**Shropshire Council**route map to zero carbon

**Spring Progress Report 2020** 



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# **Climate Change Strategy Framework**

Following the climate emergency declaration in May 2019, Shropshire Council created a Climate Change Task Force to reinforce an existing working group of key officers from across the Council. To drive improvements corporately we have taken steps to make carbon reduction a normal consideration in all operations.

The Council agreed the objective of achieving net-zero carbon performance for its own operations by 2030. Climate action appraisals are now compulsory in all key council decisions, forcing climate impact to be considered and criteria to be met. We are working across council services to develop and implement design guidance for new Council buildings, and to improve the performance of existing ones.

We have also provided key staff with carbon literacy training to equip them with the knowledge and skills they need to reduce carbon emissions across the council. We are developing a corporate Climate Change Strategy and an annual Action Plan which will set out the key areas where the Council will focus its efforts and specific projects which will move us closer to our goal of net-zero performance. The Climate Change Strategy Framework was agreed by Council in December 2019.

The framework assembles policies and actions to help mitigate and adapt to climate change, to help ensure a sustainable future for the county. The strategy will develop a collective council response to harness existing activity, which is essential to ensure all services play a vital role to addressing climate change and communicate collective action.

Building on and affirming previous policy and direction as set out from 2010:

"Securing our future, whilst meeting our present needs – working together to balance social, environmental and economic needs"

The strategy has three main objectives as a **route map to zero carbon**:

- Mitigate the causes of climate change through carbon reductions
- Adapt services and their delivery to respond to changes in the climate
- Promote sustainable practices via all services

# **Shropshire Climate Change Resources**

Please see our Climate Change and Sustainability pages for updates:

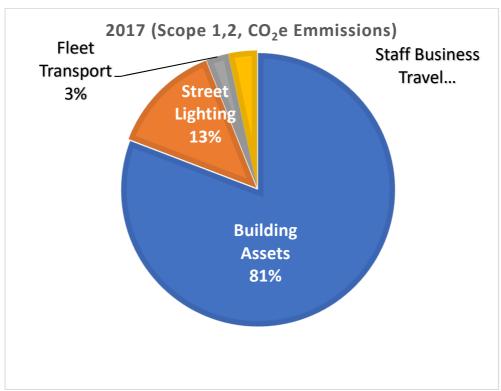
http://shropshire.gov.uk/climate-change-and-sustainability/

Also please several other relevant sections under Environment and Planning on the **Shropshire Council Website**:

- <u>Building Control</u>
- <u>Drainage and Flooding</u>
- <u>Environment</u>
- Environmental Health
- Funding Opportunities
- <u>Historic Environment</u>
- Information Intelligence and Insight
- Natural Shropshire
- Planning Policy
- Recycling

# **Shropshire Council Carbon Footprint (Scope 1,2)**

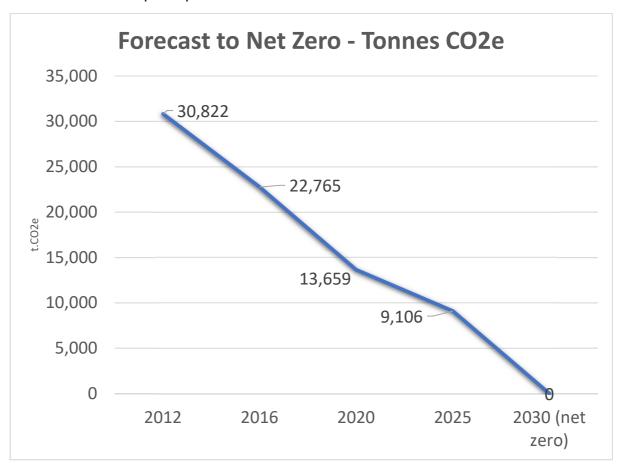
The current picture of Shropshire council carbon footprint indicates mainly scope 1(direct) and 2 (indirect) emissions only and we are starting to assess scope 3 (3<sup>rd</sup> supply chain) to obtain a more complete picture of our organisational carbon footprint. This is except for staff business and commuting travel and other scope 3 (procured goods and services, supply chain and investments).



Year	Total (tCO2e)	Building Assets (Scope1,2)	Street Lighting (Scope2)	Fleet Transport (Scope1)	Business Travel (scope 3)
2008 Baseline	57,575	38,991	6,000	11,889	695
2012/13	30,822	23,909	4,952	1066	895
2016/17	22,765	18,396	3,000	597	771
2020	13,659	11,038	1,800	358	463
2025	9,106	7,358	1,200	239	308
2030 (net-zero)	0	0	0	0	0

# The Route to Net Zero

- The best available data suggests that Shropshire Council's own carbon emissions were 23,000 tonnes in 2017, or 1.3% of the Shropshire total;
- We have indirect influence over a significantly greater level of emissions;
   1.75m tonnes net CO2 county level.
- Our emissions have reduced by 26% from 2012. (scope 1,2)
- We are assessing Scope 3 for procured goods and services as well as business travel and investments. This will be added to the model once we have a complete picture of the data.



# The Achievements So Far...

## **Energy and Water Monitoring**

Shropshire Council began its Carbon Management Programme in 2010 and has been implementing energy saving since the early 2000s. Reporting obligations were done in conjunction with the CRC (Carbon Reduction Commitments) and Carbon Trust recommendations. These drivers established a protocol for monitoring energy, water and resulting carbon emissions. This works well and using Energy monitoring software: Systems Link.

Tables 1, 2, show total consumption across corporate buildings. Appendix B details the assumptions used. Financial years at four-year interval: 2012 and 2016.

Table 1 2012/13 Building Consumption and Running Costs (all sites)

FY2012/13	(kWh)	Cost (£)	kgCO₂e
Electric	31,651,907	£3,933,999.87	15,710,741
Gas	35,359,098	£1,466,508.87	6,491,930
Oil	6,056,476	£424,526.23	1,619,502
Biomass	40,980	£4,332.57	520
Water	211,567 (m <sup>3</sup> )	£719,742.38	72,800
TOTAL	73 GWh	£6.55m	23,909

## Table 2 2016/17 Building Consumption and Running Costs (all sites)

FY2016/17	(kWh)	Cost (£)	kgCO₂e
Electric	31,071,785	£3,958,133.61	11,944,926
Gas	30,567,833	£911,268.07	5,629,494
Oil	2,864,149	£130,292.60	767,282
Biomass	78,567	£4,475.89	998
Water	153,823 (m³)	£586,774.89	52,915
TOTAL	65 GWh	£5.59m	18,396

# **Corporate Building Savings (Energy monitoring)**

# **Energy Monitoring and DEC Reports**

Display Energy Certificate (DEC) data, indicate that 70% of Shropshire Council building energy use is associated with sites with A to D ratings and 30% in buildings performing worse than typical (E to G). Dramatic improvements in energy performance are possible through a combination of operational improvements and up to date building retrofit methods.

Comparing the 16/17 and 12/13 datasets, implied savings are due to a vigilant, rigorous energy and water monitoring programme (Table 3).

Table 3 Savings by Fuel and Revenue Type over a 4-year period

Savings 2012-2017	kWh	£	
Electric	580,122	-£24,134 *	
Gas	4,791,265	£555,240.80	
Oil	3,192,327	£294,233.63	
Water	57,744 (m³)	£132,967.49	
Total	8,621,458	£958,308	<b>£</b>

<sup>\*</sup>Energy saving made but cost went up due to tariff/commodity increases (£/kWh).

Total Energy	GWh	Cost (£)	kgCO₂e
FY2012/13	73	£6.55m	23,909
FY2016/17	65	£5.59m	18,396
Savings	~9GWh	~£1m	5,513 t.CO <sub>2</sub> e
over 5 years			

# **SEPuBu (Sustainable Energy in Public Buildings)**

#### Introduction

SEPuBu is a programme is managed by Herefordshire Council across the Marches. As a delivery partner, Shropshire Council signed a SEPuBu partnership agreement in July 2017. The agreement detailed a commitment to provide capital match funding at a maximum of 40% for each project that will meet the agreed programme objectives and outputs between March 2017 and February 2020.

The projects were commissioned via Property Services Group and the Commissioning Team which is part of Assets and Estates in Shropshire Council.

http://shropshire.gov.uk/climate-change-and-sustainability/sepubu-sustainable-energy-in-public-buildings/

## **Technologies**

The technology interventions should include a minimum but not limited to:

- Energy control systems.
- Lighting including movement and/or light sensors.
- Variable speed drives & compressors.
- Systems offering better use of heat.
- Renewable energy technologies.
- Energy storage.
- Solid wall insulation.
- Triple or Quadruple glazing.
- Voltage optimisation & power factor correction.

#### Method

Annual savings are prioritised based on building energy cost performance ( $f/m^2$ ):

Building Priority / Performance	Building Energy Cost (£/m²)
High Priority / Very Poor Performance	£30 -> £65 /m2
Medium Priority / Medium Performance	£10 -> £30 /m2
Low Priority / Good Energy Performance	£5 -> £10 / m2

#### **Assumptions**

Electric rate of 13.33p/kWh, carbon factor of  $0.307~kgCO_2e$  / kWh for UK grid sourced electricity and  $0.204~kgCO_2e$  / kWh for grid sourced gas (DBEIS, 2018).





# **Estimated Savings**

The efficiency savings are based on a combination of three of the following measures:

- 1. <u>Electrical Efficiency Measures (3 of following):</u>
  - LED's & sensors, Solar photovoltaics, voltage optimization, Variable Speed Drives.
- 2. Thermal Efficiency Measures (3 of following):

Solid wall Insulation, Secondary Glazing, BMS (improved boiler controls)

	Savings (£)	Saving (kWh)	Saving (kg CO2e)
High Priority Builds	£74,577	767,413	203,469
Medium Priority	£28,791	306,309	80,077
Low Priority	£8,832	104,782	26,208

# **Phase 1 Project Works (completed Feb 2020)**

6 Public buildings were completed with retrofit efficiency in Phase 1 by February 2020. The measures included LED lighting, solar PV and an Air Source Heat Pump at Severn Valley Country Park.

Corporate Landlord Building	Intervention	Anticipated Saving (£ p.a.)	Saving (t.CO2e p.a.)
Shrewsbury Market Hall	LED lighting & Solar PV	£5,894	16
Greenacres Rural Farm	Solar PV	£6,206	16
Theatre Severn Shrewsbury	LED lighting & controls	£10,581	28
Severn Valley Country Park	LED lighting & controls, ASHP	£2,133	6
Shropshire Archives	LED lighting & controls	£2,091	6
Bridgnorth Library	LED lighting & controls	£1,442	4

<u>TOTAL: £28,347</u> <u>76 tonnes CO2e</u>

#### **Anticipated Annual Savings**

This top-level benchmark calculation depends on the scope of works commissioned:

# **Total Anticipated Savings (Phase 1 and 2 as proposed):**

	Saving (£)	Carbon Savings
All Buildings	£105,652 p.a.	<u>261t</u> CO₂e p.a.





#### **Shrewsbury Market Hall**

The Market Hall is public space retail; 22kW solar array to help offset the summer ventilation system requirements. The additional efficiency measure of LED lighting replacements will reduce their load in conjunction with the onsite generation.







#### **Greenacres Rural Unit**

At Greenacres farm, the 50kW solar array has been installed to offset the energy requirement and assist with future irrigation through the summer months.



Additional interventions may be added later; such as rain water harvesting and utilizing the excess solar generation for hot water and to power irrigation activities. Battery storage may be viable and beneficial to this site to further reduce utility costs. These are all important consideration in a changing climate and good publicity for Shropshire Council to since the service area is social care for vulnerable adults.





# **LED Street Lighting Programme - Highways**

Shropshire Council is planning to convert almost 16,000 streetlights to LED lighting over the next three years – saving the council more than £1.2m a year in reduced energy and maintenance costs once the conversion is complete and saving almost 3,000 tonnes of CO2 every year. Since 2013, the council has converted over 3300 street lights from conventional 'sodium discharge' lighting to LED lighting. Subject to securing the Salix funding and Cabinet approval, work would be carried out to convert the remaining 15,783 lights. Initial analysis suggests the work could deliver annual savings of 5,675,552kWh, an energy cost reduction of £805,000 per year, plus a reduction in CO2 emissions of 2,911 tonnes a year. Savings in operational and maintenance costs would provide a further £366,000 of additional savings per year.

# Other Technologies and Traffic Control

The work would also see the lights fitted with central management system (CMS) controls which enable dimming, part-night lighting and fault identification, leading to further savings and greater functionality.

The provision of CMS, together with LED technology, will allow the extension of dimming options between certain hours to also incorporate variable dimming levels which would be commensurate with the volumes of both vehicular and pedestrian traffic, to a far higher degree than currently possible.

**Salix Finance Ltd** provides interest-free Government funding to the public sector to improve their energy efficiency, reduce carbon emissions and lower energy bills.

**Table 4 Summary Table of Street Light Savings Since 2012** 

Period	Technology	Capital (SALIX)	Energy Saving (kWh p.a.)	Saving (£ p.a.)	GHG Saving (t.CO <sub>2</sub> e p.a.)
2019-2021	16,000 LED + Dimming, CMS	£8.5m	5,675,552	£1.2m	2,911t

# **Renewable Energy**

- Shropshire sites moved entirely to 'Pure Green' electricity from 1st September 2019; this will greatly reduce our buildings carbon footprint.
- Energy In 2019, Government data shows that Shropshire was ranked 5th nationally for installed renewable energy capacity;
- Shropshire home to the largest amount of installed capacity of anaerobic digestion (AD), ~16 MW or over 5% of the total UK installed capacity.
- Sites are being assessed in both land and buildings with potential for renewable energy across Shropshire Council's estate.

# Solar Photovoltaics (PV) - Shropshire Council Properties Only

http://shropshire.gov.uk/climate-change-and-sustainability/solar-photovoltaics-pv/

## An environmental good news story

Solar generation is a good news story for Shropshire Council, growing year on year since 2012 with solar arrays installed across 27 sites and a peak capacity of over 1.2MW. The cumulative energy generated since the first installation in 2012 is 5,778,895kWh (that's enough electricity to boil water for 288,944,750 cups of tea or power 2,000 homes for a year!). Additionally, the total carbon dioxide emissions avoided since installation is over 2,000 tonnes. This is carbon dioxide (CO2) saved by not using electricity from power stations, which sometimes burn fossil fuels and release CO2 into the atmosphere.

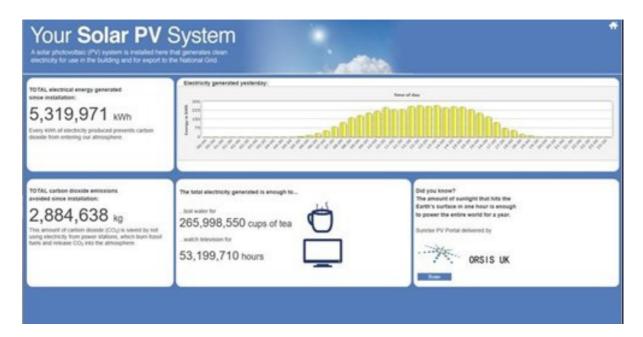


Figure 1 Our ORSIS Solar Monitoring Platform

**Solar PV** has matured as a technology. It's a proven method of generating electricity, and produces zero emissions and zero noise, and the annual and daily predictability of solar ensures generation can be reliably forecast. 70%-reduced manufacturing costs have lowered the install costs, and increasing grid-electric costs make solar PV, alongside other renewable energy types, an attractive proposition. Solar PV is now a key contributor to the UK's energy mix for zero carbon clean generation on a commercial scale, ground- and roof-mounted on businesses and domestic dwellings. Depending on the time of year, the UK's contribution to its energy mix into the National Grid from low carbon energy generation **can typically vary between 30% and 70%**, and was 45% in 2018.

## **SolarEdge Monitoring Systems**

Our newer sites are on a system called **SolarEdge** and the following links allow you to monitor the live performance of these sites:

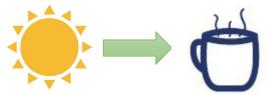
- Enterprise House
- Shrewsbury Market Hall
- <u>Tannery Student Accommodation</u>
- Greenacres Farm (live link to follow shortly)



Over 2,000 tonnes CO<sub>2</sub>e saved (over 5 years)

Enough to boil water for 300 million cups of tea...!

Power 2,000 homes a year!



Since 2012 the financial benefits for properties with solar PV are as follows (based on average electricity price 12.5p/kWh).

**Table 5 Solar Energy, Financial and Carbon Benefits** 

	Energy (MWh)	Savings (£)	Savings (t.CO2e)
2012	460	£44,197	255
2013	603	£61,257	313
2014	616	£65,573	287
2015	626	£64,656	247
2016	841	£86,906	260
2017	755	£89,349	209
2018	804	£100,508	247
2019	920	£114,982	255
TOTAL	<u>5,625</u>	£627,432	2,072

# **Zero Carbon Transport**

#### **SCPC**

Shropshire Council Pool Cycles (SCPC) have been restored and relaunched. Colleagues have sacrificed lunchtimes to help repair them. They allow staff to take daytime trips into town, to meetings or simply for a nice lunchtime ride. There are ten Giant cycles based at Shirehall (5 gents and 5 ladies) and a further 10 at the Highways Depot Longden Road. The keys for locks are held at the North Entrance and lockers on the way out (close to the roller doors) contain spare tubes, pumps and helmets for staff to use.









**Figure 2 Shropshire Council Pool Cycles** 

There are 20 pool cycles altogether (10 Shirehall and 10 Transport Depot). There are around 5 regular users so far. Uptake is expected to improve with publicity. There has been interest for SCPC at office sites for these throughout Shrewsbury and the potential for a future trial and conversion to electric cycles (aka e-bikes or Pedelec's). Conversion kits are available to do this.

#### E-Bikes

The event below took place in May 2019 and allowed staff try out e-bikes on a test circuit. The event was well received and there were several follow up enquiries for e-bikes and many staff signing up to our cycle to work scheme. We had attendance and displays from Sustran's (Sustainable Transport National Cycle Network), a local cycle vendor offered a free cycle health check. Following this success, we are planning further e-bike promotions at future **Tech Severn** events, together with other low carbon tech.

# Could this be your best 10 minute break of the year?

# Test ride an e-bike at Shirehall!

- up to 20 e-bikes, hybrid, folding and regular bikes for you to try
- five stalls, three gazebos and a riding zone
- Cycle2Work tax free scheme information
- free health check on your existing bike.





Don't miss this opportunity... Wednesday 22 May, 12 till 2pm forecourt of Shirehall.





# **Resource Management**

Veolia has provided favourable carbon emission data based on Shropshire Council's Municipal waste contract (Table 6).

## **Municipal Recycling**

The carbon footprint for domestic municipal waste has improved by removing waste from landfill and enhanced recycling processes, kerbside collections and the generation of energy from waste (Veolia UK, 2018a) 2009 to 2016:

	Climate change (GWP100a) (kg CO2 eq.)
Collection	529,247
Transportation	3,953,682
Intermediate	955,410
facilities	
Recycling	-26,151,295
Treatment &	-4,128,199
recovery	
Landfill	922,208
Total	-23,918,947

Table 6 Emissions Savings: Municipal Waste Shropshire

23,919 tonnes *co₂e* 



# **Landfill Emission Assumptions**

\* Green House Gas (GHG) emissions defined  $CO_2e$  (UK DBEIS - Department of Energy and Industrial Strategy) regional data sets (UK Government, 2017) and targets. Landfill waste GHG emissions = 588.9 kg  $CO_2e$  per tonne. (UK Government GHG Conversion Factors for Company Reporting, 2017).

# **Energy Recovery Facility (ERF) Battlefield, Shrewsbury**



Figure 3 Veolia Energy Recovery Facility: Shrewsbury.

Table 7 Veolia Achievements (2018)

Measurable	Annual Benefits
Electricity produced	10,000 homes a year!
Household waste	reduce to 5%instead of landfilling 65% of household waste 2005/6
Waste processed	Shropshire produced 162,000 tonnes of municipal waste in 2017-18; 67,000 tonnes or 41% was processed through energy recovery. (https://www.shropshire.gov.uk/media/7231/amr-2017-18.pdf). In 2018/19 we processed 166,734 tonnes of municipal waste, of which 68,389t was sent through the ERF (about 41%) and 3,299t landfilled (less than 2%).
Avoided GHG	The Greenhouse gas diversion report for 2018/19 shows a saving of 22,240 carbon equivalent tonnes for Shropshire. 96,000 tonnes $CO_2e$ p.a. (including other local authority contracts).

# **Commercial Recycling**

The commercial waste contract shows opportunity for improvement, this will be achieved in conjunction with Veolia targeting office staff and selected corporate landlord buildings with an awareness raising campaign.

Over the eight-year period to 2025 WRAP estimates the potential benefits to be in the order of:

£430M

potential increase in revenue from sales of recovered materials 4.5M

tonnes CO<sub>2</sub>(eq) potential reduction in greenhouse gas emissions

£240M

potential increase in renewable energy sales

£30M

savings to reprocessors and the recycling industry from lower contamination achieved through greater consistency

Figure 4 UK Waste Resource Action Plan (WRAP, 2018)

# **Shirehall (Dry Mixed Recycling)**

Table 8 shows Facilities Management (FM) Shirehall commodity costs. DMR is currently just over 40% with scope for improvement. Kitchen waste has increased significantly (an additional £1k p.a.). Paper towels (both supply and disposal cost since non-recyclable). Efficient hand dryers may be a cost-effective alternative.

Table 8 Shirehall Commodity/Service Costs (Facilities Management, 2017)

Year	General		Confidential Paper		-	Toilet Paper	Soap
2016	£5,421.96	£3,119.18	£1,320.00	£276.50	£14,779.80	£5,722.34	£216.00
2017	£6,507.84	£4,295.04	£1,440.00	£1,357.12	£14,527.26	£8,527.69	£396.00

Table 9 The DMR Business Case (Veolia per bin pick-up)

Bin Type	Veolia Code	Capacity	Pick-up (£)
DMR	150106 Recyclate - Mixed	EURO 1100 LTR	<u>£7.14</u>
General	200301 Non-Hazardous Industrial	EURO 1100 LTR	£11.35
General		EURO 660 LTR	<u>£8.26</u>

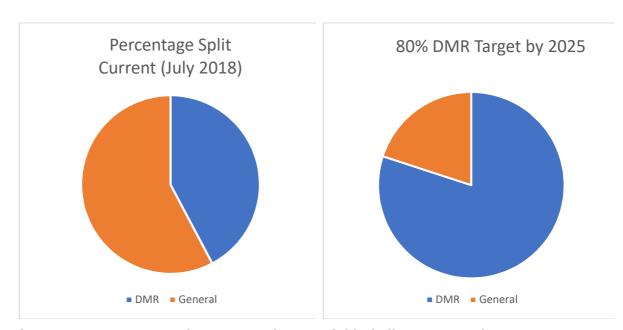


Figure 5 Current DMR Performance and Target (Shirehall, 2018, 2025)

Table 10 Shirehall DMR 2025 Target

	2018 mix	Current Cost	2025 mix	Target Cost
DMR	42%	£3,995	80%	£7,950
General	58%	£8,156	20%	£2,972
<u>Total</u>	_	£12,150		£10,923

Shirehall produced 21.50 tonnes of dry mixed recycling in the last year and 29,094kWh electricity was generated at the Veolia ERF last year from the 43.489 tonnes of general waste processed, enough to power 9 homes for a whole year. A Target to increase from 50% - 80% by 2025 (Table 10), will help reduce cost, environmental impact and improve our circular economy. Achieving the target of 80% DMR by 2025 will generate savings of £1,228 p.a.

## **Recycling and Re-use Improvement**

Shropshire Council is relaunching its Dry Mixed Recycling (DMR) services as it looks to increase recycling across the organisation and make savings. The Waste and Resources Action Programme (WRAP) forecast that £30million could be saved by 2025 across the UK. This suggests that Shropshire Council could save £8,596 at Shirehall alone by 2025 by increasing DMR to 80% based on current potential savings calculations. Pilot buildings with high public function and visibility.

For this to be achieved, an effective awareness and engagement campaign is necessary with staff that will educate and make it much easier to recycle. For savings to be achieved, we need the buy in of all staff across all services.

#### **Aims**

- Improve waste streams, reduce cost to council and promote sustainability.
- Reduce general waste towards zero and increase recycling streams.
- To increase DMR performance rate across office sites from 40% to 80%.
- To remove all under desk general bins to encourage use of recycling bins.
- To encourage re-use of office equipment and furniture.

#### **Objectives**

- Raise staff awareness of the DMR and Re-use campaign events.
- Make it clearer to staff how to recycle in the workplace.
- To communicate to staff the removal of office bins to minimise backlash.
- Re-establish a Green Champions scheme to facilitate the above.

#### **Key Messages**

- As a Council, we are working to increase DMR recycling to 80% by 2020, but we need your (the staff) support to **make it happen**.
- Set a target (to be agreed) for zero single use plastics) by 2030.
- Demonstrate measurable financial and environmental savings

#### **Audience**

- All staff: area managers, directors and officers voluntary attendance.
- Front line staff: Facilities Management, cleaners, Shire services team.

#### **Internal Channels**

- TV's in public areas of Shirehall.
- Computer / laptop lock screens, Staff Newsletter, Intranet, Email.
- Bins themselves (stickers), Staff Noticeboards, Yammer.

#### Warp-it

#### What's it all about?

- Warp-it (Waste Action Reuse Portal) is a marketplace to encourage peer to peer trades stops staff buying items the organisation already has.
- The system knows who wants surplus assets, reducing the need for storage.

#### https://www.warp-it.co.uk/

# **Reuse Office Equipment**

An online reuse platform makes it easy to get, give and loan surplus stationery, furniture and other equipment within organisation, and external parties.

- · Procurement tool: stops staff buying items that are already surplus.
- · Waste reduction tool; new owners for items that may have been skipped.

## **Key Benefits**

- Better management of assets coming out of buildings.
- Find homes for assets prior to building clearance (See here).
- Reduce waste cost finding homes for scrapped assets.
- Catalogue furniture office assets use of stickers.
- Create wish lists, requirements for stationery, furniture.
- Reduce procurement costs across the budgets.
- Link up with other public organisations e.g. NHS Trusts. (See here).
- Connect, support schools and '3rd sector'.
- Incremental improvements to automate a repurposing process.

## Latest Items



1 X Photographic copy stand with lamps



19 X Used arch lever files and A4 files



2 X Desk height beech effect drawer unit



5 X Sinlge low beech effect lockable cupboard

## Figure 6 Shropshire Council Items Listed

Warp-it has exceeded our expectations (Table 11): a target of £25k in the first year. **We** are now aiming for £100k transactions in the first 5 years (based on the methodology of savings from procurement and disposal costs).

#### **Table 11 Key Performance Metrics for Shropshire Council (first 12 months)**

So far, we have 210 members on the system and they've managed to save:

- £36,120 (in procurement and disposal costs)
- 7,224 kg in waste avoided
- 16,028 kg CO2 in greenhouse gas emissions avoided
- 21 trees equivalent

The next step is to move to a more ambitious goal and save £50k by 2021!

This is a great performance and our next step is to sign up our first external partner; including SaTH (Shrewsbury and Telford Hospital Trust who originally pitched the idea to myself), The Ministry of Justice and schools/academies in the Local Authority Area. These schools will then be able to carry our peer "trades" as a distribution network across the whole West Midlands Area.

#### UK wide the savings by re-use via Warp-it are as follows:



Figure 7 Warp-it Performance Metrics - UK Wide



Figure 8 The Warp-it Team