceptance and the installation process.
- 1.3 Remit Zero describe their technology as - using the principals of natural science to develop a portfolio of zero emission high performance products. The Company's first product, the cylo vessel, could change the way many families and businesses heat their homes and premises; a simple, innovative, affordable, and rapidly deployable heating solution, which will help reduce CO2 emissions rapidly, while maintaining the user's comfort and convenience.

- 1.4 This project will conduct consumer trials of cylo. Relying solely on water and electricity, the cylo vessel can replace a fossil fuel boiler, without compromise, providing the same familiar functional performance, convenience, and low cost of operation, but with absolutely zero emissions.
- 1.5 The cylo vessel is powered by electricity and is both a boiler and a source of hot water. The vessel stores thermal energy highly efficiently, harnessing electricity directly, either from renewables, such as solar PV, or from the grid ideally when it is in abundance and at its cheapest, utilising off-peak electricity tariffs, including emerging dynamic Demand Side Response (DSR) based tariffs.
- 1.6 Unlike other thermal batteries, cylo uses pressurised water as its working fluid, taking advantage of its high heat capacity and transfer qualities, effectively transporting heat through a co-current heat exchanger to provide both emission-free heating and hot water.
- 1.7 The cylo vessel is largely "solid state" and manufactured in stainless steel resulting in low-maintenance and long product life. The cylo vessel does not degrade with thermal cycling, this results in longer plant life and long-term use.
- 1.8 At full charge, each cylo vessel can store 68 kWh, enough to cater for the needs of most UK homes on a cold winter day regardless of a properties age or thermal efficiency. This storage capability, if aggregated, could play a meaningful role in grid balancing services by providing high volume long-duration storage with an extremely low environmental impact.

Physical Appearance & Performance Qualities



Energy in 12kW from grid; 3 kW from solar

Cylo® storage capacity 68 kWh

Output temperature – typically 55 to 85 C

Control Requirements

1. Charging; timeclock or DSR capable controller
2. Discharging; via timeclock/thermostat or WISER micro BEMS
3. Thermodynamic control; via micro-controller
4. Aggregation; grid balancing services

7. Net Zero Solutions through Applied Natural Science

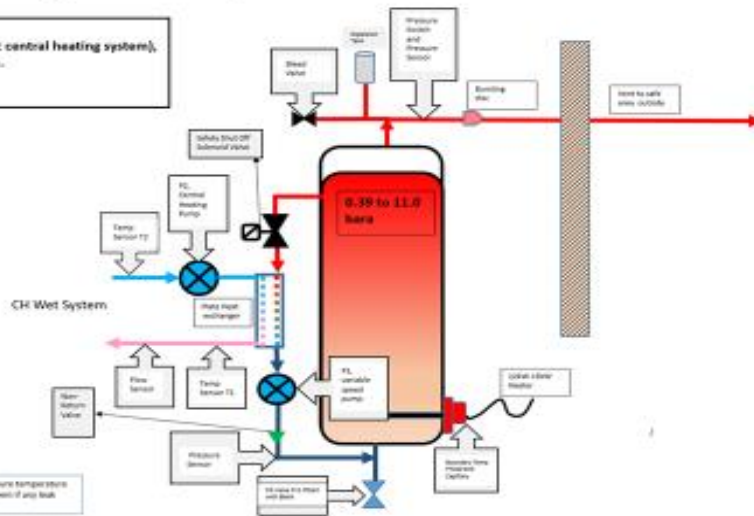
2. Scope and Project Summary.

- 2.1 Funding is requested to conduct consumer trials for Remit Zero(r)'s zero emission heating appliance cylo. These trials involve installing cylo into 10 domestic council-owned properties within East Devon. I am seeking £125,000 to part fund the installations.

- 2.2 As described above cylo is an innovative electrical boiler and thermal store which uses pressurised water as its working fluid to provide emission-free heating and hot water. cylo is zero emission at point of use. cylo's ability to store thermal energy enables a user to harness electricity from the grid during off-peak hours, when it is in abundance, at its cheapest, and most likely to derive from renewable sources. Cylo can utilise locally available renewables such as solar PV at all times of the day regardless of a household's electrical demand. cylo is designed to utilise surplus grid supplied electricity by responding to command signals from network operators as envisaged within PAS 1878:21 (Demand Side Response).
- 2.3 The exciting issue is that cylo addresses consumer need by reducing energy costs and carbon emissions. An additional benefit is that cylo facilitates the UK's net zero strategy through its ability, when aggregated, to improve grid balancing, by harnessing electricity during periods of oversupply.
- 2.4 Our intention is that the trials will couple the installation of cylo with solar on the roofs of selected properties. This project will aggregate and compare data on the charging and discharging of the cylo vessel, this coupled with user interaction surveys will provide feedback on user behaviour and acceptance criteria. The following will be monitored with data sent and stored securely:
- Electricity used to charge cylo, both quantity and timing.
 - Thermal output to the house from cylo.
 - All room temperatures for 24 hours per day.
 - Outside air temperature for 24 hours per day.
 - Application of a Remit Zero designed external heat flux sensor, this will identify effective heat loss from the building as it is affected by both temperature and wind speed variation. This will be monitored for 24 hours per day. This measurement will also inform regarding the condition and performance of any cavity or wall insulation.
- 2.5 The project aims to demonstrate cylo's benefits including its ability to reduce costs for those within fuel poverty, in a way that enables low-income households to play a meaningful role in tackling climate change. This project will enable Remit Zero(r) to build a strong business case justifying the mass, rapid commercialisation of cylo by illustrating its benefits. Following completion, this project will inform similar initiatives within both the public and private sector, within domestic and commercial premises.
- 2.6 An extract of the Innovate UK bid has been reproduced in **annex 1** providing more detail on the cylo product.

Engineering concept

Thermal Battery "Cylo".
Heat flux to secondary circuit, (wet central heating system),
controlled by variable speed pump.
Rev1- 05/07/2022



3. Next steps

- 3.1 I am hopeful that the bid for funding will be successful and we can implement the scheme as described. If we are not successful I would like to work up a Plan B.
- 3.2 The stated benefits of the technology, locally developed and manufactured, make this a very attractive proposition. We have been bidding for funding to install air source heat pumps as part of our drive to decarbonise our housing stock before cylo arrived on the scene. Moreover, an important consideration that is relevant to our cost of living concerns and poverty strategy is the ability to deliver low cost forms of space heating and hot water for tenants.
- 3.3 I would like the ability to negotiate with Remit Zero to ensure that we have a project that can be progressed accepting that this will likely cost us more than our contribution, but if the benefits are realised this would be a good investment. Assuming a successful pilot we could then look at how we scale up the installation process at an economic cost.

Financial implications:

The financial implications are considered within the body of the report.

Legal implications:

There are no legal implications.