




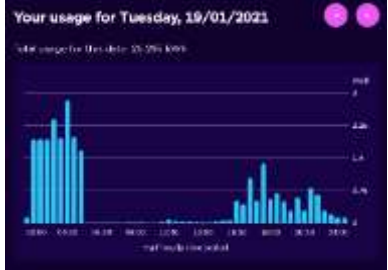


Case Study:

Journey to Zero 2015->2025 (Welshpool)








Energy Efficiency (EE)

Measure	Make / Model	Purpose	Capital £ (approx.)	Photo
Insulation (1990-2000)	Kingspan polycell / cellotex silver lined roof, floor and wall insulation	keeps home warm by reducing heat loss	(part of original build)	
Biomass Pellet Boiler (installed 2015)	Klover diva mid (20kW)	Space heating and hot water	£3,000 (pellets cost~£350 per year)	 
Draft excluders and heavy curtains (2018)	All windows and external doors	Improve air tightness and keep home warmer.	~£300 (additional to build)	
LED lighting (2018)	Various	60-80% more efficient	~£150 for 50 bulbs	
Smart Meter (2019)	SMETS2	Monitoring & Accurate Billing	n/a	



Renewable Energy (RE)

Measure (install date)	Make / Model	Purpose	Capital £	Photo
Roof mounted Solar PV (2019)	Mon-Si PV(4kW) 5kW inverter	Offset house electric	~£5,000	
Battery System (2019)	PylonTech 9.6kWh Li-ion Ph.	Use all PV & optimize tariff , emergency power supply (EPS)	~£4,000	
Load Diverter (2019)	My Energi Eddie Harvi and Hub	Divert PV to hot water	~£250 (fitted)	
Green Tariff (2020)	Octopus Energy	Zero carbon and flexible time-of-use	n/a	 Agile and Go Tariff 5p/kWh (12:30-4am) Accurate monitoring




Resource Management (RM)

Measure	Purpose	Capital Cost	Photo
Recycling	In accordance with Local Authority	Paid: council tax	
Re-use and Repair	Save money by repurposing and buying 2 nd hand.	n/a: Freecycle , Freegle , repair - cafés, skillshops.	
Food	Save money by wasting less	n/a	
Compost garden and kitchen waste	Save money on food purchases as below	~£50	
Growing Veg	Save money on food: sufficiency and climate resilience	£0-£50/yr.	
Water efficiency: Private water supply (1995)	No more water bills and : climate change adaptation and resilience.	Maintenance cost <£30/year	
Water efficiency: Rainwater Harvesting 2x1000L IBC Tanks (2019)	Save water and climate change resilience and adaptation	£120	




Next Steps: Energy Efficiency

Measure	Make / Model	Purpose	Photo
DIY Secondary glazing as an interim measure	Magnetic frames Polycarbonate or Perspex glazing	To improve U values of largest windows	
Insulation & air tightness (2021)	Ground floor and roof space – increase thickness	Further reduce fabric heat loss	
Boiler energy manager and TRV controllers (2022)	Danfoss or (Hive or similar)	Zonal control of heating, improve comfort and efficiency	
Windows (2023)	Triple glazed & quality double glazed units	Reduce heat loss	
Electric matt underfloor heater basement (2023)	LaminaHeat ComfortFilm (UFH) over insulation	Improve comfort levels basement	
MVHR: Heat exchangers and heat recovery (2024)	heat exchangers and ducting (roof & basement)	exchange warm air to basement (winter) cool air (in summer)	

Next Steps: Renewable Energy

Measure	Make / Model	Purpose	Photo
Solar Thermal (?)	2kWth collector	Offset hot water showers/bath	
Wind Turbine (2024)	Ista Breeze Heli 4kW	Offset EV charging and heating costs autumn/winter.	
More solar PV on outbuilding (2025)	5kW	Offset EV and machinery	

Next Steps: Zero Carbon Transport

Measure	Make / Model	Purpose	Photo
E-bike or pedelec (2023)	Conversion kit for Brompton and ladies Giant	Commute/leisure	
EV Charger (2024)	My Energi Zappi The world's first solar EV charger	Commute / leisure travel	
EV (2024)	Nissan Leaf, Vauxhall or Mitsubishi	Commute and holidays	

Case Study - Conclusion

In summary the journey to zero carbon has been achievable and affordable by implementing measures over a 10-year period as budgets allow. It is important to take the long view do measures in sequence or in conjunction with wider works (e.g. do windows and fabric improvements before decorating or at the same time as an extension and changing room layouts).

We have been very pleased with the way the measures have worked and have made our home very comfortable and affordable to live in. We look forward to future measures such as a small wind turbine and electric car as budgets allow to ensure true zero carbon.

Welshpool House EPC uplift summary (modelled with FSAP)

Year	EPC	kWh/m ² /yr	Energy (kWh)	Cost (£ p.a.)	Total CO ₂ , kg/year	CO ₂ per m ²
2014	D	-	-	-	-	-
2019	C	127	28,989	977	1120	5
2024	A	70	15,940	359	-460	-2

Annual Saving

57

13,049

£618

1580

7/m²