**Rhydwen Drive – Denbighshire County Council – ORP 2.1**

54 properties in Rhyl had retrofit measures including EWI, PV and batteries following the completion of works in Meliden from ORP 1

**Background**

ORP 2.1 funding provided the opportunity to continue the work done in ORP 1, this included the same measures but in an area of high deprivation.  Rhydwen Drive was chosen as it was next to have a new roof under Denbighshire Housing programme of works.  ORP 2.1 funded an uplift of capital works to include a roof with integrated PV as part of a decarbonisation. Rhydwen Drive is in an area with high depravation and so it was decided to take the positive learning from Meliden in ORP 1 and roll out the positive improvements where it would make the largest difference to the community. 54 properties in Rhyl had retrofit measures including EWI, PV and batteries following the completion of works in Meliden from ORP 1. Additionally, these properties also had IES and Environmental sensors and gateways.

**Project learning**

* After retrofit works completed all properties are awaiting a new EPC and will be included in a full stock survey required for WHQS
* The PV was analysed to identify the best performance. This was found to be unsurprisingly on south facing orientations, however the shadows on roofs also affect how well a PV system operates. Batteries were in storage longer than desired due to Covid 19 lockdowns and such have required additional maintenance, it has been decided not to replace these systems until the maintenance and health and safety requirements for batteries is better understood
* Analysis of savings shows a wide variation of benefits depending on external factors; however, all properties have seen savings from the insulation and PV
* Community Engagement was held at the local community centre on the same street. Classroom training related to the new technologies. Q+As for residents about retrofit
* Technology is always evolving, future proofing properties can be complicated, and it is better to do smaller projects and always looking to find cheaper (technology and data), more efficient, and more tenant and maintenance friendly devices
* PV, inverters, and batteries were installed alongside training for the installation of these technologies in social housing. Learning from orientation of PV panels, the maintenance requirements of batteries and the impact of shadows form chimneys, neighbouring buildings, and trees are now better understood
* Rhydwen Drive and Rhydwen Close provide a good example of the differences in efficiency associated with different orientation of roof and shadows from chimneys which are a mix of chimneys on the north and south orientation of the property

**Project innovation**

The installation of EWI, new roof with solar panels, batteries, and IES and environmental sensors to properties in an area of high need and deprivation; and provide an uplift to the area. Additional Innovation for ORP 2.1 included:

* 54 properties in Rhyl had retrofit measures including rock wall EWI, PV and Batteries following the completion of works in Meliden from ORP 1
* Local resident engagement and opportunities for training and work at Phoenix Centre Rhyl, a local training and community centre situated on Rhydwen Road allowed for local staff, including local TLO and apprentices
* Additional analysis included monthly recording of power generated and money saved
* Test and Learn continued with the roll out of IES and Environmental sensors and gateways

**Challenges**

* The issues for ORP 1 and ORP 2.1 started to be found towards the end of ORP 2.1. these include:
  + issues with batteries (largely associated with Covid and a long delay with installations)
  + issues with wired in IES and Environmental systems – a high cost for data which lasted for the required three years
* Installing and getting the benefits of IES and Environmental sensors relies on several limiting factors:
  + access to the property
  + correct installation
  + correct reading of QR codes and serial numbers
  + a good internet connection
  + the cost of telecom data
  + a good dashboard which correctly display data
  + correct analysis of data
* Barriers in any part of the above chain results in expensive data gaps
* Batteries went in late due to Covid Lockdowns and this has had a long-term impact on the maintenance of batteries
* Inverters are not designed to have lots of different voltages, basically the panels need to produce the same voltage to work or the lower voltage panels are ignored. This can cause issues where a shadow falls onto some of the solar panels. There are alternative technology options for future innovations, these include Micro Inverters and Power Optimisers
* It is highly recommended a lot of planning is put into the addition of batteries, gateways, and IES and environmental systems to greatly reduce costs and maintenance issues
* Other issues associated include:
  + the correct installation of technologies
  + skills gaps
  + data poverty (where PV systems ideally require Wi-Fi for monitoring)
  + connection issues between devices, platforms and Trustmark.
* The technologies used for IES and Environmental monitoring were changed for ORP 2.2 and again for ORP 3.2 (see those case studies for more details)
* The EWI added in Rhyl for OPR 2.1 and 3.1 included issues with roofing, EWI and maintaining these. Window ledges especially have caused issues as the material used does not survive wear and tear, and can be easily broken. Tiles have slipped and guttering become detached
* External window sills not meeting the minimum 40 mm clear overhang and other snagging issues have required contractors to return and perform regular snagging inspections