Carbon Zero Homes Project Final Report

*The **Carbon Zero Homes Project** aims to support households to make changes to existing buildings so that energy consumption and emissions are reduced, and your home is warmer, healthier and more comfortable.*

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SCAN ME

DATE: 26Jun24 **VERSION:** 1.1

REPORT TO: Carbon Zero Committee, Stoke Climsland Parish Council

REPORT FROM: Andy Nevill, Project Officer, Carbon Zero Homes Project

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1. ABOUT THIS REPORT

1.1 This is the final report for this project which was set up by the Carbon Zero Committee of Stoke Climsland Parish Council with the aim to support households to make changes to existing buildings so that energy consumption and emissions are reduced, and homes are warmer, healthier, and more comfortable.

1.2 The project is part of the parish response to the Carbon Neutral Cornwall Call to Action, in respect of "improving the energy efficiency of homes across Cornwall", and has been fully funded by the Community Levelling Up Programme (CLUP).

1.3 This report is structured around the generic indicator types for a project: inputs, process, outputs, perception, and outcomes. It should be read in conjunction with the two appendices (separate documents) and has been written with enough detail so that it is of some practical use for other parish councils and community groups who wish to support their communities in a comparable way.

2. BACKGROUND

2.1 Extracted from the UK Green Building Council's Home Retrofit report: "*The UK has one of the oldest and leakiest housing stocks in western Europe, possibly in the world. Yet 80% of homes that are lived in today will still be inhabited in 2050. Without urgent, nationwide action, our buildings will continue to waste precious, and increasingly expensive, heat as it leaks out of every uninsulated wall, roof, and door"* (UK Green Building Council, 2024).

2.2 63% of UK homes are below EPC 'C' (17 million). In order to achieve Net Zero targets the UK needs to deliver at least 5 retrofits per minute over the next 3 decades at a cost of £1 trillion (Department for Energy Security and Net Zero (DESNZ), 2024).

2.3 It is estimated to cost the NHS in the UK £2.5 billion a year to treat people affected by poor housing – significant factor: cold damp homes (bre Group, 2021).

2.4 Homes in the South West were more likely to have an EPC rating of F or G (6%) in comparison to all other regions (Department for Levelling Up, Housing and Communities, 2022). 80% of homes in the parish have an EPC rating of D or less. Most of the parish is off the gas grid. As with many rural communities, the housing stock is quite old (100-200yrs+) and there are lots of traditionally built properties with solid stone walls.

2.5 UK homes use 35% of the UK's energy and emit 20% of our carbon dioxide emissions (TrustMark, 2024). In 2020, our homes in Cornwall consumed 3,974 GWh of fuel. This represents 35% of the total energy consumed in Cornwall, and 21% of Cornwall's greenhouse gas emissions come from our homes (University of Exeter, 2023).

2.6 In a typical household, around 80% of energy use will be for space heating and hot water (Energy Saving Devon, 2024).

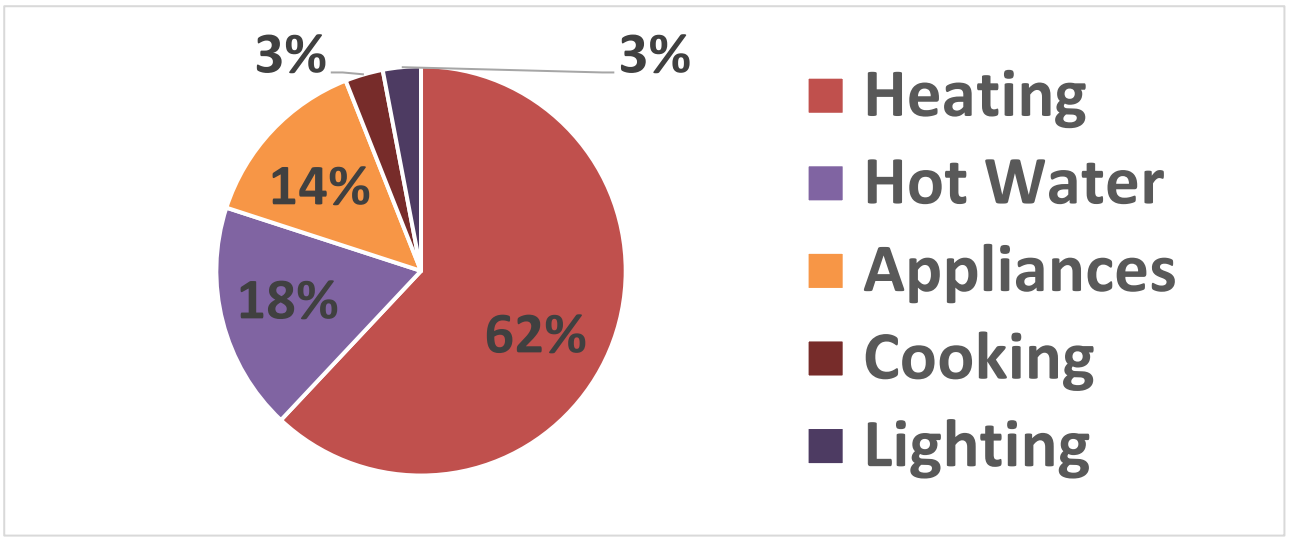

Figure 1: Typical household energy use.

2.7 OFGEM use Typical Domestic Consumption Values (TDCVs) to calculate the energy price cap and the energy price guarantee (Ofgem, 2024). The current 'typical value' for average energy use for a typical house (2-3 bedrooms, 2-3 occupants) is 14,200 kWh/year. Applying the ratios above, that equates to 8,804 kWh/year for space heating, 2,556 kWh/year for hot water, and 2,840 for appliances, cooking and lighting .

2.8 Perhaps the most important enabler that will need to drive improved decarbonisation and retrofit of buildings is public engagement and advice (Mission Zero Coalition, 2023).

3. TIMELINE

3.1 This project has been operational for 9 months (July 2023 – March 2024).

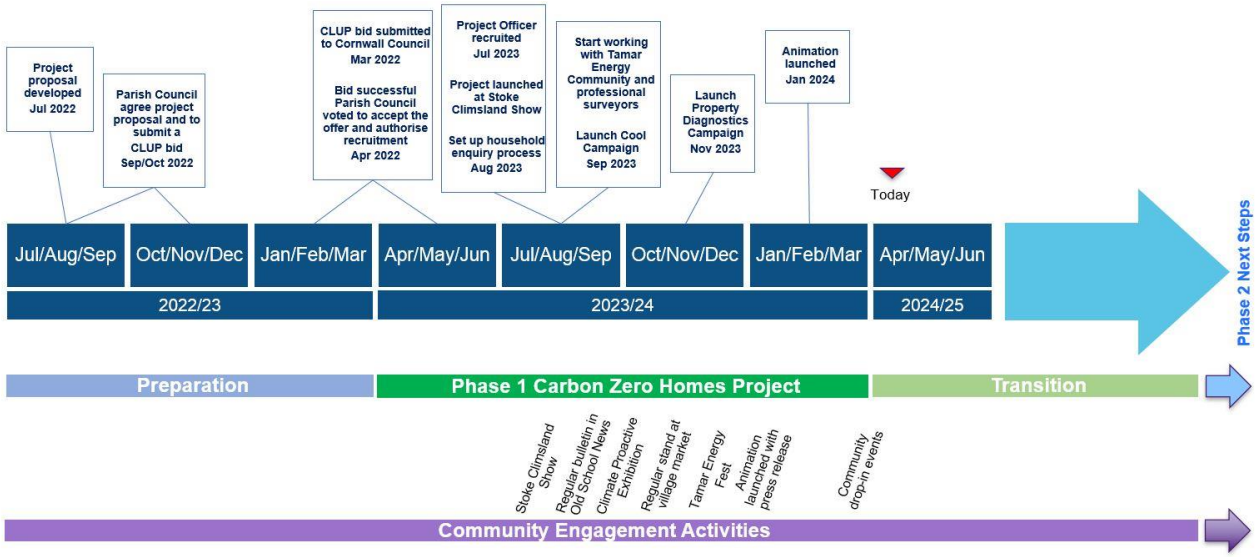

Figure 2: Project timeline.

4. TIMING

4.1 At 2023/4, it is reasonable to assume that this project is at the 'slow growth' stage of an S-curve adoption and activity model for domestic retrofit, moving into the 'take off' stage. This is with reference to *'Net Zero Whole Life Carbon Roadmap: A Pathway for the UK Built Environment'* (UK Green Building Council, 2021), and *'Greening Our Existing Homes'* (Construction Leadership Council, 2021, London). There are significant supply chain risks and capacity constraints which will have headwind impact on actual adoption and activity.

4.2 In the context of a wider UK effort and the stage this is at, this project is best described as a 'pathfinder project'.

5. INPUTS

5.1 The project has had the following inputs:

5.1.1 CLUP grant of £54,648.51.

5.1.2 Household contributions for surveys: £6,300.

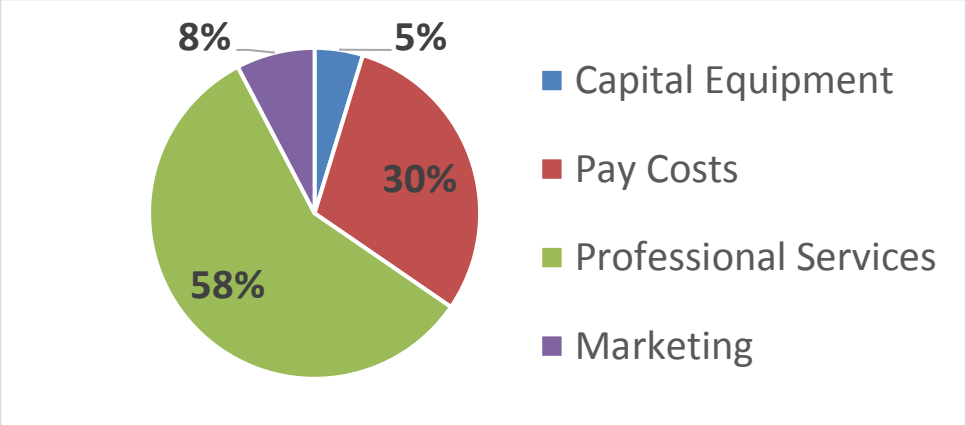

Figure 3: Allocation of funding.

5.1.3 Stoke Climsland Parish Council Carbon Zero Committee.

5.1.4 Project officer (part-time).

5.1.5 Parish clerk (part-time).

5.1.6 Tamar Energy Community (TEC) (professional advisor).

5.1.7 Professional services for property surveys provided by Two Counties Property Surveyors, Cornwall Council, MPA Plumbing & Heating Ltd, Dartmoor Energy Ltd, and Eco Nrg Ltd.

5.1.8 Professional services for the animation provided by Ruby Ingleheart and her team.

5.1.9 A professional grade thermal imaging camera purchased for the project (surveys).

5.1.10 Advice and support from various organisations, networks, and individuals, including but not limited to, Cornwall Council, Community Energy Plus, Stoke Climsland School, the Retrofit-in-Devon network, and UKGBC.

5.2 The is a Stoke Climsland Parish Council project for the local community, administered by them with delegation to the Carbon Zero Committee, which has effectively acted as the project steering group.

6. PROCESS

6.1 The following business models and tools were adopted:

6.1.1 Servant leadership: It has not been for this project to dictate what people [parish residents] should and should not do. It is also important to acknowledge that there are many households who are already taking action to improve the energy efficiency of their homes, and therefore the community itself is a body of knowledge. This has been a learning project, and aims to improve household knowledge about their own homes so that they are better equipped to make informed decisions – toward a destination of improved energy efficiency. This project has aligned with the servant leadership model.

6.1.2 Stages of Change Model: This project is informed by the Stages of Change Model, developed by Prochaska and DiClemente for applications in the health sector. This focuses on individual decision making, describes 6 stages of change, and can be adapted for non-medical applications. For this project, the 6th stage, relapse, is not particularly relevant – the figure below illustrates the 5 relevant stages.

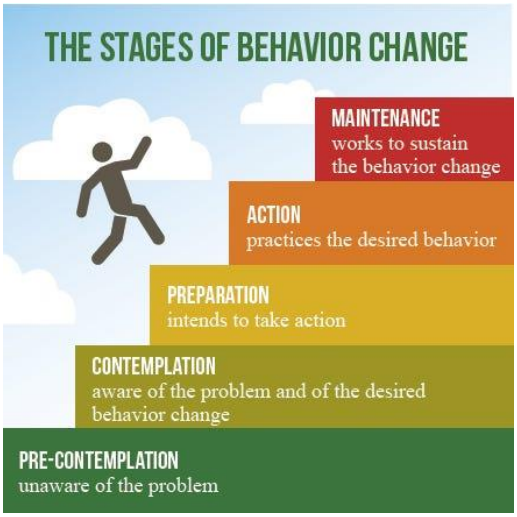

Figure 4: Stages of Change Model.

6.1.3 The theory of inventive problem solving (TRIZ): The TRIZ approach to problem solving has been sitting in the background. This methodology originated in 1946 by Soviet inventor Genrich Altshuller who observed that inventive solutions often resolve contradictions using specific, repeatable principles. The 40 TRIZ principles are a list of known solutions which can be used to solve problems.

6.2 The following professional frameworks were adopted:

6.2.1 PAS 2035:2023: is the British standard for retrofitting dwellings.

6.2.2 Coaching: a household's situation, their energy efficiency journey, and their motivations for acting all belong to them. The role of this project has been to facilitate and to build awareness and knowledge - this is coaching.

6.2.3 Plan-Do-Study-Act (PDSA): is a well-known widely adopted service improvement method. It is particularly relevant for this project due to the limited timescale and the need to rapidly innovate and deliver for parish residents.

6.3 Project activity can be grouped as follows:

- Community engagement
- Receiving and responding to queries
- Producing and providing information
- Building relationships and working with others
- Campaign programme
- Animation
- Project management and administration

6.3.1 Community engagement.

6.3.1.1 The project needed to gear up to be able to provide an 'event stand' for various community engagement events. This included having a banner, an outdoor gazebo, a display board, props, posters, a main project leaflet and other written material.

6.3.1.2 A raffle was organised for the launch of the project. This seeded the Cool Campaign (appliance energy monitors) and initiated a cycle of plan-do-study-act which led to the Property Diagnostics Campaign (surveys).

6.3.1.3 A process was required to produce a monthly bulletin for the project which was published in the parish newsletter (The Old School News) and used for other communication purposes.

6.3.1.4 It was decided to arrange a direct mail communication to all parish residents to publicise the project and the Property Diagnostics Campaign. This required a process to design and print a flyer and to send this out to c.700 household addresses.

6.3.2 Receiving and responding to queries.

6.3.2.1 An administrative process was required to receive and respond to queries and requests for advice and support.

6.3.3 Producing and providing information.

6.3.3.1 The Microsoft office suite of software was used to produce information, including Work, Excel, PowerPoint, and Publisher.

6.3.3.2 The parish council website was used to host a page for the project.

6.3.3.3 The parish newsletter, the Old School News, was used to publish monthly project bulletins and other articles.

6.3.3.4 Google forms was used to collect and help analyse feedback from households.

6.3.3.5 Quick response (QR) codes were generated for use in published material. This was used to direct people to information on the parish council website.

6.3.4 Building relationships and working with others.

6.3.4.1 There was an initial research process to gather information and key reports and identify who's who working in this space. Building relationships and working with others was an ongoing process throughout the project.

6.3.5 Campaign programme.

6.3.5.1 A campaign programme was established which enabled specific campaigns to be launched. The project ran 2 campaigns: i) the Cool Campaign, and ii) the Property Diagnostics Campaign.

6.3.6 Campaign programme – the Cool Campaign.

6.3.6.1 The Cool Campaign followed from the launch raffle which included issuing 15 appliance energy monitors as prizes. The campaign aimed to encourage households to check the energy consumption of their fridge/freezer.

6.3.7 Campaign programme – Property Diagnostics Campaign.

6.3.7.1 The Property Diagnostics Campaign was the result of two cycles of plan-do-study-act. Firstly, 3 retrofit surveys were provided as launch raffle prizes. The survey findings were reviewed, and feedback was obtained from households. This led to a pilot involving 3 more properties, with a particular focus on historic and traditional property considerations which was identified as being highly relevant due to the typical parish architype. As this progressed the campaign was named the Property Diagnostics Campaign which was expanded to include heat loss surveys and was launched across the parish.

6.3.7.2 The offer to households was up to three different types of survey:

- Retrofit assessment and whole house plan
- Heritage / Traditional Property Survey
- Heat Loss Survey / Heating System Assessment

6.3.7.3 The survey costs were subsidised by the project; the cost to the household was a flat fee of £150 towards the cost of the retrofit survey.

6.3.7.4 Due to capacity constraints and timescales, two additional companies were brought in to provide extra capacity for heat loss surveys.

6.3.7.5 As feedback was coming in, some households were saying that a follow-up session would be useful to help them make sense of their survey findings and to help them on

their retrofit journey. An offer for TEC to provide a follow-up session emerged from this and was sent out to all participating households.

6.3.7.6 Managing the property diagnostics campaign [for 45 clients] has been resource intensive. It is estimated that there have been between 15 and 20 interactions for each client – around 750 in total for the campaign. This excludes the direct interactions clients were having with surveyor(s). A system was required to log and track all these interactions and those with the surveyors.

6.3.7.7 Where quantitative feedback was collected, a Likert scale of 1 to 6 was used, where 1 = strongly disagree and 6 = strongly agree. Mean and standard deviation figures were calculated in order to interpret aggregated responses.

6.3.8 <u>Animation.</u>

6.3.8.1 A decision was made to create an animation. This is a specific aspect of community engagement. Producing this was a complex process, involving over 30 people organised into 3 teams, dealing with multiple deadlines. The whole process started with a written brief.

6.3.8.2 The creative and production team was managed by the animator.

6.3.8.3 A research team was assembled who were subject matter experts. This gave the animation authenticity and credibility. They were interviewed by the script writer and from that came the script which was then used to create a story board. The animation is then created from the story board.

6.3.8.4 A review team was also assembled. This was the largest team and were asked to review various material through an 'end user' lens. People were recruited both from within and outside the parish. The Retrofit-in-Devon network added peer-review to the process just before it was finalised.

6.3.8.5 A press release was issued to publicise the launch of the animation.

6.3.9 <u>Project management and administration.</u>

6.3.9.1 The parish council's Carbon Zero Committee acted as the steering group and due to the nature of the project needed to be agile. Additional committee and parish council meetings were required and there was a draw on Carbon Zero Committee expertise and resources.

6.3.9.2 Local government procedures were used for procurement.

6.3.9.3 The parish council clerk was responsible for financial matters and liaised with the CLUP team. Managing the finances was challenging because 3 different processes needed to come together: i) managing the project budget, ii) parish council cash flow and liquidity, and iii) processing retrospective CLUP grant claims. The project budget was relatively large compared to the parish council annual operating budget. This combination of issues became a serious risk to the project and the clerk had to request to submit an additional CLUP claim to maintain liquidity. Had that not happened, the project would not have completed to plan.

7. OUTPUTS

7.1 The outputs from the processes described above can be grouped as follows:

- Community engagement
- Receiving and responding to queries
- Producing and providing information
- Building relationships and working with others
- Campaign programme
- Thermal imaging camera
- Animation

7.2 <u>Community engagement.</u>

7.2.1 Key messaging was developed around the launch of the project and for the animation.

7.2.1.1 Households will have different personal motivations for improving the energy efficiency of their homes – retrofitting is the common unifying action. Personal motivations belong to households; this project did not judge or influence motivations, but it needed to find a way to articulate what they are. Three groupings for motivations were identified and a single word headlined each group. This was used throughout the project:

- **MONEY**: Supporting households to save money
- **HEALTH**: Supporting households to have warm, healthy, and comfortable homes
- **CLIMATE**: Supporting households to reduce energy consumption and emissions

7.2.1.2 There are 3 aspects to the key messaging communicated through the animation. Firstly: “create a plan”. Secondly: “have a holistic assessment [diagnostic] of your home”. Thirdly: “6 key considerations”:

- Understanding the underlying condition of a house itself
- Insulation
- Ventilation
- Heating a home
- Cooling a home
- The use of renewable and smart technologies

7.2.2 With reference to a behavioural insights project looking at householder engagement with retrofit (Local Government Association (LGA), 2023), some initial marketing was carried out to help build a picture of the situation within the parish.

7.2.2.1 Awareness of the use of 'retrofit' as a term was tested:

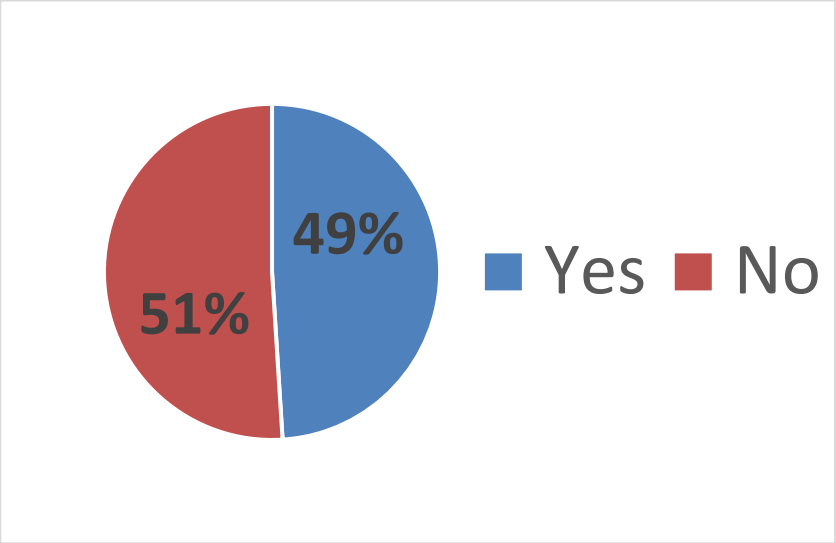

Figure 5: Have you heard of the term RETROFIT relating to home energy efficiency? (n=40).

7.2.2.2 Which of the following statements best describes your situation? (n=40)

- 47%: I have made energy efficiency measures recently, and I am planning to make more changes soon
- 18%: I am aware of the benefits of home energy efficiency measures, and I am planning to make changes soon
- 32%: I would consider making home energy efficiency measures at some point in the future
- 3%: I have made the home energy efficiency measures I wish to make
- 0%: I am not considering making any home energy efficiency measures

This indicates that a significant number of households are already taking action and that there is significant interest.

7.2.3 The project arranged and attended a number of community engagement events:

- Annual Stoke Climsland Show, 12th August 2023
- Climate Proactive Exhibition, 16th September 2023
- Stoke Climsland monthly market, September 2023 – March 2024
- Tamar Energy Fest, 11th November 2023
- Callington New Outlook group, 16th January 2024
- 'Hungry for Change' meal, 22nd February 2024
- Tamar to Moor Community Area Partnership (CAP), 7th March 2024
- Community drop-in events, 9th March and 13th April 2024

7.2.4 A parish-wide direct mailshot was released in January 2024 to promote the project and particularly the property diagnostics campaign. This was delivered to approximately 700 households. As a result, 14 (2%) enquires converted into clients for the property diagnostics campaign.

7.3 Receiving and responding to queries.

7.3.1 Over the operational period of the project, 101 queries were handled.

7.3.2 There were generally 3 types of response to queries: i) providing information on a topic, for example, heat pumps and solar PV, ii) signposting, for example, to an organisation or a grant scheme or a source of available information, and iii) recruiting into the property diagnostics campaign.

7.3.3 A coaching tool, nrg-Coach, was developed to help structure conversations with households and for home visits.

7.4 Producing and providing information.

7.4.1 For most topics there is a wealth of information available on-line, but there are multiple sources of information, and it is rare to find a comprehensive single source of information. For some topics, notably heat pumps, it can be difficult to find reliable truth.

7.4.2 Themes for enquiries started to emerge as they started to come in. This was used to prioritise the creation of written material. In no particular order, the topics for written material were as follows:

- Finding trustworthy installers
- Home upgrade grant
- Heat pumps

- Heating systems
- Hydrotreated vegetable oil (HVO)
- Plug-in energy monitors
- Improving historic and traditional buildings
- Solar PV and batteries
- Loft insulation
- Funding and grants
- Rogue traders and scams

7.5 Building relationships and working with others.

7.5.1 Tamar Energy Community (TEC) became a strategic and operational partner for this project, which on reflection was of critical importance. Not least this provided access to existing well established networks, for example, the Retrofit-in-Devon (RID) network. TEC also work closely with Community Energy Plus (CEP) who provide energy advice across Cornwall.

7.5.2 Also of critical importance were the relationships with the surveyors who were providing property surveys.

7.5.3 The health related aspects of retroffiting are important. The animation became the catalyst to develop relationships with health sector collaborators.

7.6 Campaign programme – the Cool Campaign.

7.6.1 This was launched to raised awareness about the energy consumption of appliances and to encourage households to check their fridge/freezer. Cooling appliances can consume a lot of electricity over the year and can be 'below the radar'.

7.6.2 This was a written campaign which was mainly promoted via the parish newsletter.

7.7 Campaign programme – Property Diagnostics Campaign.

7.7.1 This was the significant activity and output for this project.

7.7.2 45 households accepted the offer of subsidised property survey(s). The number of surveys which could be carried out was limited by a combination of budget, capacity and the project timeline:

- 45 x Retrofit assessment and whole house plan
- 20 x Heritage / Traditional Property Survey
- 20 x Heat Loss Survey / Heating System Assessment

7.7.3 Feedback from households has contributed significantly to the learning.

7.7.4 The campaign process was modified as a direct result of incoming feedback. Households were offered a follow-up with Tamar Energy Community to help them make sense of the information they have received from their property survey(s). This was in addition to any follow up they may be having directly with the surveyor(s).

7.7.5 Standard Assessment Procedure (SAP).

7.7.5.1 The reduced data Standard Assessment Procedure (RdSAP) is used to produce retrofit assessment and EPCs and is derived from SAP. It is known within the retrofit industry that this method does not properly deal with renewable technologies and combinations of renewable technologies – it can understate benefits. An update to RdSAP, V10, was due to be released in April 2024 but has been delayed until later in the summer. It is understood that this revision will deal with some of the shortfalls. In 2025 the SAP and RdSAP methods are due to be replaced by the Home Energy Model.

7.7.5.2 This became a risk for this project and whilst it was not possible to influence the root cause, it was possible to take some practical action to mitigate this risk. This action became a form of words which the retrofit surveyor included within the survey reports, as follows:

> ***Advice and Information on Renewable Technologies***
>
> *The methods used to produce retrofit assessment reports are prescribed by UK standards which are very comprehensive. However, these are not currently sophisticated enough to deal with all the opportunities for the use of renewable technologies.*
>
> *This is beyond our control, and in due course will be addressed by industry bodies and the UK government. In the meantime, please see below some more information on this issue.*
>
> *This particularly affects the modelling for heat pumps, which tends to underestimate the efficiency of heat pump systems. Also, it is not currently possible to model the complex interactions between a heat pump and other renewable and smart technologies such as solar PV, home batteries and smart electricity tariffs.*
>
> *Correctly installed and operated heat pumps can perform to a very high standard in UK homes. A heat pump used in combination with other renewable and smart technologies can maximise efficiencies.*

In the first instance, households should assume that a heat pump could potentially be a solution for their home, and then seek to confirm or reject this based on practical considerations and reliable information. This does require a bit of effort because heat pumps are often misunderstood, and there are many myths about them, spread on social media and via newspapers. Professional advice should be obtained from a MCS accredited designer/installer.

7.8 Thermal imaging camera.

7.8.1 A professional grade thermal imaging camera (FLIR E6-XT) was purchased in November 2023.

7.8.2 The retrofit surveyor used this as an additional feature for the retrofit surveys. Households engaged with the use of the camera during the surveys and thermal images were provided with the survey reports. Households were provided with thermal images with their survey report and feedback was collected.

7.9 Animation.

7.9.1 An early challenge for the project was 'how to describe whole house retrofit in simple everyday terms'. A search on-line discovered some animations, but these felt quite corporate and were, for example, aimed at recruiting. So a decision was made to create an animation for the project aimed at households.

7.9.2 Work on this commenced in October 2023 and the animation was launched 24th January 2024 with a press release. It was difficult to track media attention. BBC Radio Cornwall picked up the press release on 6th February 2024.

7.9.3 The animation can be viewed via the Stoke Climsland Parish Council website or You Tube (search: Carbon Zero Homes Project).

8. PERCEPTION

8.1 For this project, perception is a review of feedback. A feedback questionnaire was created using google forms and this was used to collect feedback from households who engaged in the property diagnostics campaign. Professional collaborators to the project were also invited to provide their reflections and feedback and a reflection was provided by the parish council's Carbon Zero Committee.

8.2 Feedback was received from all 45 households and one household submitted 2 responses (n=46). Quantitative feedback was obtained for a range of questions using a 6 point Likert scale, as follows:

Likert scale	Interval	Difference	Interpretation
1	1.000 – 1.833	0.833	Strongly disagree
2	1.834 – 2.666	0.832	Disagree
3	2.667 – 3.499	0.832	Slightly disagree
4	3.500 – 4.332	0.832	Slightly agree
5	4.333 – 5.165	0.832	Agree
6	5.166 – 6.000	0.834	Strongly agree

8.3 Household knowledge.

8.3.1 Households were asked to score whether they felt more knowledgeable about their homes following the survey. The response for each survey type is as follows:

- Retrofit assessment and whole house plan:

  Interpretation: **strongly agree** (mean score: 5.41; standard deviation: 1.01; n=46)

- Heritage / traditional property survey:

  Interpretation: **agree** (mean score: 5.10; standard deviation: 0.89; n=20)

- Heat loss survey / heating system assessment:

  Interpretation: **agree** (mean score: 5.05; standard deviation: 1.16; n=20)

8.4 Barriers to acting.

8.4.1 Households were asked to identify any barriers to acting. The top 5 barriers identified are as follows:

- Finding good contractors and trades: 63%
- High up-front costs: 50%
- Access to funding: 50%
- Disruption and hassle: 41%
- Competing priorities and pressures: 33%

8.5 Utility.

8.5.1 Households were asked to identify who the surveys would be most suitable and useful for. The top 4 choices are as follows:

- Anyone: 72%

- Little or no knowledge about their house: 37%
- Don't know where to start: 33%
- Knowledgeable homeowner – to help confirm what they think they know: 28%

8.6 Net promoter score.

8.6.1 Households were asked to score whether they would recommend their property diagnostics experience to others. This question and the response is as follows:

- I would recommend this to others:

Interpretation: **strongly agree** (mean score: 5.67; standard deviation: 0.69; n=46)

8.7 Sharing information.

8.7.1 Households were asked: "Would you be willing to share your experiences of improving your home with other residents?":

- Yes: 89%
- No: 11%

8.8 Stoke Climsland Retrofit Guide.

8.8.1 Households were asked: "Would you be willing to participate in the creation of the Stoke Climsland Retrofit Guide for yourself and other households – to capture and share learning from this project?":

- Yes: 59%
- No: 41%

8.9 Thermal imaging camera.

8.9.1 Use of the thermal imaging camera was successful in engaging households in the survey and provided additional information about their homes.

8.9.2 Households were asked to score whether this added value to the survey. This question and the response is as follows:

- I feel that the thermal imaging camera added value to the survey:

Interpretation: **strongly agree** (mean score: 5.78; standard deviation: 0.58; n=36)

8.10 Animation.

8.10.1 Feedback on the animation has been monitored since it was launched. This has been verbal feedback, and feedback from households was also received via the questionnaire.

8.10.2 Feedback received from professionals allied to energy efficiency and retrofitting has been very positive and the animation has been shared and adopted. For example it is being used at the beginning of meetings and events to help set the scene.

8.10.3 Feedback received from households is also very positive overall, including credit to the clarity of message about creating a plan and covering the 6 key considerations. Where there has been critical feedback this related to a view that it is too simplistic for people who would consider themselves already knowledgeable. Also, some people did not like animation, and some felt that the animation was aimed at younger generations and therefore did not appeal to them.

8.10.4 This feedback has helped to confirm that the animation is targeting people at the initial stages of the Stages of Change Model as well as providing an overview and important key messages for more seasoned households.

8.11 Critical reflections and feedback from professional collaborators.

8.11.1 Tamar Energy Community.

Tamar Energy Community (TEC) is delighted to have had the opportunity to work with Andy and the team on the Carbon Zero Homes Project. We feel you should be very proud of what you have achieved, and for courageously pursuing the concept from the initial idea to a funded reality. Our challenge now, at TEC, is to support the work undertaken through maintaining links to support into the Stoke Climsland community; and encourage those surveyed to continue through to implementation of improvements.

In particular, being able to get across to households the importance of having a plan, and seeing the improvement path as a journey to be factored in to spending decisions is very important; and the animation helps bring this across.

We welcome those households who have been involved in the project so far to keep in touch; and others within the community can get in touch if they have an interest in a retrofit advice visit.

8.11.2 Two Counties Property Surveyors.

It was a real pleasure to be involved in a project that was both community led and one in which the community actively participated.

As a Retrofit Assessor mainly involved in working under various Government Grant Schemes, my role is often limited to recommending those particular Energy Efficiency Measures that are under the current funding schedules. Working with the Carbon Zero Homes Project has allowed me the freedom to unleash the full potential of Retrofit in that all Energy Efficiency Measures can be considered and included as appropriate.

Working alongside, and in consultation with the Historic Buildings professional and the Heat Pump 'Guru' has been a revelation for me in terms of my Personal Professional Development, enhancing my technical knowledge and developing my awareness of alternative and sustainable/traditional methods of insulation.

The project has also highlighted, in my opinion, the negative effect/impact that legislation regarding listed buildings and dwellings situated within Conservation Areas has on upgrading this type of housing stock to be more energy efficient. My concern is that with so many barriers imposed (for understandable reasons) these historic properties may actually suffer as a result of unaffordable heating systems that are often underemployed due to cost of fuel/electricity, leading to a decline in the building fabric of these precious homes. A more pragmatic approach to the installation of renewables and upgrades such as sympathetic double glazing to replace poor and inefficient single glazing (not historic glazing) that often requires (and doesn't receive) extensive maintenance could go a long way to ensuring the longevity of these properties.

My advice to those households moving forward would be to take full advantage of the help offered by T.E.C, formulate an affordable structured whole house plan, and work slowly toward achieving your aims, and remember to ventilate!

8.11.3 Cornwall Council (Historic Environment).

I thought adding a heritage/traditional property survey for the historic buildings was a positive addition to the whole house plan and heat loss survey/heating system assessment. It highlighted what was significant about the building, what repairs needed to be carried out prior to any retrofitting and how the building could be upgraded without damaging it's character. All reports were agreed in principle by the Council's Historic Environment Planning Team which should help future listed building consent or planning applications.

The thermal imaging carried out as part of the whole house plan was really useful and showed clearly where the cold spots where. These were often on window reveals and north facing elevations. Repairs were often needed on south westerly facing elevations on account of the prevailing wind. The importance of improving existing rain and surface water discharge systems and the need for increased controlled ventilation came up regularly.

Historic buildings differ in construction and orientation and a holistic assessment is needed. A number of buildings had solid original walls with extensions in cavity blockwork which

required different methodologies for upgrading them. Some already had internal dry lining and some had hard cement pointing and external render which was preventing the solid walls from breathing. Other buildings had poor quality modern alterations that could be replaced with better quality more efficient options. Suitable methods to upgrade the buildings all differed and highlighted that a' one solutions fits all' approach is not possible.

The feedback from homeowners on the completed reports was really encouraging with a high proportion of homeowners feeling that they were more knowledgeable about their building and intended to carry out recommendations in the reports.

The three reports gave a comprehensive summary of issues and opportunities. Although they were separate, rather than combined, reports there were no major conflicting issues. I think the project is a great reference and pilot for other towns to take on a similar approach.

8.11.4 MPA Plumbing & Heating Ltd.

It was a pleasure being involved with this project. It was a good way to inform and educate home owners about the importance of having a good heat loss assessment of the property so that their heating system can be designed properly. A good installer will always do this.

When homeowners are engaging with installers they should ask the following questions. How will you design the system so that it is as efficient as possible? What controls will you use and why? How can you get the flow temperatures as low as possible?

A good source of information is the Heat Geek website and YouTube channel.

8.11.5 Eco Nrg Ltd.

Main reflection, that I see most days or many occurrences, in my experience two most common points of 'contention' when we are specifying heat pumps, and both have been mentioned in this report.

Both are linked to operation and performance, and both have a negative effect on SCOP (Seasonal Coefficient of Performance) and running costs. Firstly, failure to take necessary steps to combat the inevitable 'lower flow temperatures from heat pumps' in systems that have been designed for fossil fuel heat sources. Secondly, usage 'like a gas boiler' – not giving the heat pump time to create enough heat to satisfy a current heating system.

Problems rise from three facets of the installation process, which are the clear responsibility of the Renewables engineer. We must combine three things relating to heat pump specification. Firstly, reinforce the lower flow temperature performance and cover incorrect specifications. Secondly, correct installation. Thirdly, and most importantly, communicate the best way of customer usage and operation with as little client setting changes as

possible. If we fail in any of these 3 principles it lets down a tried and tested, reliable technology of Ground Source & Air Source technology, allowing the spread of bad news circulating about heat pumps and not the success story there should be.

Specify it correctly, Install it correctly, Use it correctly.

I agree with the consensus of opinion about the difficulty of customers sourcing good responsible MCS Certified installers and see the lack of quality engineers being partly down to knowledge, opportunity, and training within the industry.

The current Quick fix to MCS Certification and Umbrella schemes through the supply chain where inexperienced heating installers can buy Registered products and have installations Certified, in my opinion is not the answer and may be adding to the number of poor installations, who knows?

8.11.6 Dartmoor Energy Ltd.

The homeowners we visited seemed to know very little about the Retrofit world. Most of the residents had heard horror stories about poor insulation and heat pump installations via the media, so thought they weren't possible. During the survey the HOs were engaged and interested in what was going on. The HOs had lots of questions about the systems and how they would interact with their property. After discussing everything and answering their questions, I felt that the HOs understood far more. They were more interested and open to the idea of installing carbon reducing measures to their property.

8.12 Critical reflection from Stoke Climsland Parish Council Carbon Zero Committee.

Stoke Climsland Parish Council and its Carbon Zero Committee are intensely proud of this project. For a small parish council to successfully bid for Community Levelling Up funding and then to deliver the project is an achievement in itself, especially as the value of funding was close to £55,000 and a 99% spend, retrospectively, on a precept of £30,500 required some careful management of finances. This included carrying the VAT on purchases for almost the full term of the project.

Many councils signed in to the Climate Emergency but Stoke Climsland has also taken positive action in encouraging households to aim for Carbon Zero through this project.

The Carbon Zero Committee is a split of councillor and resident input administered by the clerk. The project officer had the responsibility for the delivery while the council was the vehicle for managing the project.

9. OUTCOMES

9.1 Outcome indicators measure the long-term goals achieved. For this project the best outcome indicator would be the actual energy efficiency improvement as a result of project interventions.

9.2 This project has no control over what improvement work is actually carried out following surveys and other interventions. The project timeline is much shorter than a typical retrofit project timeline, which could be multiple years and could be as long as 15 or even 25 years. Also, the method used by the government for assessing energy performance of a property, the Standard Assessment Procedure (SAP), is changing. Some households have provided feedback on the measures they have and intend to carry out, but evidence of outcome would require a rerun of the survey.

9.3 So whilst it is not possible to measure actual outcomes, it has been possible to identify two proxy indicators for outcomes: i) potential energy performance improvement, and ii) propensity to act.

9.4 <u>Potential energy performance improvement.</u>

9.4.1 Currently, the energy performance of a property is calculated using the SAP. This is then used to produce energy performance certificates (EPCs) which translate a SAP score of 1 to 100 into a scale from A (extremely energy efficient) to G, (extremely inefficient). For reference: A = 92-100; B = 81-91; C = 69-80; D = 55-68; E = 39-54; F = 21-38; G = 1 - 20 SAP points.

9.4.2 For the properties surveyed, the EPC ratings were as follows:

- EPC rating of between F and B
- Average EPC rating: E

9.4.3 The number of improvement measures identified for a property ranged from 2 to 11; the average was 6.7 and median was 7.

9.4.4 If all the improvement measures identified were carried out the properties would have improved EPC ratings of:

- EPC rating of between E and A
- Average EPC rating: C

This is the theoretical ‘best case’. Scores improved by between 2 and 50 SAP points; the average improvement was 20 SAP points.

9.4.5 In 2025 the SAP method is due to be replaced by the new Home Energy Model, which will be used to assess compliance with the Future Homes Standard. This aims to provide more accurate assessments of energy efficiency and carbon emissions (GOV.UK, 2024). The assessments should also provide information as to what improvement work is possible given the age and type of property.

9.5 Propensity to act.

9.5.1 Households were asked to score whether a survey had encouraged them to act. The propensity to act for each survey type is as follows:

- Retrofit assessment and whole house plan:

  Interpretation: **strongly agree** (mean score: 5.22; standard deviation: 1.16; n=46)

- Heritage / traditional property survey:

  Interpretation: **agree** (mean score: 4.85; standard deviation: 1.01; n=20)

- Heat loss survey / heating system assessment:

  Interpretation: **agree** (mean score: 4.85; standard deviation: 1.01; n=20)

9.6 It is reasonable to conclude that it is highly likely that the project will influence positive outcomes (actual energy efficiency improvement). A longitudinal study would be required to capture evidence of this.

10.KEY MESSAGES AND LESSONS LEARNED

10.1 Plain English.

10.1.1 The energy efficiency and retrofitting landscape is very complex to navigate and is full of technical jargon and reports which require interpretation. This project quickly recognised the importance of using plain English in order to communicate and engage with households.

10.1.2 We all have our own learning and communication styles and preferences. For example, some people may prefer talking through an issue, some may prefer the written word, and some may prefer looking at pictures, diagrams, and graphs. To some extent these preferences are evidenced through the feedback provided by households on their survey experiences and reports.

10.1.3 This project has adopted various methods of communication in an attempt to appeal to different learning and communication styles and preferences.

10.2 Using imagery.

10.2.1 Imagery was used where possible to help communicate key messages.

10.2.2 For example, an image of a mackerel (Local Government Association (LGA), 2023) was used to communicate the desirable thickness for loft insulation. The average length of a mackerel is 27cm. This has been effective because people remember the mackerel.

10.2.3 The animation was a mix of visual imagery, the spoken word, and the written word (sub-titles). The main character is a crab – which is memorable. Similarly, a successful advertising campaign is still in operation using a meerkat, which is not otherwise normally associated with insurance.

10.3 The importance of feeling safe.

10.3.1 Home and property owners need to feel safe when engaging with retrofit related activities.

10.3.2 Rogue traders and scams are actively targeting households in the area of energy efficiency, and this has the attention of trading standards offices who have issued warnings about rogue traders offering to do unnecessary work, for example, on solar PV installations and spray foam insulation. This project has established a safe 'front door' for households.

10.3.3 The barrier identified by the highest number of people providing feedback was 'finding good contractors and trades'. This relates to supply chain capacity, trust, and confidence.

10.3.4 Householders who are knowledgeable and informed about their homes will have very limited direct impact on supply chain capacity constraints, but they will be better equipped to have positive experiences with contractors and trades when that becomes possible. Ideally, they need to be an 'informed client', which means having enough knowledge to feel confident about asking contractors and trades the right questions.

10.3.5 It was well beyond the capabilities of this project to establish a quality assurance process which could result in recommending specific contractors and trades. Instead, recognised good practice was adopted, which is to refer households to TrustMark, the only Government endorsed scheme aimed at doing this.

10.4 CLUP administration.

10.4.1 The CLUP team should note the financial challenges experienced by this project and the risk this created. It was very [too] late into the project that Cornwall Council (who were managing the CLUP scheme) provided information on an option for the parish council to obtain bridging funding. The procedures for administering claims should be reviewed in light of this.

10.5 Decouple diagnostics from intervention.

10.5.1 This project has shown the value of decoupling property diagnostics from carrying out energy efficiency measures.

10.5.2 This is an application of the TRIZ principle 'segmentation' - divide an object into independent parts. This concept of decoupling is applied elsewhere, for example, in the NHS there are diagnostic centres and treatment centres.

10.5.3 The property surveys were carried out with the sole aim of equipping households with information about their homes. The surveys were not biased towards any specific intervention and were not part of a process to sell products and services. There were no conditions on how households then choose to use this information.

10.5.4 This is a challenge for heat loss surveys because these are usually built [coupled] into the process of quoting for and supplying new heating systems. The cost of this is therefore built into that process and is not very visible to the customer.

10.6 Targets need to be process-driven.

10.6.1 For a household to aim towards a blunt blanket target for energy efficiency is not practical nor achievable, for example, for all properties to reach an EPC rating of C or better by 2030.

10.6.2 Every home is unique, and it would be far better to support households to go through a robust process to enable them to create an optimised retrofit plan which is the best plan for them, and their home based on its location and construction.

10.6.3 It would be beneficial for wording used to communicate targets to centre around 'having and progressing a plan'.

10.7 Moisture and ventilation.

10.7.1 The control of moisture and ventilation should be up front and centre stage for household retrofitting. The retrofit surveys for 81% of households contained recommendations relating to ventilation. This relates to a basic understanding of building physics.

10.8 Heat pumps.

10.8.1 The tabloid press and social media channels have been very successful at spreading anxiety and misinformation about heat pumps. There is no shortage of horror stories about defective heat pump installations and disgruntled households. Equally, the energy intensity benefits of a heat pump (the amount of electrical energy required to heat a home and provide hot water) are poorly communicated. Lots of people will have an opinion on whether or not a heat pump is right for them, but it is highly unlikely that this is based on the findings from a good objective survey for their property. The words 'heat pump' invoke instantaneous emotional reactions.

10.8.2 Poor installations undoubtedly exist, and the main root causes for poor performance and household dissatisfaction are poor design and/or installation and problems with how a heating systems is used (it is not a gas boiler!).

10.8.3 The process of evaluating the suitability of a heat pump for a property would be useful for most households, regardless of whether that process ends up with a plan to install a heat pump or not. This is because it could help to inform households about how to optimise their existing heating, the significance of 'low flow temperatures' (regardless of boiler type), how to upgrade their heating system in manageable stages over time and the extent to which additional insulation is actually required to reduce the heat load of the property.

10.8.4 This project has identified interest in having local activities and action on the topic of 'truth and myth' about heat pumps. This would help to better equip households with reliable information about heat pumps so that they can apply this to their own situation. With a typical household using 80% of their energy on heating and hot water this has to be a significant topic for future community-wide conversations and this topic should be on the radar for all communities.

10.8.5 'Low flow temperature heating system' is jargon, and the words 'heat pump' invoke emotional reactions. It would be better to use the term 'efficient heating system', or similar, when engaging with households.

10.8.6 Installing an efficient heating system with a heat pump could be the single largest step a household can take to reduce carbon emissions while also saving money on energy bills.

10.9 Whole house energy demand.

10.9.1 For retrofitting, a whole house approach is advocated, but the methods adopted to assess the current and potential energy demand for a property are currently far from systematic.

10.9.2 For a domestic property, it is commonplace for 'energy demand' and 'reducing energy demand' to be associated with the fabric performance of the property and fabric improvements. And it is entirely sensible to reduce heat loss through fabric improvements to a practical minimum, not least to minimise the size of the heating system required. It is currently much less commonplace for the energy intensity benefits of an efficient heating system to be considered in the context of assessing and reducing the overall energy demand.

10.9.3 For a typical household, around 80% of energy use will be for space heating and hot water (Energy Saving Devon, 2024). So the efficiency of the heating system will have a major impact on the overall energy demand for a property.

10.9.4 For a typical household, replacing a fossil fuel fired boiler with an air source heat pump can result in a reduction in their overall annual energy demand of at least 61%. This is calculated as follows using typical figures for a gas fired combi boiler.

10.9.5 A gas fired combi boiler typically operates at 83% efficiency (Alsop, 2020). An air source heat pump typically operates at between 300% and 400% efficiency (Alsop, Best air source heat pumps and set ups, 2020). This figure for heat pumps is increasing as installations are improving; typically 300% to 500% (Dartmoor Energy, 2024). A figure of 350% is assumed for this calculation.

10.9.6 Table 1 below shows figures for a typical household, consuming 14,200kWh/year (Ofgem, 2024). They are using a gas fired combi boiler operating at 83% efficiency, so the annual heat demand for space heating and hot water would be 9,429 kWh/year. The energy consumed by the boiler to provide this heat is 11,360 kWh/year.

GAS BOILER	Energy Demand [kWh/year]	Energy Demand [%]	Heating System Efficiency [%]	Heat Demand [kWh/year]
Whole House	14,200	100%		
Appliances, cooking and lighting	2,840	20%		
Space Heating and Hot Water	11,360	80%	83%	9,429

Table 1: Energy and heat demand for a typical household with a gas fired combi boiler.

10.9.7 Table 2 shows figures for the same property with the same heat demand of 9,429 kWh/year, and the same consumption for appliances, cooking and lighting, but with an air source heat pump installed operating at 350% efficiency. It is assumed that there are no additional fabric improvements, which if carried out would further reduce the heat demand.

AIR SOURCE HEAT PUMP	Energy Demand [kWh/year]	Energy Demand [%]	Heating System Efficiency [%]	Heat Demand [kWh/year]
Whole House	5,534	100%		
Appliances, cooking and lighting	2,840	51%		
Space Heating and Hot Water	2,694	49%	350%	9,429

Table 2: Energy and heat demand for the same typical household with an air source heat pump.

10.9.8 The property would now use only 2,694 kWh/year to produce the same amount of heat. The heat pump would be consuming 2,694 kWh/year of electricity to extract energy from the surrounding air – to pump 9,429 kWh/year of heat into the house.

10.9.9 Therefore, to provide the same amount of heat, the air source heat pump is consuming 8,666 kWh/year (76%) less energy compared with the gas fired combi boiler, which equates to an overall reduction of 61% in the annual energy demand for the property.

10.9.10 As consumers, we pay for the energy we use, not the heat produced by our heating systems. This is highly relevant for households as the ratio of electricity-to-gas prices continues to fall (Nesta, 2023). At the time of producing this report, the average standard unit rates for the South West were 24.21p/kWh for electricity and 6.33p/kWh for gas (Ofgem, 2024) – a ratio of 3.83. Therefore, using these rates for the example above, the annual cost for space heating and hot water would be £719.09 with the gas combi boiler and £652.20 with the air source heat pump, excluding standing charges of 67.19p/day for electricity and 30.97p/day for gas. If it is possible to stop using gas altogether and remove the gas meter, the annual standing charge of £113.04 for gas could also be saved.

10.9.11 For properties using oil and solid fuel fired boilers, the energy demand reduction will tend to be better because these boilers tend to be less efficient than a gas fired boiler. Also, the unit cost of oil and coal is higher than natural gas, which increases the cost savings.

10.9.12 A systematic whole house approach to assessing and reducing energy demand should be adopted and there are opportunities to improve how households are

informed and educated about this. Again, this relates to a basic understanding of building physics.

10.10 Insulation should be 'suitable and sufficient'.

10.10.1 At a practical level for households there are problems with the terminology 'fabric first', which is an aspect of the PAS 2035 standard. The reason for this relates to the extent to which a property needs to be insulated for it to be suitable for an efficient heating system, particularly a heat pump based system.

10.10.2 It is a myth that a property needs to be thoroughly insulated before a heat pump (or any other type of boiler) can be installed. Evidence exists, including within the parish, of efficient and effective heat pump installations in properties with solid stone walls with little or no wall insulation.

10.10.3 A traditionally built Cornish cottage with solid stone walls is a very common architype within the parish and many households will not be able to or want to install external wall insulation (EWI). Internal wall insulation (IWI) can also be very difficult to install properly and may not be possible or desirable – not least it affects the way that a property performs in terms of storing and radiating heat (its thermal mass), and can create unintended problems with moisture unless great care is taken with the choice of materials and installation.

10.10.4 For most properties, insulation improvements including windows, doors and loft spaces and dealing with uncontrolled ventilation (too much or too little) would be very sensible, but the challenge for households is deciding how far to go with floor and wall insulation. Costs for floor and wall insulation can be very high, installation can be very disruptive, and it is difficult to find out about embodied carbon costs. Cavity wall insulation (CWI) can be effective, but needs to be properly indicated, specified, and installed to avoid moisture related problems. CWI may not be appropriate for weather-exposed walls, particularly those subject to driving wind and rain.

10.10.5 A pragmatic approach is required for insulation and the law of diminishing returns applies to all insulation (Nesta, 2024). Insulation should be suitable and sufficient, and the priorities, motivations and needs of individual households and the practicalities of their homes and circumstances should be properly considered, i.e., it should be situational in application.

10.10.6 It is recommended that future revisions of PAS 2035 should include the wording 'suitable and sufficient' with respect to insulation and should consider the unintended consequences of the term 'fabric first' which is now widely used.

10.11 Limitations of the SAP and RdSAP.

10.11.1 Regarding the limitations of the SAP and RdSAP, and in the intervening time while SAP and RdSAP methods are being replaced by the Home Energy Model, there is an opportunity for retrofit assessors and domestic energy assessors to alert households about what may not be properly communicated via their survey report and/or EPC certificate.

10.12 Radon.

10.12.1 There is scant information about radon within the retrofitting landscape. Radon is a naturally occurring radioactive gas that is present in all homes in varying degrees and is the major source of ionising radiation exposure to the UK population. Households with elevated levels of radon are advised to take remedial action in the home. Large parts of Cornwall are defined as radon affected areas and all households living in the parish should be aware of the risks of radon (UK Health Security Agency, 2024).

10.12.2 Most remedial action to reduce indoor radon levels is to do with ventilation (Department for Environment, Food and Rural Affairs (Defra), 2004). Retrofitting is an opportunity to also reduce the risks associated with radon in the home, and the converse is true. Radon protection measures include installing radon sumps, sealing gaps and cracks in floors, improving ventilation under suspended timber floors, installing positive input ventilation, and improving poor ventilation.

10.13 Futurology.

10.13.1 More work needs to be done to inform households in plain English about trends and influences which together will shape the future situation they could find themselves in. The information is available, for example, UKGBC maintain a solutions library (UK Green Buildings Council, 2024). This is about throwing some light on unknown unknowns (for households). Having an eye on the future will be helpful for households who are developing their plans.

10.13.2 For example, Government-led structural changes; how the electricity grid is de-carbonizing; the electrification of domestic heating; the growing significance of ‘time of use’ tariffs; the impact of falling electricity-to-gas price ratios; the use of natural and sustainable materials; and, how the financial sector is innovating.

10.13.3 A PESTLE analysis could be used to do this, which studies key external factors and trends under the following headings: political, economic, sociological, technological, legal, and environmental.

10.14 National grant scheme for property diagnostics.

10.14.1 The grants and funding landscape is complex and constantly changing. Government grant schemes are generally means tested and target the least energy efficient properties.

10.14.2 This project has identified the merits of decoupling diagnostics from intervention.

10.14.3 Households who would not generally meet the eligibility criteria for grant schemes as they are currently structured would benefit from a new type of grant scheme which would be designed to subsidise the cost of property diagnostics. The purpose of such a scheme would be to uplift household knowledge and curiosity about their homes and their options – so that they become 'informed clients'.

10.14.4 This project has identified significant propensity to act following property diagnostic activities for the project cohort of households. Feedback from households identifies 72% of responses indicating that survey interventions would be suitable and useful for 'anyone'.

10.15 The ideal intervention.

10.15.1 This project has engaged with different surveyors and survey methods to provide households with property diagnostic information about their homes. The surveys are broadly 'off the shelf' and there is some overlap between them.

10.15.2 A key question to ask is: *what would be the specification for the 'best' survey intervention?*

10.15.3 From what we have learnt from this project, this would be a survey process with the following headings:

- underlying condition
- moisture and ventilation (option: heritage assessment)
- efficient heating system assessment

10.15.4 Underlying condition would include a damp survey.

10.15.5 Moisture and ventilation would cover general traditional building considerations, for example performance and considerations for solid walls, and there would be an option for a heritage assessment for listed properties and those within designated protected areas.

10.15.6 The efficient heating system assessment would address the question, 'what is the best heating solution for this property'. Requirements for fabric improvements to reduce space heating demand would be derived from this, together with cooling and affordability considerations and opportunities for interacting renewable and smart technologies.

10.15.7 The next key question to ask is: *how could this best be delivered?*

10.15.8 This would be a generic retrofit advice visit, followed by specialised surveys as required.

10.15.9 A retrofit advice visit would be arranged by a retrofit advisor, who would scope the extent of the challenge and determine what support would be appropriate for the householder. They would provide help with navigating the complex retrofit landscape and at this stage the householder could be directed into grant funding or an active support scheme, for example, to improve insulation. Key defect areas would also be identified, for example, with ventilation, vegetation and moss management, and the adequacy of rain water drainage.

10.15.10 This would be the first step of a triage process and after directing the householder to solutions straight away, the retrofit advisor could then advise on arranging more specialised surveys and assessments as required. The retrofit advisor could also inform prospective surveyors and assessors on the nature and the scale of the challenge.

10.15.11 The measurement of property dimensions, floor plans and the collection of construction details could be done just once to a recognised industry standard which could then be used for any subsequent survey and design work.

10.16 <u>Action on key findings and lessons learned.</u>

10.16.1 This report will be presented to Stoke Climsland Parish Council by the council's Carbon Zero Committee and the council will choose to take action as appropriate. The report is also available for any onward opportunities for the council to share findings and learning from the project.

10.16.2 This report will be circulated to all the households who participated in the property diagnostics campaign, which may help them with their plans and any future action.

10.16.3 This report is also available for all other residents, and there are plans to produce a Stoke Climsland Retrofit Guide for parish residents, which will contain relevant information from this report.

10.16.4 This report has been produced with input from the professional collaborators, including Tamar Energy Community and the property surveyors. They will choose to take action as appropriate.

11.ACKNOWLEDGMENTS

11.1 It has been a pleasure and a privilege to work with households who have engaged with this project. There is such a wealth of knowledge within our community, and a healthy appetite to improve it. Thank you and good luck to everyone!

11.2 Thank you to Kate Royston and the team at Tamar Energy Community – who's support has been critically important for this project.

11.3 The surveyors who have supported this project, and their colleagues who have worked with them, together have an enormous wealth of knowledge and experience and have gone the extra mile. Thank you to Paul Willingham, Andrew Richards, Mat Acaster, Nathan Brown, Rob Tapson, James Fortune and Dan Kelly.

11.4 Thirty+ people generously gave their time and expertise to help create the animation. The gifted production team was led by Ruby Ingleheart and the animation was written by Jamie Lock. Collaborating were Tamar Energy Community, Two Counties Property Surveyors, Cornwall Partnership NHS Trust and Tamar Valley Health.

11.5 Past and present members of the parish council's Carbon Zero Committee have provided the steering group for this project and stepped up to deal with a number of challenges. They had the vision for this project and their work started back in July 2022. They represent the energy of all the volunteers in this community who are motivated to make things happen for the benefit of the community.

11.6 Children from Stoke Climsland School helped out with launch of this project and created 3 wonderful puppets, which have made an appearance at numerous events. This project is for them.

11.7 Without the funding from the Community Levelling Up Programme, which was granted to the parish council, this project would not have happened.

12.ESSENTIAL READING LIST

12.1 Well over 100 sources of information have been identified and used throughout this project. From these, the following 3 reports have been selected for an essential reading list for households.

12.1.1 **Energy Saving Devon. (2024, March 11).** ***The Devon retrofit guide.*** Retrieved from Energy Saving Devon: https://www.energysavingdevon.org.uk/document/devon-retrofit-guide/

This is a comprehensive practical guide which was published in 2023 with input from a very wide range of knowledgeable organisations and individuals, including Tamar Energy Community. It targets a gap in the guidance available for the competent DIYer through to the trades and professional services, and the housing types featured are relevant for this parish.

12.1.2 **Richards, A., & Smith, P. (2014).** ***Improving Energy Efficiency in Historic Cornish Buildings.*** Truro: Cornwall Council. Retrieved from https://www.cornwall.gov.uk/media/bpedqi4m/improving-energy-efficiency-in-cornish-buildings.pdf

This report provides practical information on considerations for traditionally built and historic buildings, including information on the use of natural and sustainable materials and on permissions for buildings with restrictions. Although published 10 years ago, it is still relevant, and is currently in the process of being updated. The lead author has provided the heritage property surveys for this project.

12.1.3 **TrustMark. (2024, March 11).** ***A guide to retrofitting your home.*** Retrieved from TrustMark: https://www.trustmark.org.uk/homeowner/information-guidance/retrofit-your-home

This is a good general guide including information on the retrofitting process and how to find contractors and traders. TrustMark is the only UK government-endorsed quality scheme for work carried out in and around the home.

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