

Somerset West and Taunton
Low Carbon Retrofit Strategy & Delivery Plan 2022-2028
October 2022

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Executive Summary

In 2019 SWT declared a climate change emergency. Since 2019 SWT has been working with other Somerset Councils on a Climate Resilience plan (CDCM plan) and the Somerset Climate Change Emergency Strategy to help the County and District combat climate change and reduce carbon (CO₂) emissions. Housing has a critical role in helping the council respond to the climate change emergency. To tackle the climate crisis, the UK government has legislated that the UK will reach net zero carbon emissions by 2050, meaning the UK will be putting no more carbon into the air than it is taking out. Homes account for about 14% of the UK's CO₂.

Although most homes in the District are private dwellings there is a significant proportion of social housing of which c5700 are owned and managed by the Council. SWT homes account for 9,144tCO₂ pa which is an average of 1.7tCO₂ per annum per property. SWT homes accounts for approximately one third of the CO₂ generated from SWT assets or activity.

This strategy will form an appendix of the Housing Revenue Account's Asset Management Strategy. A revision of the main body of the Asset Management Strategy and will be considered by Members in 2023. SWT's Low Carbon Retrofit Strategy 2022-2028 sets out the principles and practical steps to allow SWT homes achieve EPC C by 2030 and zero carbon by 2050. The strategy is supported by a delivery plan which identifies some of the short and medium term opportunities that will provide early momentum to achieve the estimated £135m investment required to achieve zero carbon.

The social housing environment is ever changing with the need to respond to national and local factors. This strategy recognises outside factors, such as new legislation and new technology, will bring opportunity and challenge to the delivery of zero carbon. The strategy and delivery plan will help guide decisions to help the Council steer an efficient path to zero carbon. The available technologies and grants in relation to low carbon retrofit will vary dramatically over the next twenty years meaning the Council must have a strategy, data and capacity able to respond.

The UK and the world is experiencing unprecedented fuel price inflation and uncertainty. The District will see thousands of households experiencing fuel poverty for the first time during 2022 and a dramatic cost of living crisis is emerging. In the short term this strategy encourages energy saving advice and sign-posting tenants to further information sources to help manage energy costs. While these activities are useful they are unlikely to make a significant impact on the rapidly rising energy costs to customers. The council can make a huge impact as landlord in the medium and long term through an investment strategy which reduces the heat demand required by the Council's homes through fabric measures. This could see by 2040 c70%-80% less fuel required to heat homes.

To reflect the changing environment the strategy will be reviewed every five years as the council progresses towards zero carbon and the delivery plan will be reviewed annually to feed into the housing revenue accounts annual budget setting cycle.

The five main goals of the strategy and delivery plan are;

1. Tenants at the heart of zero carbon

2. All SWT homes to achieve EPC C by 2030 (c1850 homes) or have an alternative investment option identified. Our current estimation is c300 homes could miss the target.
3. Aim to reduce heat demand from 170kWh/m²/yr. to 50kWh/m²/yr. by 2040 through a 'fabric first' approach. This is a very ambitious target and many homes may require additional investment which will increase the cost of zero carbon significantly above the £135m or require more disinvestment options.
4. Replace fossil fuel in SWT homes with electric based heat and power by 2050 at a pace to ensure affordable energy for tenants and in line with available funds. This does not prevent replacing fossil fuel with electric heat and power immediately where their heat demand is sufficiently low and funding is available.
5. The investment remains affordable within the constraints of the Housing Revenue Account's annual, medium term and thirty year financial plans.

The costs of achieving zero carbon is estimated at c£135m over 28 years. This is based on today's prices. The strategy and delivery plan recognise that zero carbon is not affordable to the landlord under its current business plan and therefore it needs to;

- Align Decent Homes standard improvements with retrofit programmes
- Maximise grant and subsidy
- Place tenants at the heart of zero carbon
- Ensure good data influences decisions
- Embrace a no regrets approach (correct specification of works for each individual property, improving ventilation and avoiding cold bridging and damp, progressive investment steps, selective demolition and disposal where targets cannot be achieved)

The housing service is transforming the decent homes capital programme to fully integrate a zero carbon 'no regrets' approach. Once achieved, this will permit the current business plan capital programme to contribute significantly towards zero carbon in both the specification of products it delivers and the timing of the replacement components. In addition, the service will build on the Council's success of bidding for grant and substantially increase its investment plans with available grants and steer away from investment where the investment contradicts the pathway to zero carbon identified for that archetype or individual property.

The Council has invested in the new 'Open' databases, which includes Open Housing and Open Assets, and retrofit software (Parity Portfolio). It has also employed specialist retrofit advisors and PAS2035 coordinators. Through good data and surveying the Council has been able to create archetype studies by property form. SWT has identified 12 pathways to zero carbon which cover 96% of the Council's properties. SWT is able to carry out modelling of different pathways to zero carbon for sub archetypes as investment opportunities emerge. Through archetype studies and pathways to zero carbon SWT understand the specification and types of components required to achieve a c70%-80% heat demand reduction and the timing of fuel switch away from fossil fuel. As a result the service is able to better align the council's decent homes investment and retrofit investment.

The council has been working with specialist retrofit consultants to guide our delivery plan and invest significantly in specialist PAS 2035 co-ordination and individual property PAS2035 assessments and design. In addition, most contractors will be required to be TrustMark registered which provides a significant level of confidence in their skills, design, the recording of data and warranties for of products.

As a result of this approach SWT and tenants confidence will increase and the council will have evidence of success in delivering measures to reduce CO2 and fuel use. Monitoring success pre and post works is essential. New SMART heating controls and energy monitoring technology will be introduced into more homes to help tenants manage their heat and power consumption better. The service is also seeking to install monitoring technology which will help the tenants and council if there are problems with the property such as high humidity, excessive fuel costs and will identify properties behaving better or worse than the average.

Our approach will maximise grant opportunities by identifying the pathways to zero carbon which provides the service with the transparency to identify properties which qualify for grant and which would benefit from the grant.

SWT has developed this strategy with tenants. In particular the council has worked with tenants through the Low Carbon Retrofit Working Group. However, the strategy is also influenced by the Strategic Tenants Group, the Damp and Mould Working Group and the NTWP Works and Low Carbon Working Group. Engagement and communication with tenants is critical if SWT is to achieve zero carbon. Communication prior and during work programmes must be of a high standard and personalised to localities and customers need. The Tenant Engagement Plan and Vulnerable Persons Policy has been developed to assist SWT staff, tenants and contractors with the aim of preparing tenants with the information and support they need to participate in works. The policies are aimed at increasing access at the first time of asking to ensure the council and its contractors carry out surveys and works. In addition, customers will need to understand any new technology which is in their home, especially boiler controls and performance data. To this end the service will need to enhance the knowledge of all front line staff to offer timely and accurate advice. It is also considered beneficial to introduce tenant feedback processes and remote monitoring to help identify any problems, for example, under performance against the anticipated improvement from investment.

1 Introduction

What is low carbon retrofit

Responding to climate change requires the need to reduce energy consumption and improve the resilience of the built environment. Buildings account for 30%-40% of the energy consumed and 20%-36% of energy related greenhouse gas emissions across the European Union, United Kingdom and US. Increases in flooding and extreme weather triggered by climate change pose heightened risks to assets like buildings and property. Governments, landowners, property managers and investors alike are recognising these challenges and looking for solutions to safeguard buildings and users, shore up their investments and respond to policy imperatives. One area where they have found common ground is the huge and urgent need for upgrades to improve the energy efficiency, affordability, comfort and resilience of housing and building stock. Retrofit is simply the process of making changes to existing buildings so that energy consumption and emissions are reduced.

SWT in developing its approach to new build zero carbon affordable homes and zero carbon affordable housing retrofit builds on some of the knowledge and experience. SWT has considered good practice and the advice of leading organisations such as the London Energy Transformation Initiative (LETI) and the Good Homes Alliance. This strategy has interpreted LETI's retrofit 2021 guidance to meet the challenges of SWT's stock and has gone further by calculating the estimated financial cost of achieving zero carbon. The strategy does welcome LETI's good practice guidance and endorses the LETI definition as presented in its Climate Emergency Retrofit Guide;

'Retrofit isn't just about reducing carbon emissions. A best practice retrofit should reduce fuel bills and also improve health and wellbeing. Retrofit at scale would also generate significant employment opportunities and stimulate the economy'.

A massive transformation is needed to meet the demand for energy efficient homes and buildings and to keep climate change within the bounds of the Paris Accords. The scale of the retrofit challenge is significant with roughly 15,000 houses across Europe needing to have retrofit works carried out every day for the next 30 years to achieve the target.

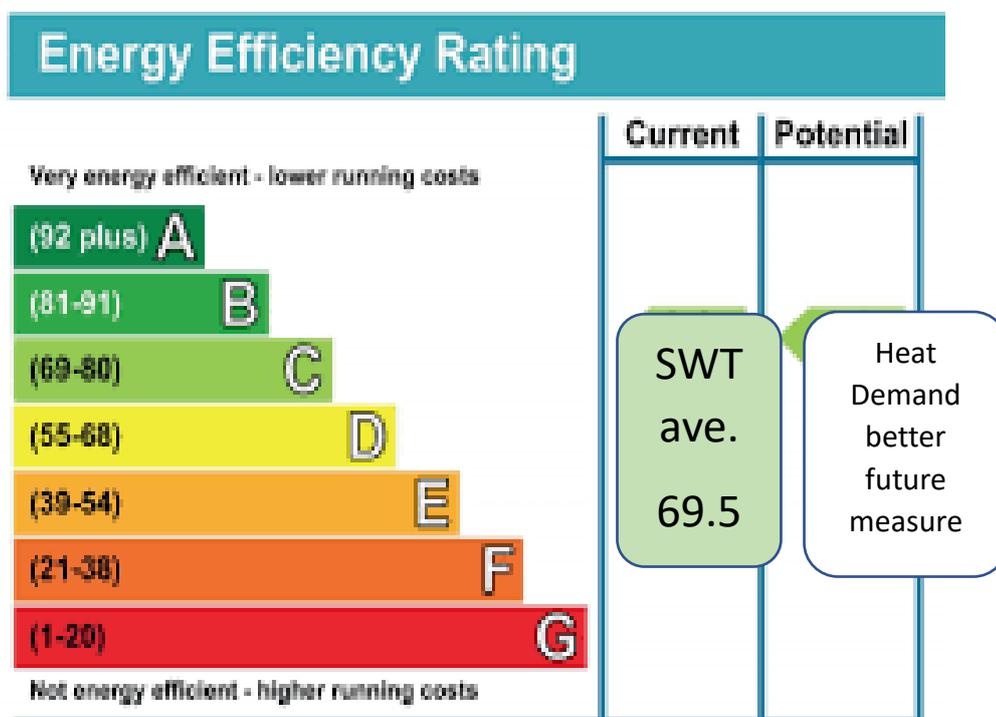
SWT has set down a strategic ambition to achieve zero carbon ahead of 2050 and is making investment decisions to progress carbon reduction in all aspects of its work and influence. In the UK 80% of the homes which exist today will be in use in 2050. Officers forecast that c80% of SWT's affordable homes will be Council affordable homes in 2050 with c20% of the stock new build homes built to a zero carbon standard. The Council will lose c20% of homes through the Right to Buy, selective disposal and selective demolition. Retrofitting SWT homes by 2050 is a challenge proportionate to the national challenge and requires transformation in how we invest and provide our services.

National Targets

There are two main low carbon retrofit targets which the council must achieve or risk being unable to let the properties.

The UK Government passed the Climate Change Act 2019 which committed the UK to a legally binding target of net zero by 2050. In addition, social landlords are required to achieve EPC C or better (B, A) as measured through the Standards Assessment Procedure (SAP) for all households in their homes suffering from fuel poverty by 2030. The revised definition of fuel poverty is someone living in a property rated D, E, F or G and therefore the council in practice have to bring their homes up to EPC C by 2030. Image 1 shows the efficiency rating bands and the Standard Assessment Procedure (SAP) points for each band. Band A is considered Excellent (high SAP points) and Band G is considered very poor (low SAP points) in terms of energy efficiency. Although EPC Bands allow properties energy efficiency to be compared very easily this strategy proposes heat demand and fuel source as the critical measures as we seek to achieve zero carbon.

Image 1 – Energy Efficiency Rating System and SWTs average SAP rating



To achieve zero carbon by 2050 we will need to remove the use of fossil fuels from homes and switch to fossil free renewable sources of energy primarily electric. However, without reducing the heat demand of our homes through improved insulation, often referred to as a fabric first approach, or without a significant reduction in the cost of electricity a fuel switch strategy would be unaffordable for many tenants. Government recognise that a fabric first approach has the opportunity to reduce heat demand in homes to allow the switch for many homes to affordable electric heat and power.

The strategy has considered the SWT Community Scrutiny Committees Task and Finish Group’s report on Council Housing Zero Carbon Retrofit 2022. The report

included a wide range of recommendations including a fabric first, whole house approach to retrofit, learning from local and national best practice, removal of fossil fuels and building customer awareness. This strategy embraces and reinforces many of the sentiments of the Task and Finish Group.

The London Energy Transformation Initiative (LETI) is a leading zero carbon collective which produces excellent guidance which officers have used in the development of zero carbon new build and retrofit standards. The LETI principles are:

- Reduce energy consumption
- Prioritise occupant's health
- Have a whole house retrofit plan
- Measure performance
- Think Big

This strategy follows the principles but not the absolute letter of the London Energy Transformation Initiative (LETI) guidance or retrofit blueprint (image 2). SWT will apply these principles to our archetypes and property forms (houses, bungalows and apartments).

Image 2 – LETI's retrofit blueprint (this image is to illustrate the complexity and connected considerations which a best practice approach to retrofit requires, a readable version can be found online)

A blueprint for retrofitting the UK's homes to meet the climate challenge

A policymaker's summary of the LETI Climate Emergency Retrofit Guide

LETI's six principles for good retrofit

Follow these principles to maximise the multiple benefits of retrofit and minimise the risks. For example: reducing energy consumption is key to reducing carbon emissions, tackling fuel poverty and improving national energy security.

- 1: Reduce energy consumption
- 2: Prioritise occupant and building health
- 3: Have a whole building Retrofit Plan
- 4: Measure the performance
- 5: Think big!
- 6: Consider impact on embodied carbon

LETI's recommended energy performance targets

The current industry measurement of energy performance is an EPC. However a good EPC score does not necessarily indicate a building with high levels of energy efficiency.

LETI has defined what good retrofit looks like through best practice and exemplar energy targets for constrained and unconstrained buildings.



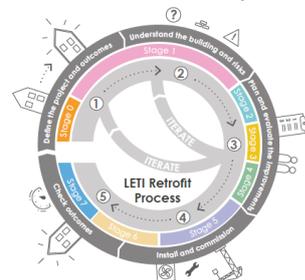
LETI's whole house Retrofit Plan

LETI recommends a whole house approach to retrofit rather than retrofitting individual elements in isolation. A whole house Retrofit Plan should:

- Set out the key building information, constraints, risks and opportunities.
- Define the key works proposed along with related strategies and details.
- Define the sequence of work.
- Be appropriate in its level of detail and intervention for the building size, context, use, owner and occupants, scope of work and heritage value.
- Include a plan for monitoring and reporting energy consumption.
- Keep your retrofit plan with the building for future occupants.

This is similar to PAS 2035's risk-based paths; avoiding abortive work and minimising risk.

LETI's recommended retrofit process



	LETI best practice retrofit	LETI exemplar retrofit
Fossil fuel free	Fossil fuel free home	Fossil fuel free home
Energy Use Intensity	50 kWh/m ² /yr +10 kWh/m ² /yr Additional allowance for constrained retrofit	40 kWh/m ² /yr
Space heating demand	50 kWh/m ² /yr +10 kWh/m ² /yr Additional allowance for constrained retrofit	25 kWh/m ² /yr
Hot water demand	20 kWh/m ² /yr +5 kWh/m ² /yr Additional allowance for homes <75m ²	20 kWh/m ² /yr +5 kWh/m ² /yr Additional allowance for homes <75m ²
Renewable energy	40% of total energy covered by renewables Maximise renewables where conditions are suitable	40% of total energy covered by renewables Maximise renewables where conditions are suitable

New build vs retrofit

It is generally preferable to retrofit than demolish and build new, because of the much greater embodied carbon in new build than in retrofit.

For retrofits that include a new build element, or any new builds, we recommend you look at LETI's [Climate Emergency Design Guide](#) and the [Embodied Carbon Primer](#).

For new buildings, there is consensus that a huge shift is needed in policy to produce net zero carbon compliant buildings - please see LETI's response to the Future Homes and the [Future Buildings Standard](#).

It is hoped that this strategy and delivery plan is further evidence of the council leading by example. Social housing providers have emerged as innovators of low carbon transitions in the UK residential sector. Research published in the *Energy and Buildings Journal (Vol 177)* suggested social housing providers tend to have a

significant amount of influence over large housing stocks, have opportunities to access funding to retrofit on a large scale, can make explicit connections between reduced carbon emissions and improved quality of life for low-income residents, and foster a close relationship with the place and communities they serve. In effect, social housing providers are not only facilitators but also realise low carbon transitions through various strategies.

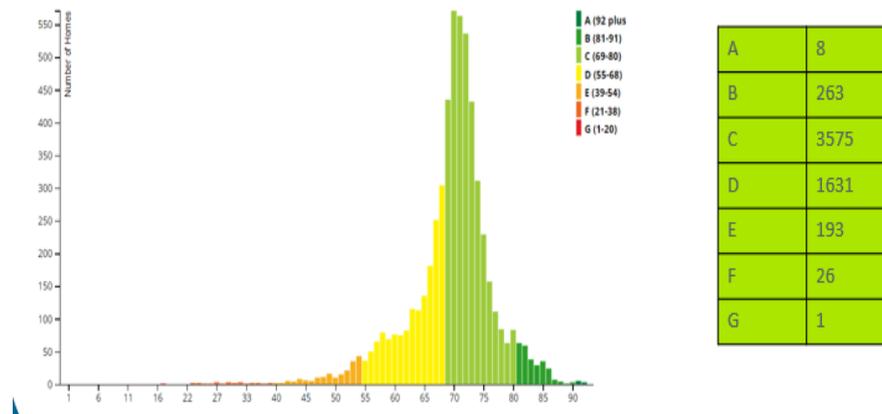
2. SWT housing stock baseline

The Council's c5,700 homes are estimated to account for nearly one third of the Council's own carbon footprint. In 2018/19 12,000 tCO₂e was the estimated volume of carbon released from SWT homes and in 2021/2022 we are now calculating this at 9,860tCO₂ using Parity Portfolio software. Our modelling predicts that an investment of £135m will achieve zero carbon by 2050 with a significant number of archetypes and properties unable to meet our ambition of zero carbon using a heat demand of 50kWh/m²/yr. . However, some of these properties will achieve zero carbon with additional measures and interventions or with ongoing higher than desired fuel usage.

SWT's retrofit investment must be based on robust data and analysis. The housing service has invested in Parity Portfolio and Open Housing and Open Assets software as well as developing pathways to zero carbon through archetype studies. although our data is constantly improving there is sufficient confidence in the data to allow investment priorities and principles to be created. Our data sets are allowing the Council to create pathways to zero carbon for 12 different property archetypes covering 95% of the stock. Our data has significantly improved over the past 12 months and will continue to improve through surveys, use of software and new staff capacity to analyse data. The service is also changing to better capture the data following decent homes and retrofit capital investment programmes.

SWTs baseline has been created through our own resources and by the use of specialists, Parity Portfolio software and our own stock condition and EPC records. Our 'Parity Portfolio' modelling which uses EPC's, capital investment data, such as boiler replacements and other indicators, is able to provide many insights into our stock profile and retrofit requirements. Chart 1 shows that although 1851 SWT homes do not meet the 2030 target the average SAP rating across the stock as a whole does achieve EPC C (69.5). Of those homes not achieving EPC C 86% are in EPC Band D and a small number of low cost interventions such as quality windows low energy lighting, improved loft insulation or gas boiler upgrade will bring the majority of these homes up to the standard will move these homes to band C. It should be noted that pre works assessments will identify the accuracy of the data we hold and this may lead to retrofit solutions being reconsidered. Please note that EPC's and SAP are not a measurement fit for purpose to identify carbon reduction.

Chart 1 – Profile of SWT properties 2022 in relation to EPC bands



Although EPC's and SAP measurements are not appropriate for measuring carbon reduction the data does suggest that 3845 properties are EPC A, B or C. We can therefore assume that 66% of council homes already meet the 2030 target and governments fuel poverty measure.

The average cost of bringing SWT homes up to EPC C is £3.2k which is a moderate business plan investment. SWT do have some outliers such as Woolaway and Cornish non-traditional properties, pre 1930 homes and solid wall properties. The Council will need to consider if these homes offer value for money on a cluster or individual basis and if a retention or disposal strategy should be pursued. In addition, some stock will become tiered and not merit investment but offer opportunities for demolition to create sites for new build council homes or disposal.

Chart 2 shows SWT stock profile by age. SWT has recognised the need to make disinvestment decisions such as demolition and disposal where an overriding case is presented. SWT have recently experienced the need to disinvest in woolaway and Wordsworth Drive Flats as the properties have been recognised as uneconomic to bring to a decent homes and zero carbon standard. Although the HRA investment pre 2030 to achieve EPC C is significant the greater challenge is to bring homes up to the 2050 zero carbon standard. On average homes will cost c£24k. This cost does not include any complementary work such as support for customers, decanting, refixing of components disturbed during work or early replacement of components before their anticipated failure date.

Chart 2 – Stock profile by age

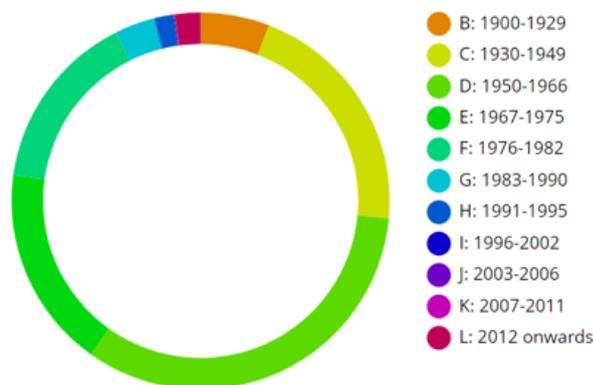


Table 1 below provides a summary of some of the baseline stock data which is helpful when considering low carbon retrofit and investment options. The baseline data suggests each home on average produces 1.7 tons of CO2 annually which is 9,685 tons of carbon annually from all SWT homes. A key baseline measure important in the strategy is heat demand. Officers using archetype studies based on a limited number of property survey's have estimated the average heat demand of 170 kWh/m2/yr. This measure excludes household domestic energy appliances, equipment or vehicles as the landlord can only influence but not control these items. It should be noted that as more homes are surveyed pre works the baseline will

change. Reducing heat demand along with switching fuel to electricity will be key indicators when measuring success of the strategy.

Table 1 – SWT Baseline Stock Data

	2022 Baseline
SWT Properties (excludes leaseholders)	5697 (100%)
Houses	2848 (50%)
Apartments	1994 (35%)
Bungalows	855 (15%)
Leaseholder	450 (100%)
Properties above EPC C (C, B, A) (excludes leaseholders)	3846 (65.78%)
Properties EPC D or below (D, E, F) (excludes leaseholders)	1851 (33.2%)
Average SAP	69.5 (EPC C)
Architypes	14
% of stock covered by Architype studies	80%
% of stock covered by PAS surveys	0.004%
Average CO2 per units	1.7 tCO2 pa
Total CO2	9,685 tCO2
Average Heat demand per property	170 kWhH/m2/yr

**note data will change as more property surveys are conducted pre works*

Architype Studies

SWT is creating c12 high level architype pathways to zero carbon (table 2) which also consider a properties form (bungalow, house, apartment). This strategy places significant emphasis on the architype studies to establish our base line, targets and pathways to zero carbon. As more individual property studies are conducted baselines, targets and pathways will be refined. The importance of zero carbon pathway modelling is critical to understand the investment decisions including the sequence of investment based on a fabric first approach. These high level studies cover 96% of SWT homes and will ultimately be transparent to allow tenants, staff and Members to understand how SWT plan to achieve zero carbon and reduce fuel usage for each home/architype. Table 3 shows the 14 SWT property architypes and tables 2, 3 and 4 are examples of how these architype template help officers understand the measures to achieve zero carbon. These studies show the importance of considering each architype on its merit and these high level studies are followed by whole house and block surveys often using the PAS 2035 assessment process.

Table 2 – Property Architype Studies

SWT Architype Studies 2022				
Architype	% of SMT Stock	Heat demand Baseline (kWh/m2/yr)	Ambitious 2040 Heat demand (kWh/M2/yr)	% improvement
1 Conventional House	77.40%	193	49.75	388%
2 Conventional Apartment		187	25	748%
3 Conventional Bungalow		188	41.25	456%
4 Woolaway House semi	3.80%	170	37	459%
5 Woolaway House Terrace		170	37	459%
6 Cornish House	6.30%	TBC	TBC	TBC
7 Cornish Apartment		TBC	TBC	TBC
8 Cornish bungalow		TBC	TBC	TBC
9 Easiform House	7.10%	TBC	TBC	TBC
10 Easiform Apartment		TBC	TBC	TBC
11 Easiform maisonette		TBC	TBC	TBC
12 BISF House Semi	1.30%	TBC	TBC	TBC
13 Others	4.10%	No Architype studies planned		

Table 3 - Profile of SWT stock by architype

Architype	SWT Units
Conventional	4417
Easiform	407
Cornish PRC	359
Woolaway*	218
Airy	24
BISF	77
HSG REV AC	1
Relocat	10
Special PP	3
Rema PRC	43
Stanard WIC	8
Tru-steel	24
Concrete	63
Timber	52
	5706

** Some woolaways are currently under demolition*

The Council’s most common property architype is a brick build conventional house. The circles on table 4 shows the baseline and optimum investment to ensure the home is affordable to the tenant and zero carbon once the grid is decarbonised. This architype has the potential to reduce its heat demand by 388% (193 kWh/m2/yr. to 49.75 kWh/m2/yr.). This property could achieve a heat demand of 25 kWh/m2/yr. however this would require greater disruption to the household and significantly higher costs.

Table 4 – Architype 1 – Pathway to Zero Carbon – conventional brick built semi-detached house

VOR Architype Pathway – Conventional Semi (Cavity Wall) target = 49.75kWhm2pa (no floor intervention)

Prop Avt	Baseline	Fabric <90 kWh/m²	EPC-B	EPC-A
EPC Information		EW/DOORS & WINDOWS/AF50/MEV	...plus PV	...plus FLOOR/ASHP/MVHR/AF50
Existing EPC	E-48			
Full SAP EPC Rating	E-48	C-73	B-89	A-95
Final Heat Demand (kWh/m²/year)	193	49.75	49.75	25
Floor U-Value	0.73	0.73	0.73	0.18
Wall U-Value (Sys Build)	2.4	0.2	0.2	0.2
Roof U-Value	2.4	0.13	0.13	0.13
Door U-Value	2.85	1.2	1.2	1.2
Window U-Value	2.7	1.2	1.2	1.2
Air Tightness	9.78	5	5	3
Solar PV KWP			3	3
ASHP				YES
Ventilation Type	IEV	MEV	MEV	MVHR
Thermal Efficiency				90%

(a larger version of this table is available at appendix 2)

Table 5 again shows a common property architype which is a brick build conventional apartment often 2 or 3 storeys. The circles on table 5 shows the baseline and optimum investment to ensure the home is affordable to the tenant and zero carbon once the grid is decarbonised. This architype has the potential to reduce its heat demand by 748% (187 kWh/m2/yr. to 25 kWh/m2/yr.). This architype does not achieve a minimum heat demand of 50 kWh/m2/yr. without external wall insulation and triple glazing.

Table 5 – Architype 2 – Pathway to Zero Carbon – conventional brick built low rise apartment

VOR Architype Pathway – Conventional top floor Flat (Cavity Wall) target = 25kWhm2pa (no floor intervention)

Prop Rd	Baseline	Fabric <90 kWh/m²	EPC-B	EPC-A
EPC Information		CW/FLAT ROOF/MEV	...plus Solar	...plus EW/W&D/MVHR
Existing EPC	D-64			
Full SAP EPC Rating	D-56	C-73	B-89	A-95
Final Heat Demand (kWh/m²/year)	187	60	60	25
Floor U-Value	N/A	N/A	N/A	N/A
Wall U-Value	1.55	0.55	0.55	0.18
Roof U-Value	2.03	0.19	0.19	0.19
Door U-Value	2.9	2.9	2.9	1
Window U-Value	2.8	2.8	2.8	1
Air Tightness	4.17	4.17	4.17	3
Solar PV KWP			2.5	2.5
ASHP				
Ventilation Type	IEV	MEV	MEV	MVHR
Thermal Efficiency				90%

(a larger version of this table is available at appendix 2)

Table 6 is again a common property architype which is a brick build conventional bungalow. The circles on table 6 shows the baseline and optimum investment to ensure the home is affordable to the tenant and zero carbon once the grid is decarbonised. This architype has the potential to reduce its heat demand by 456%

(188 kWh/m²/yr. to 41.25 kWh/m²/yr.). This archetype requires an insulated floor to achieve a maximum heat of 50 kWh/m²/yr. If a property has a concrete foundation insulated floors can be expensive and intrusive. This example allows asset managers to consider if bungalows and ground floor apartments merit having their floors insulated when a property becomes void and/or when it requires a new kitchen and bathroom to limit the extra disruption to tenants and limit what would be expensive additional costs. Please note that insulating concrete floors create additional costs such as replacing/realigning existing fixtures including skirting, stairs, kitchen, bathroom, ramps and steps. These additional costs as well as rent loss and decant costs are not included in the £135m investment to achieve zero carbon.

Table 6 – Architype 2 – Pathway to Zero Carbon – conventional brick built Bungalow

VOR Architype Pathway – Conventional Bungalow
(Cavity Wall) target = 42.25wKhm2pa with floors improved during void works

	Baseline	Fabric <90 kWh/m ²	EPC-B	EPC-A
EPC Information		EW/DOORS & WINDOWS/AP50/MEV	...plus PV	...plus FLOOR/MVHR
Existing EPC	E-45			
Full SAP EPC Rating	E-45	C-73	B-91	A-94
Final Heat Demand (kWh/m ² /year)	188	83.25	83.25	41.25
Floor U-Value	0.77	0.72	0.72	0.18
Wall U-Value	1.55	0.18	0.18	0.18
Roof U-Value	0.27	0.13	0.13	0.13
Door U-Value	3.05/4.5*	1.2	1.2	1.2
Window U-Value	2.8	1.2	1.2	1.2
Air Tightness	6.57	3	3	3
Solar PV KWP			2.5	2.5
ASHP	YES**	YES**	YES**	YES**
Ventilation Type	IEV	MEV	MEV	MVHR
Thermal Efficiency				90%

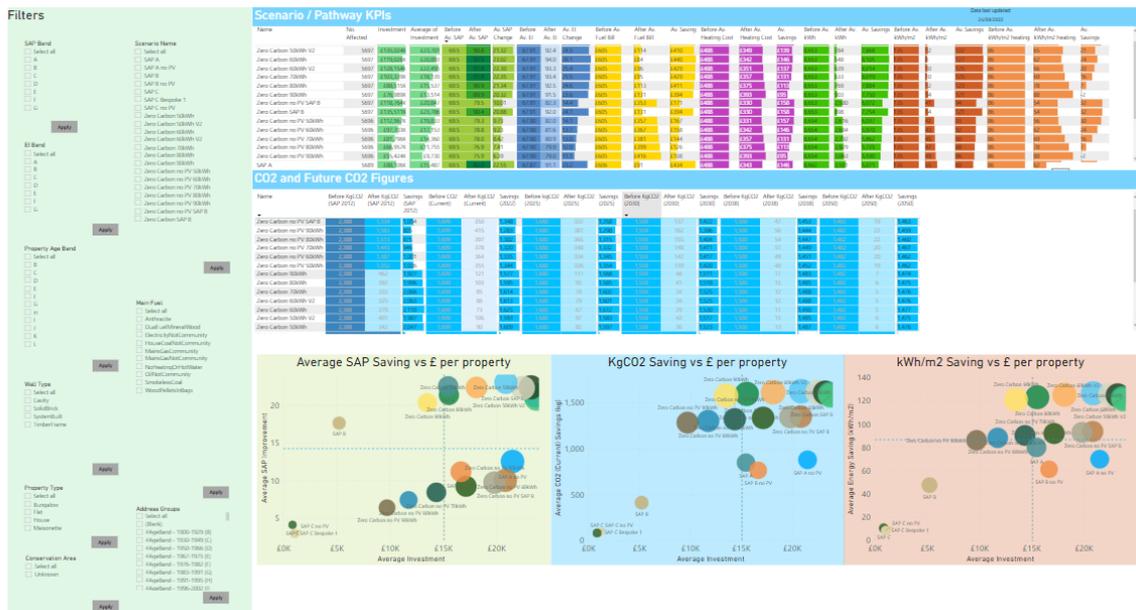
(a larger version of this table is available at appendix 2)

Parity Portfolio Software

Parity Portfolio software helps landlords model options to improve the energy and carbon performance of the existing housing stock. The software includes the latest RdSAP method, with additional and enhanced analysis using georeferenced data. The parity software uses SWTs stock condition data and other relevant data sources to produce property profiles made up of all c5700 SWT homes. The collation and cleansing of data will usually involve some cloning and highlight conflicting or missing data. As the data analysis is done automatically and at individual property level, when new data is updated for example following surveys or capital works the baseline and scenarios update automatically.

The data is available for SWT to run an unlimited number of scenarios (image 3) to help the Council consider a broad range of approaches to achieve zero carbon. The software has numerous property component options which its intelligence can match to the scenario. The service has restricted the choices available when running scenarios to avoid too many component combinations which would be too bespoke to deliver and maintain and /or lead to greater tenant disruption and cost. A fabric first approach excluding internal wall insulation (IWI) and limited floor insulation followed by fuel switch was the preferred scenario which has provided our investment cost estimates.

Image 3 – Parity Software scenario comparison capacity



Data collection and PAS2035 Surveys

The council has a new asset database called Open Assets which sits within the new Open data base for the housing service. The data base is populated with our stock condition data which supports the decent homes programme. The retrofit programme and decent homes programme are now coming together as the single capital programme with the aim of timely investment to ensure all SWT homes are achieving the decent homes standard and also achieving the low carbon and zero carbon standards.

Landlords conduct EPC surveys as part of the lettings process to ensure incoming tenants are aware of the energy efficiency rating of homes. Landlords also carry out stock condition surveys to understand the investment needs of their homes to keep them to the decent home’s standard. Increasing both Government and landlords have been concerned about the problems which have arisen as bi-products of inappropriate Decent Homes retrofit works, specifications, design or components. Issues such as damp and mould or cold bridging are examples of these failings. To support a ‘no regrets’ approach the government require local authorities to follow the PAS 2035 process and appoint TrustMark accredited contractors if they wish to receive government grant. PAS 2035 is a new, comprehensive domestic retrofit standard which will protect landlords and tenants and ensure works are identified and specified correctly. Certified organisations who have the TrustMark accreditation deliver the installations, record and lodge information correctly and issue the appropriate warranties and guarantees.

SWT will follow the PAS2035 requirements and use PAS coordinators and PAS qualified assessors and designers as it develops its programmes of capital works where it is likely the property will qualify for government grant.

SWT low carbon retrofit Targets

Good customer engagement and communication, a fabric first approach and proactive pursuit of subsidy will be embraced to maximise the delivery of;

- a) the greatest CO2 reduction in the shortest time,
- b) a sustainable reduction in average fuel consumption
- c) affordability of retrofit works to the HRA business plan.

Table 7 shows some key baseline data, and the low carbon retrofit targets for 2030, 2040 and 2050. The targets show that the Council can become compliant with the 2030 target at relative low costs and moderate costs (c£3.2m per units). It will incur significantly more cost to reduce heat demand to c50 kWh/m2/yr. (c13k per unit).

The period 2040-2050 will focus on removing fossil fuels (c9k per unit) and resolving challenges to properties unable to achieve the target. There are a large number of properties which will fail to achieve a heat demand below 50kWh/m2/yr. which will require either additional fabric measures or additional on site renewable energy solutions to ensure the fuel costs are sustainable for the tenant.

Table 7 – SWT 2022 baseline and targets 2030, 2040 and 2050.

	2022 Baseline	2030 Target EPC C	2040 target Fabric first 50 kWh/m2/yr	2050 Target Zero Carbon
SWT Properties (excludes leaseholders)	5697 (100%)	5500 (100%)*	5200 (100%)*	5000 (100%)*
Houses	2848 (50%)			2250 (45%)*
Apartments	1994 (35%)			1895 (37%)*
Bungalows	855 (15%)			855 (18%)*
Leaseholder	450 (100%)			727 (100%)*
Properties above EPC C (C, B, A) (excludes leaseholders)	3846 (65.78%)	5397 (95%)	5200 (100%)	5000 (100%)
Properties EPC D or below (D, E, F) (excludes leaseholders)	1851 (33.2%)	c300 (c5%)	0 (0%)	0 (0%)
Average SAP	69.5 (EPC C)	TBC	TBC	91.9 (EPC B)**
Architypes	14	14	14	14
% of stock covered by Architype studies	96%	96%	100%	100%
% of stock covered by PAS surveys (or other retrofit assessment)	0.004%	20%	75%	100%
Average CO2 per units	1.7 tCO2 pa	TBC	0.63 tCO2	0 tCO2 pa
Total CO2	9,685 tCO2	TBC	3,587 tCO2	0 tCO2
Average Heat demand per property	170 kWh/m2/yr	95 kWh/m2/yr	50 kWh/m2/yr	50 kWh/m2/yr
Total investment for stock to achieve target***	0	£6,000,000	£66,000,000	£135,000,000
Average investment per property to achieve EPC C	0	£3,270	£12,638	£23,697
* assumption 'best guess' based the potential variance due to Right to Buy Sales plus disposals and demolitions plus new build homes				
*** Do include associated costs such as decanting, environmetnal works, replacement of components in advance of their renewal date, surveys, etc				

A key concern for many Members and observers is the pace which fossil fuel is being replaced by on site or grid renewable heat and power. Chart 3 provides a picture of the relative progress of key measures which supports a fabric first approach within a restricted budget. The position taken by the strategy is based primarily on the following assumptions:

- The Housing Revenue Account will have insufficient funds to deliver all required measures for Zero Carbon through a one off whole house approach. The housing service will need to revisit many properties over the next 28 years to achieve the standard.

- A fabric first approach will reduce the heat and power required for a property regardless of fuel source. When a properties heat demand is reduced through insulation measures the amount of fossil fuel used to heat and power the property reduces. If a 50 kWh/m2/yr. target is achieved the housing stock will reduce fuel usage by 70%+. In theory this means fuel regardless of type will reduce by 70%. This would be a significant achievement and avoid higher electricity costs for many customers.
- A fabric first approach means that when fossil fuel is replaced in SWT homes the specification for the new electric heating system will be based on the lower heat demand required to keep the property warm. This will means boilers will be more efficient and smaller. If heating system require less electricity then any demands on the grid or PV will be less.
- Some SWT properties will receive a whole house approach with multiple measures which will include renewable heat and power between 2022. An estimate is that c1100 properties could benefit from early replacement of fossil fuel.
- Significant progress has been made by the grid in decarbonising over the past ten years and this will continue. The heat demand target of <50 kWh/m2/yr. is set as it is thought for a household with average income electric heating from the grid will be affordable. For some low income / vulnerable customers SWT would like to go further through on site renewable heat and power providing greater cost efficiency. The strategy recognises that the largest contribution to reducing CO2 and fuel usage in the short term within the assumed financial resources is an ambitious target.
- The government are emphasising the fabric first approach through the various grant and obligations they control. This means that in the short term SWT can deliver more fabric measures as more subsidy is available for fabric than renewable heat and power measures.

Image 4 - Why Fabric First -

Benefits of a fabric first approach?



Achieving 2030 Targets

SWT will strive to achieve EPC C for all SWT homes by 2030. This will require 1891 homes to receive investment in low carbon measures primarily through three work packages and some will need to be considered as part of an asset management option appraisal. As new grant opportunities are introduced more new investment packages will be introduced. The three work packages are:

1. Multiple measures usually moving properties two EPC bands through multiple fabric measures including improved wall, loft, window, door insulation, improved air tightness and ventilation and where funding permits renewable heat and power – Examples of this would be plans being progressed for some non-traditional properties including some Woolaways, Cornish, Easiform and apartment blocks. The service has a significant funding pledge from an energy provider to deliver comprehensive improvements to public and private dwellings with c£6m estimated for SWT homes between 2022 and 2026. This initiative will use a neighbourhood based social housing led approach to delivering energy company obligation. Properties in this category should require few future measures following works to achieve zero carbon.
2. Windows replacement scheme with a minimum insulation value of U1.2 supported by a wraparound energy package where the property will receive complementary draught proofing, loft insulation, low energy lighting, improved boiler controls and property monitoring technology. The service hopes to improve 1100 homes from EPC D to EPC C between 2022 and 2026 using this approach and is commencing on a priority list of 617 homes.
3. Continuation of our boiler replacement scheme with the replacement of inefficient gas, electric or solid fuel with more efficient heating. The majority of replacement systems will be new gas combi boilers but some electric and renewable systems. Properties improved with a new boiler will also be supported by a wraparound energy package where the property will receive complementary draught proofing, loft insulation, low energy lighting, improved boiler controls and property monitoring technology. The service hopes to upgrade c250 homes from EPC D to EPC C between 2022 and 2024. These properties will still require fabric first measures to achieve a heat demand of 50 kWh/m²/yr. and zero carbon.

Achieving 2040 Targets

SWT will strive to achieve 50 kWh/m²/yr. for all SWT homes by 2040. This will require circa 5000 homes to receive significant fabric investment and frequent use of high performing double or triple glazing and doors, greater attention to air tightness and draught proofing measures and increased use of mechanical ventilation. The stock will also see an increase in the use of external wall insulation. The service is investing in software and staff capacity to help analyse retrofit and decent homes data to identify properties able to cost effectively receive multiple fabric first measures through a whole house approach. Between 2028 and 2040 the alignment of decent homes and retrofit will remain in significant focus as multiple measures delivered simultaneously will reduce prelim costs. The nature of the interventions will mean a significant uplift in the average cost of works. It is likely that during this period some additional measures such as floor insulation will be introduced within the void programme in

particular for bungalows and some apartments in order to minimise any decants required as a result of retrofit. The decanting of tenants will significantly increase the complexity of the works programme and incur additional costs and major disruption for tenants. The service is preparing block investment plans which will place the Council's 440 housing blocks within timelines for investment and also allow consultation with leaseholders and tenants on comprehensive block refurbishment packages.

Achieving 2050 Targets

SWT will strive to achieve zero carbon by switching fuel away from fossil fuel once properties heat demand is significantly low to minimise the impact of fuel affordability. Some fuel switching is taking place at the moment as some heating systems need replacing and the tenant should be no financially worse off after fabric works. Solid fuel systems and inefficient electric systems will be replaced by more efficient electric systems such as quantum or Air Source Heat Pumps. However, switching tenants from gas prior to significantly reducing heat demand or a significant change in the cost of electricity compared to gas will have the potential to increase fuel poverty for more tenants and exaggerate the cost of living crisis. It would also be the case that the property would require the specifying of a larger/more powerful boiler than would be required post fabric first insulation works as the system would be specified for heating more colder air. It is worth noting that c650 (11%) Air Source Heat Pumps have been installed in SWT homes although there is significant variation in the heat demand for those properties leading to both good and poor user experiences. All homes which use electric heating and no fossil fuel will automatically be zero carbon as soon as the national grid is decarbonised. Therefore c1700 homes are already compliant albeit with insufficient insulation to make the homes efficient to heat.

In order to achieve zero carbon in the most cost economic way whilst saving the greatest amount of carbon and fuel in the shortest time fuel switching should in the majority of cases take place once a property has achieved its optimum heat demand as close to 50 kWh/m²/yr. possible. In some cases where grants become available and the heat demand is sufficiently low immediate investment in fuel switch would be progressed. For example 37 Woolaway properties are proposed for an all walls out refurbishment improving their heat demand from 170kWh/m²/yr to 39 kWh/m²/yr. This has coincided with a grant guidance being announced which will permit the additional costs of Air Source Heat Pumps to be met.

Asset management plans to manage investment and disinvestment

The service will refine its asset strategy to identify properties at risk of not achieving zero carbon at an affordable fuel cost to the tenant by 2050. Our experience has highlighted that exploring low and zero carbon for some of our stock can identify shortfalls in the value for money investment would provide. Our recent experience at Wordsworth Drive flats turned an investment opportunity into a disinvestment project as the properties were not of sufficient build quality to merit investment to the decent homes and zero carbon standard. It is inevitable that the council will need to consider if some homes should be retained and if not should they be sold or demolished.

Customers that the heart of Zero carbon

Achieving zero carbon, tenancy sustainment and fuel affordability are just three of the reasons for the Council and tenants to work ever closer. The Council must work with tenants to ensure our staff and contractors can carry out surveys, works and maintain properties in an efficient and timely manner. Through this cooperation tenants will benefit from lower energy bills and healthier homes. Tenants guidance and insight about their homes and neighbourhoods is extremely valuable in ensuring the Council is able to deliver information, works and services appropriately. The service experiences a high number of access refusals and by working with tenants the Council will deliver capital schemes faster, more economically and more efficiently.

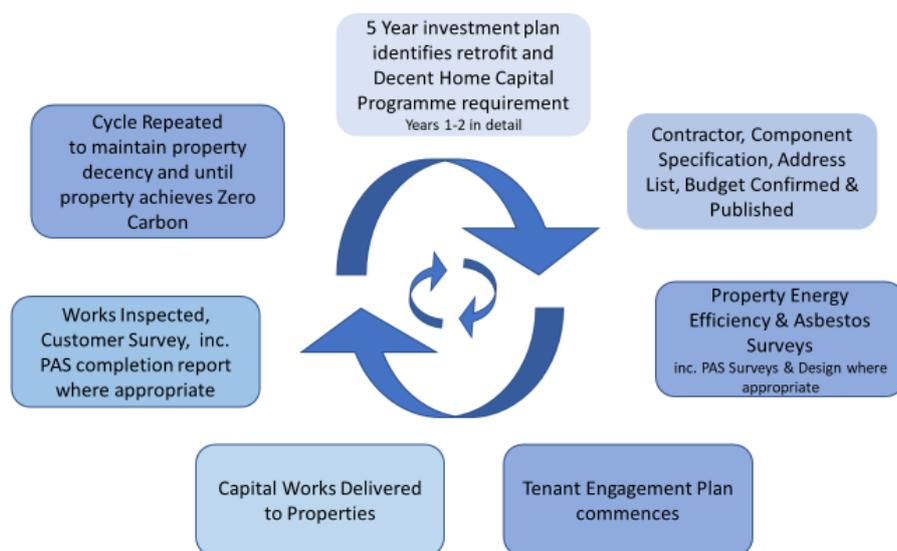
SWT has been working with tenants through the Tenants Strategic Group, Damp and Mould Working Group and through two Low Carbon Working Groups including one looking in detail at the 256 zero carbon new build and retrofit homes in North Taunton and the other District wide working group with tenants representing tenants from all over the district to specifically help guide officers on this retrofit strategy and delivery plan. Customers are shaping the procedures we seek to adopt during the retrofit programmes. Below is a list of the most common themes which tenants have raised through these forums:

- Good communication to promote low carbon and zero carbon retrofit in different formats is essential – face to face, newsletters, websites and social media, local open events or drop in opportunities, show houses, tenant liaison officers, housing officers, call centre
- Good communication and doing what is promised will develop more trust and encourage more tenant interest.
- A standardised approach to tenant consultation, engagement and support before, during and after capital works from the Council and its contractors
- Promotion of the benefits of well insulated, warm, healthy and affordable homes to tenants needs to be prominent
- A more personalised approach during consultation with more opportunities for face to face contact and advice prior and during works, such as tenant liaison officers and open events. Easy to read guides and face to face inductions are important to allow tenants to become familiar with any new technology in their homes
- Better use of technology to inform and support tenants including web based information, smart controls, feedback from remote monitoring to evidence homes are more efficient following works
- Timely publication of capital investment programmes enabling tenants to access to information about their home such as an online carbon or fuel calculator.
- Standard policies to be issued at the tender stage to potential contractors which set out SWTs requirements on matters such as customer engagement, additional support for vulnerable customers before and during works and a social value requirement.
- Ensuring homes are left tidy following works
- Showing what works and the benefits for tenants of retrofit through virtual means and show houses

- Joined up messages from SWT officers, trades and contractor about works, the benefits of retrofit and use of components
- Ensuring staff and contractors are wearing the appropriate identify badges when calling on tenants
- A dedicated person (tenant liaison officer) to call or meet when there are questions
- More jobs completed on first visit or within the same programme of work
- Clarity of start and end dates for works prior to work commencing
- Tenants to act as champions promoting the benefits to other tenants

As a result of these themes a number of new initiatives and practices will be actioned. Chart X is a circular process which will become common in order to deliver capital works and ensure customer information, engagement and feedback is built into the delivery of capital programmes. The process is cyclical as many homes will need visiting several times to deliver retrofit works over the next two decades and properties also move in and out of decent homes standard as components wear out.

Chart 3; Circular Capital Programme Process



These include:

- The production and use of a number of policy statements when procuring contractors or during capital works carried out by SWT or their contractors. These will include; expected standards of tenant engagement to inform a contractor's tenant engagement plan. a statement on the expected standard of additional support for vulnerable customers during work programmes and a standard approach to collecting customer satisfaction data. These policies will reflect the need to target the tenant and not the property.
- Work programmes to be designed and agree earlier to allow the timely promotion of works, ensure a good lead in time for consultation in advance of work, reduce access problems and help align more work programmes and surveys to reduce the number of visits to tenants homes

- Build in funding and time to capital programmes to support vulnerable tenants with preparatory works ahead of installation e.g. cleaning lofts and moving furniture.
- The launch of a show house in early spring 2023 to promote low carbon components to tenants, staff, Members and contractors. The show house will include displays and virtual tours of other SWT zero carbon new build and retrofit projects as well as showing materials and technology commonly used in retrofit.
- Identify additional capacity to ensure SWT can prepare and deliver programmes of work in a timely way.
- Set up a leaseholder forum to ensure leaseholders understand the implications of zero carbon for them and the financial contributions they may have to make.
- The development of standardised written information to be used at specific stages of consultation. Ensure we are able to explain why things are needed, and who will be doing them and when they will take place.
- A mechanism to ensure the landlord and its contractors can have better customer insight when engaging customers during works by making best use of the data available through our open system.
- Training and support for SWT colleagues to ensure joined up messages during customer contact
- Ensure contract specifications are clear and the council works with contractors to ensure technical information is clear, correct, and easy to understand.
- Include tenant representatives in the selection of smart controls and devices prior to contract award.
- Continue with the Tenants Low Carbon Working Group in order to support tenant retrofit champions and guide officers as we deliver works, agree work programmes, appoint contractors, and engage with other customers.

4. Fuel Poverty and Healthy Homes

Healthy Homes

The right home environment is the foundation from which we can build healthy and fulfilling lives. Housing affects our wellbeing, risk of disease and demands on health and care services. We need warm, safe and secure homes to help us to lead healthy, independent lives and to recover from illness

Generally speaking, the health of older people, children, disabled people and people with long term illnesses is at greater risk from poor housing conditions. The home is a social determinant of health and as a result is a key driver of health inequalities. Those living in poverty are more likely to live in poorer housing, precarious housing circumstances or lack accommodation altogether.

Tenure is also a key social determinant of health. Generally speaking, 63% of people are owner occupiers, 17% live in social homes, whilst 20% are in the private rented sector

- Owner occupied homes: a shrinking resource and the most (by number) of unhealthy homes. Many are inaccessible and a significant proportion are under-occupied. Many elderly residents own their homes but are income poor
- Social homes: a shrinking resource but the most healthy and accessible homes. Highest proportion of overcrowding. The range of issues will vary dependent on location and provider
- Private rented sector: The biggest proportion of unhealthy homes: The least affordable and least stable. Occupiers have a younger demographic compared to other

Interventions on housing standards are essential to remove health inequalities

The right home environment can:

- Protect and improve health and wellbeing and prevent physical and mental ill-health;
- Enable people to manage their health and care needs, including long-term conditions, and ensure positive care experiences by integrating services in the home;
- Allow people to remain in their own home for as long as they choose. In doing so it can:
 - Delay and reduce the need for primary care and social care interventions, including admission to long-term care settings;
 - Prevent hospital admissions;
 - Enable timely discharge from hospital and prevent re-admissions to hospital;
 - Enable rapid recovery from periods of ill-health or planned admissions.

Key features of the right home environment (both permanent and temporary)

- It is warm and affordable to heat and has adequate ventilation to support good air quality and thermal comfort in extreme conditions.

- It is free from hazards, safe from harm and promotes a sense of security;
- It enables movement around the home and is accessible, including to visitors;
- There is support from others if needed.
- Tenure that is stable and secure

Fuel Poverty

As noted above, the ability to live in thermal comfort is essential to health, especially for those who are vulnerable by reason of age or disability

The UK and many parts of the world are undergoing significant fuel inflation and both the UK and SWT district have a cost of living crisis which is under-pinned by fuel price inflation and an uncertain economic environment. Many households in the district will experience fuel poverty for the first time this year leading to choices between basic household requirement. A household's fuel poverty status depends on the interaction of three key variables

- Energy efficiency of the home
- Income
- Energy prices

The government have recently (2021) changed the definition of fuel poverty. Fuel Poverty in England is now measured using the Low Income Low Energy Efficiency (LILEE) indicator, which considers a household to be fuel poor if:

- It is living in a property with an energy efficiency rating of band D, E, F or G as determined by the by the most up-to-date Fuel Poverty Energy Efficiency Rating (FPEER) Methodology*
- Its disposable income (income after housing costs (AHC and energy needs) would be below the poverty line (defined as an equivalised disposable income of less than 60% of the national median)

The definition of fuel poverty has become more nuanced over time. Between 2013 and 2021, the definition was based on variables relating to fuel cost and income. This was the Low Income/High Costs definition. This definition took no regard to the energy efficiency of the home. Prior to 2013, the definition was based purely on the proportion of income that was spent on heating.

A critical factor of the new definition is that, should the home have an energy efficiency rating of A to C, then the residents are regarded as not being within fuel poverty, regardless of income. Key partners have adopted the recent Government change in definition. This includes the Centre for Sustainable Energy (CSE) who are important partners within Somerset Independence Plus (SIP), providing advice on warm homes, as well access to grants

Low Income Low Energy Efficiency (LILEE) Indicator

The ONS has recently published a detailed analysis of fuel poverty across England, using the LILEE indicator (Annual Fuel Poverty Statistics in England, 2022 (2020

data)). The LILEE indicator is based on statistics collected in the English Housing Survey (EHS) which is a continuous national survey commissioned by the Department of Levelling Up, Housing and Communities (DLUHC). It collects information about people's housing circumstances and the condition and energy efficiency of housing in England.

Fuel Poverty Gap

Within the recent ONS analysis, it was observed that the average fuel poor household would require a reduction of £223 to their fuel costs to be moved out of fuel poverty, this is the average fuel poverty gap. The average gap in 2020 is 2.3% lower than 2019 (£229) and 34% lower than in 2010 (£339) in real terms. The main reason for the reduction in fuel poor households in 2020 was energy efficiency. 52.1% of low income homes achieved an energy efficiency rating of band C or higher, up from 47.8% in 2019 and just 14.6% in 2010.

Fuel costs for the least efficient properties (band G) are almost three times higher than costs for the most efficient properties (bands A-C) in 2020. It is important to note that, since the publication of the ONS report, the cost of living crisis has impacted many of our poorer households and, undoubtedly, these figures will now be in reverse. This should be considered when reading the following paragraphs.

Targets

The Government has in place a statutory fuel poverty target which is: To ensure that as many fuel poor households as reasonably practicable achieve a minimum energy efficiency rating of band C by 2030 (currently 52.1% nationally and 68.4% of SWTs stock), with interim targets of band E by 2020 (currently 97.2% nationally and SWT 99.5%), and band D by 2025 (currently 90.1% nationally and SWT 96%).

The ONS report contains a detailed analysis of fuel poverty data, illustrating many points including:

- The cumulative number of energy efficiency measures installed has increased significantly between 2013 and 2020
- The average gap and proportion of households in fuel poverty is highest for those living in properties with uninsulated walls
- The average fuel poverty gap is highest for detached properties despite these having the lowest rate of fuel poverty
- Smaller properties are more likely to be occupied by the fuel poor
- Households living in properties built before 1919 have the highest share of fuel poverty
- Households living in the South West had the highest average fuel poverty gap (£287)
- Rural households have a much larger fuel poverty gap
- Fuel poor households are more likely to be off the gas grid and have an average fuel poverty gap three times higher than gas households

- The proportion of households in fuel poverty was highest for private renters at 25% whilst owner occupiers (outright owners) have the highest average gap at £292. The lowest gap (£150) was within the social housing sector
- Single parents have the highest proportion of households in fuel poverty and couples aged over 60 have the highest average gap

More detail about fuel poverty across Somerset (and the districts) can be found on the Somerset Intelligence Network (SINe) website, although the data on here is dated 2016 and relates to the previous definitions of fuel poverty.

* FPEER methodology is based primarily on the Government's Standard Assessment Procedure (SAP) for assessing the energy performance of domestic properties. Building on SAP, the FPEER Methodology also accounts for the impact of policy interventions that directly affect household energy costs. In the same way as SAP, the methodology generates an energy efficiency rating from 0 (lowest) to 100 (highest). This rating is then translated into an energy efficiency 'Band' from G (lowest) to A (highest), in a way that is analogous to a SAP rating being used to generate an overall energy efficiency Band (again from G to A) for Energy Performance Certificates.

Fuel Poverty recommendations

It is recommended that SWT adopts the Government definition (EPC C) as a means of measuring those in fuel property. An abbreviated definition for SWT is:

A household is considered to be fuel poor if;

- i). The property has an energy efficiency band rating of D, E, F or G

The council will strive towards achieving EPC C for all SWT rented homes by 2030 in line with the government target. Using this measure SWT can compare itself with national performance and align with key partners for the convenience of funding bids and joint working arrangements. In addition;

- ii). This strategy is recommending that a fabric first ambition of 50kWh/m²/yr by 2040 is recognised as an ambitious target for Council homes in order to allow the council to achieve zero carbon and minimise fuel poverty in the District. Achieving a fabric first target of 50kWh/m²/yr will allow households with an average regional income to afford to run an electric heating without the additional benefit of Air source heat pump or solar photovoltaic panels and battery storage. The fabric first target would reduce average heat demand by circa two thirds. properties which do not achieve this heat demand target should be automatically for additional energy reduction measures such as Air Source Heat Pumps, Photovoltaic Panels and batteries.

Neighbourhood based programme will be encouraged where certain properties or localities are statistically likely to be more vulnerable.

The council cannot impose on customers rules in relation to the purchase and use of appliances and electrical equipment which they use in their homes. However, over time the Council will replace gas with electric only supply and therefore fossil fuel will not be an option for tenant to heat their home or cook. The Council will;

- Help customers understand how they can save energy in the home through providing advice and information
- Promote the work of other agencies who are seeking to improve resident's health and help people as the cost of living crisis affects more households
- Provide an induction on the low carbon energy saving components of a home during lettings process
- Introduce SMART devices in the customers home to allow customers greater awareness of energy use and the ability to manage their heat and in some cases remote monitoring to allow early intervention.
- Create a more aware workforce which can direct tenants to the support they need should they have questions relating to the energy efficiency of their homes or use of the home's components

5. Ensuring affordability to the Housing Revenue Account

The Housing Revenue Account (HRA) of the Council is ring fenced and its income comes from tenants' rents. Most Council rents are set at a 'social rent' which uses a formula which typically sets social rents between 50% and 60% of market rent. SWT for new build homes has recently used 'affordable rent' which is around 80% of market rent. These properties generate more income for the HRA which compensates to a greater degree for the additional costs of building a zero carbon home. The HRA in recent years has been subject to a government imposed rent cap and a cap is also being consulted on by government. Depending on the level at which a rent cap is set the HRA can find that it has to make hard choices and where it priorities spending. In addition, the Right to Buy will mean some homes receiving additional investment will be sold with the sale price unlikely to compensate the council for the additional investment. Local authority and housing association landlords have also adopted higher standards in many areas of their work including compliance and Health and Safety works leading to more costs.

The Council annually sets rent levels within the constraints of the formula. Funding the retrofit strategy will be one of the many considerations for the council when setting rents. Constraints on rents may reduce immediate financial pressures on tenants however this benefit may be offset by a greater proportion of energy inefficient homes for longer.

The cost of achieving zero carbon for the 5797 homes is estimated at £135m which is an average of c£23,700 per property. With little opportunity to create new income the HRA will need to be very efficient in managing its business. Although the general fund is able to provide subsidy to the HRA to deliver the council zero carbon ambition as soon as possible it is assumed this opportunity is remote. The solutions to HRA business plan affordability are to be found in;

- Alignment of decent homes and retrofit programmes
- Maximise subsidy / grants
- Ensure good data influences decisions
- Tenant at the heart of zero carbon
- Selective property disposal or demolition.
- Delivering the retrofit strategy will be one of the considerations for the council when rents are set annually.

Alignment of decent homes and retrofit programmes

The decent homes programmes have c£50m over the next 5 years (c£10m per year) and has investment built in throughout the HRA business plan. Some spending will be required on essential component replacement of items unrelated to retrofit such as kitchens and bathrooms, but the majority of decent homes components can be specified to contribute to the retrofit strategy.

In considering the decent homes, compliance and retrofit programme as one programme asset managers can make decisions which provide dual purpose. There are a number of components such as windows, doors, ventilation, insulation, lighting,

roofing as well as heating systems and controls which could be installed with a specification appropriate for decent homes, compliance and retrofit requirements. In addition, there are a few retrofit works that could be efficiently done when a property is void and between tenancies although these opportunities should be limited due to the diseconomies of scale.

The 30 year business plan assumes significant levels of funding for these items which can be enhanced to achieve a retrofit specification. The alignment of decent homes, compliance and retrofit works would contribute to reducing the additional cost of delivering zero carbon retrofit. In addition, there may be efficiencies by delivering multiple measures to a property using a whole house approach or package of complementary works. Efficiencies could come from streamlining surveys, tenant consultation and liaison, contract management and collecting post works data and satisfaction.

The delivery plan (appendix 1) provides examples of how retrofit is being aligned to decent homes and compliance programmes.

Maximise subsidy and grants

The Council need to be enthusiastic and proactive in pursuing relevant subsidy which is often in the form of government grant or energy company obligation. There are and will continue to be for many years a number of grants each set up to achieve benefits for different tenures (Private Sector, Social Housing) or encourage the delivery of different measures (Insulation, fabric first, fuel switch, tackle solid wall properties, renewable heat and power, etc). Subsidies keep changing and grant rules will keep changing and therefore it is critical that the HRA has an explicit pathway to zero carbon for each property archetype and form.

However, grants should not be pursued without a clear purpose in mind which means the Council asset management service using software such as open assets and archetype pathways to zero carbon must be able to match opportunities with properties. It is also critical that opportunities can be matched swiftly as funders often provide very limited time windows to submit grant and deliver works. Currently we see many grants aimed at a fabric, worst first approach and this reflects the current UK need to reduce the heat demand of homes. Reducing heat demand will have the dual benefit of saving the most carbon for the least investment for the majority of homes and reduce the amount of electricity on a nation scale required for residential use. It should be noted that fossil fuels are still being used to generate a significant amount of grid electricity so a switch early to electricity may not save initially as much carbon as in future years. It is likely that once heat demand reduces, and the grid decarbonises more grants for fuel switch will be introduced to remove fossil based gas domestic heating with mainly electric powered systems. It is also likely that technology will advance significantly over the next twenty years and new components will be encouraged by making grants available.

The delivery plan (appendix 1) provides examples of how SWT is making use of current grants and aligned to decent homes investment to match fund grant requirements. The council is also progressing energy company obligation funding to

provide the capacity, skills and 100% resources to deliver some of the 'worst first' homes.

Ensure good data influences decisions

In previous sections the strategy has outlined the approach to data collection and analysis. As the council's Open Assets data base becomes more established and more property data is collected and verified the council will be able to be more sophisticated in aligning its investment and disinvestment. Additional resources are being priorities over the next few years to ensure our data is robust, validated, and ready to support grant applications and capital programmes. Although the use of the PAS2035 coordination and assessment will introduce additional surveying costs this approach reduces the likelihood of expensive problems such as damp and mould and failure to achieve the expected energy efficiency improvements (performance gap). The strategy is also encouraging the use of SMART controls on boilers and technology to identify early underperforming properties.

The delivery plan (appendix 1) provides examples of how good data is leading to better use of decent homes capital programme funds and early identification of properties likely to be suitable for subsidises such as Social Housing Decarbonisation Fund 1 & 2 and ECO4.

Tenant at the heart of zero carbon

In previous sections of this strategy it has been emphasised that the tenant must be at the heart of delivering zero carbon. Where the council and customers both see the merits of zero carbon communication and access to deliver programmes of investment will be more efficient and tenants will benefit from reduced fuel consumption sooner.

It is critical that leaseholders are also engaged early and become aware of the opportunities and potential cost of retrofit works. It is likely that external wall insulation will be one of the opportunities to ensure apartments achieve a low heat demand. The service is aware that leaseholders may have a property asset but may also be on a limited income.

The delivery plan (appendix 1) is promoting the introduction of a number of policies aimed at providing customers with the communication and support they require to welcome retrofit and other capital and compliance works.

A no regrets approach to zero carbon

Through the greater use of the PAS 2035 approach to surveying homes and designing out problems the council will pursue a no regrets approach. This approach should benefit the service by avoiding issues such as damp and mould by designing these problems out pre investment. The service will need to take a no regrets approach including considering in more detail the large number of homes which are at risk of not achieving 50 kWh/m²/yr by 2050 or 2050. Selective disposal of some homes will pass the liability of some of the most expensive properties to retrofit to the private sector but

generate a capital receipt which will strengthen the business plan. The council's ambition is to grow its housing stock rather than dispose of properties will remain foremost when considering options for investment and disinvestment. Additional investment is the likely outcome for many homes. However, to invest in retrofit and new build zero carbon homes the selective sale of some homes following a clear appraisal process is part of a comprehensive asset management and investment strategy.

Although homes are built to last for many years and the council invests in capital programs to maintain them properties do eventually deteriorate with age. Some properties reach a point where the benefit of investment is outweighed by the benefit of demolition. SWT must now consider zero carbon retrofit alongside compliance and decency. The council has experience of demolish homes due to investment in the homes failing to achieve value for money and would not provide quality homes in terms of health or quality of accommodation. It is noted that the demolition and replacement by new build homes has a carbon impact as the carbon already captured in the existing building is lost and the carbon used to build a new home is incurred.

It is recognised that when disposing of a property the private sector may not invest in retrofit works however legislation and grant funding may be available to the private sector which the social housing sector cannot access.

Conclusion

The Strategy accompanied by its delivery plan will make a significant contribution towards reducing CO₂ from the district housing stock. Housing has a critical role in helping the council respond to the climate change emergency. SWT are setting through this strategy ambitious targets in relation to the retrofitting of its own homes. The three main targets are:

- 2030 SWT homes to be EPC C
- 2040 SWT to strive for a heat demand of 50 kWh/m²/yr.
- 2050 All homes to be Zero Carbon

Through the creation of zero carbon pathways for all of the Council's homes based on archetype studies and individual property assessments SWT has a blueprint to guide its investment over the next 20 years and inform customers of the changes their home are likely to undergo. In achieving targets the council believe it will reduce CO₂ by 9,144t pa and make fuel switch away from fossil fuel affordable to customers.

As data and technology improve so the strategy and delivery plan will need to adapt. To reflect the changing environment the strategy will be reviewed every five years as the council progresses towards zero carbon and the delivery plan will be reviewed annually to feed into the housing revenue accounts annual budget setting cycle.

The five main goals of the strategy and delivery plan are;

1. Tenants at the heart of zero carbon
2. All SWT homes to achieve EPC C by 2030 or have an alternative investment option identified. Our current estimation is c300 homes could miss the target.
3. Aim to reduce CO₂ and fuel consumption on average from 170kWh/m²/yr. to 50kWh/m²/yr. by 2040 through a 'fabric first' approach.
4. Replace fossil fuel in SWT homes with electric based heat and power by 2050 at a pace to ensure affordable energy for tenants and in line with available funds.
5. The investment remains affordable within the constraints of the Housing Revenue Account's annual, medium term and thirty year financial plans.

The estimated cost of delivering this strategy is £135m over twenty-eight years with half the cost in fabric measures (Insulation) and half the cost in fuel switch and renewable heat and power. The estimated costs does not include pre-works, any cost of decanting tenants, early replacement of components and works required as a result of damage or works to facilitate low carbon works. There are a large number of risks associated with delivery this strategy and its targets. If the Council is unable to mitigate these risks the costs and timescales to achieve targets will grow.

The strategy and delivery plan recognise that zero carbon is not affordable to the landlord under its current business plan and therefore it needs to;

- Align Decent Homes Standard improvements with retrofit programmes

- Maximise appropriate grant and subsidy
- Place tenants at the heart of zero carbon
- Ensure good data influences decisions
- Embrace a no regrets approach

SWT has developed this strategy with tenants. In particular, the Council has worked with tenants through the Low Carbon Retrofit Working Group. However, the strategy is also influenced by the Strategic Tenants Group, the Damp and Mould Working Group and the NTWP Works and Low Carbon Working Group. Engagement and communication with tenants is critical if SWT is to achieve zero carbon. Communication prior and during work programmes must be of a high standard and personalised to localities and customers need.